COUNTY OF EL DORADO, CALIFORNIA
CHIEF ADMINISTRATIVE OFFICE
PROCUREMENT AND CONTRACTS DIVISION
solicitation on behalf of the
FACILITIES DIVISION

REQUEST FOR BIDS

INCLUDING

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, PROPOSAL, CONTRACT, AND CONDITIONS OF THE CONTRACT

FOR

SHAKORI GARAGE REPLACEMENT

BID #22-968-062

BIDS MUST BE RECEIVED BY:
2:00 P.M. (PACIFIC TIME) on AUGUST 25, 2022
THROUGH QUEST CONSTRUCTION DATA NETWORK

COUNTY OF EL DORADO
CHIEF ADMINISTRATIVE OFFICE
FACILITIESS DIVISION

SHAKORI GARAGE REPLACEMENT

BID #22-968-062

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TAHOE REGIONAL PLANNING AGENCY PERMIT
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COUNTY OF EL DORADO
CHIEF ADMINISTRATIVE OFFICE
FACILITIES DIVISION

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN by the County of El Dorado, State of California, that sealed bids for work in accordance with the Project Plans (Plans) and Contract Documents designated:

SHAKORI GARAGE REPLACEMENT
BID #22-968-062

will be received by the Chief Administrative Office, Procurement & Contracts Division, online through Quest Construction Data Network (Quest) Project #8219309, until **3:00 p.m. Pacific Time on August 25, 2022,** at which time and place bids will be publicly opened and read by the Chief Administrative Office, Procurement & Contracts Division. The bid opening will be held virtually through Zoom. The virtual meeting can be accessed via the following: https://us02web.zoom.us/j/83261215127. Meeting ID: 832 6121 5127/ (669)900-6833 US (San Jose), (253)215-8782 US (Tacoma), (346)248-2299 US (Houston).

LOCATION/DESCRIPTION OF THE WORK: The project is located at 1121 Shakori Drive, Meyers, California in El Dorado County. The Work to be done as shown on the Plans, generally consists of, but is not limited to:

A. The furnishing of all labor, materials, and equipment for the demolition of the existing equipment garage and the construction of a new building-as shown or required per the Contract Documents. Bids are required for the entire work described herein.

B. The project must be substantially complete and ready for occupancy by November 1, 2023.

C. For bonding purposes the estimated project cost is **approximately $3,300,000.**

D. **A Pre-Bid Site Visit is scheduled for this project on Thursday, August 11, 2022. BIDDERS OR THEIR REPRESENTATIVES SHALL MEET AT 1121 SHAKORI DRIVE, MEYERS, CALIFORNIA SHARPLY AT 11:00 A.M. ATTENDANCE AT THE PRE-BID SITE VISIT IS MANDATORY. REPRESENTATIVES SHALL FOLLOW COUNTY COVID-19 POLICY WHILE ON COUNTY PREMISES WHICH CURRENTLY INCLUDES, BUT IS NOT LIMITED TO, THE USE OF FACE COVERINGS AND PHYSICAL DISTANCING OF SIX (6) FEET. THE UPDATED COUNTY POLICY IS AVAILABLE AT:** https://www.edcgov.us/Government/BOS/Documents/E-11%20COVID-19%20Workplace%20Guidelines.pdf. In order to limit the disruption to the conduct of business, the meeting date listed will be the only opportunity for bidders to visit the site. The Bidder's representative will be required to sign an attendance sheet and provide the name of the firm being represented. The County will post on the Quest website such Addenda as the County in its discretion considers necessary in response to questions arising and information presented at the Pre-Bid Site Visit. Oral statements shall not be relied upon and will not be binding or legally effective. Addenda and answers to questions deemed relevant and appropriate issued as a result of the Pre-Bid Site Visit shall constitute the sole and exclusive record and statement of the results of the Pre-Bid Site Visit.

OBTAINING OR INSPECTING CONTRACT DOCUMENTS: The contract documents may be viewed and/or downloaded from the Quest Construction Data Network (Quest) website at http://www.questcdn.com. Interested parties may also access the Quest website by clicking on the link located on the Chief Administrative Office, Procurement and Contract's website at http://edcapps.edcgov.us/contracts/invite.asp and entering the Quest project #8219309.

Interested parties may view the Contract Documents on the Quest website at no charge. The digital Contract Documents may be downloaded for $30.00 by inputting the Quest project #8219309 on the websites' Project Search page. Please contact Quest CDN.com at 952.233.1632 or info@questcdn.com for assistance with free membership, registration, downloading, and working with this digital project information. To access the electronic bid form, download the project/request documents and click the online bidding button at the top of the advertisement screen. Physical paper copies of the Contract Documents, including Plans, may be examined by appointment at the County of El Dorado, Chief Administrative Office, Procurement and Contracts Division located at 330 Fair Lane, Placerville, California; however, the Chief Administrative Office will no longer issue paper copies of

the Contract Documents to bidders. To view the Contract Documents in person, contact Kady Leitner by phone at 530.621.5150 or by email at kady.leitner@edcgov.us

By paying for and downloading the digital Contract Documents, interested bidders are automatically included on the Planholders List. The list of planholders will be available on Quest's website under "View Planholders." Those downloading the Contract Documents assume responsibility and risk for completeness of the downloaded Contract Documents. To be eligible to bid, interested parties must be included on the Planholders List.

ONLY CONTRACT DOCUMENTS, INCLUDING THE PROJECT PLANS, DOWNLOADED FROM QUEST AND SUBMITTED BY A BIDDER INCLUDED ON THE PLANHOLDERS LIST WILL BE CONSIDERED FOR BID SUBMITTAL.

PRE-BID COMMUNICATIONS & REQUESTS FOR INFORMATION (RFI): Questions will be accepted in writing only, through submission to the Quest website under the Quest Project #8219309 "Project Q&A", by email, or in hard copy, until **5:00 P.M. on July 20, 2022**. Pre-bid communications and RFI are to be submitted to the email shown on the Quest website under the Quest #8219309 "Project Q&A", emailed to: kady.leitner@edcgov.us with BID #22-968-062 – RFI as the subject, or in hard copy delivered to: County of El Dorado, Procurement & Contracts, 330 Fair Lane, Placerville, CA 95667, BID #22-968-062 – RFI. If a response does not require an addenda, answers to questions deemed relevant and appropriate will be uploaded to Quest on or about July 25, 2022. Oral responses concerning the content of the Plans and Contract Documents shall not be relied upon and will not be binding or legally effective. Addenda will be uploaded in PDF format to Quest's website. To receive notification of addenda, interested bidders must be included on the planholders list.

CONTRACTORS LICENSE CLASSIFICATION: Bidders shall be properly licensed to perform the Work pursuant to the Contractors' State License Law (Business and Professions Code Section 7000 et seq.) and shall possess a California **Class B – General Building Contractor License at the time the bid is submitted**, and shall maintain a valid license and certification through completion and acceptance of the Work, including the guarantee and acceptance period. Failure of the successful Bidder to obtain proper adequate licensing shall constitute a failure to execute the Contract and shall result in the forfeiture of the Bidder's security, and may result in legal penalties.

CONTRACTOR REGISTRATION: No contractor or subcontractor may be listed on a bid proposal for a public works project or awarded a contract for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Sections 1771.1(a), 1725.5. Bids will not be accepted from unregistered contractors except as provided in section 1771.1.

PREVAILING WAGE REQUIREMENTS: In accordance with the provisions of California Labor Code Sections 1770 et seq., the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates. Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, P.O. Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at http://www.dir.ca.gov/dlsr/PWD. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the County in which the Work is to be done are available upon request.

In accordance with the provisions of Labor Code 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

BID SECURITY: A bid security shall be provided with each bid. Bid security shall be in an amount of not less than ten percent (10%) of the total amount bid for the Work and shall be cash, a certified check, or cashier's check drawn to the order of the County of El Dorado or a Bidder's Bond executed by a surety satisfactory to the County of El Dorado on the **form provided in the Proposal section of these Contract Documents.**

Bidders are required to submit either an electronic Bidder's Bond through Surety2000 or a PDF copy of a hard copy Bidder's Bond with their bid. If a bid security other than a Bidder's Bond is being used, Bidders must upload a PDF copy of the bid security with their electronic bid submittal. If a PDF copy of the bid security is uploaded, the original bid security and acknowledgment must be provided to the Chief Administrative Office, Procurement and Contracts Division, after the bid opening but before the end of business on the first business day after the bid opening. If the Bidder chooses to utilize Surety2000, by submitting their bid, Bidder hereby agrees to hold the County of El Dorado harmless from and waive any and all claims against the County of El Dorado for any claims or damages that arise from or are related to the Bidder's use of Surety 2000.

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PERFORMANCE AND PAYMENT BONDS: The successful Bidder shall be required to execute a Performance Bond and a Payment Bond for not less than one hundred percent of the construction price, issued by an Admitted Surety, an insurance organization authorized to transact business in the State of California.

SUBSTITUTION OF SECURITIES: Substitution of appropriate securities in lieu of retention amounts from progress payment is permitted under Public Contract Code § 22300.

INSTRUCTIONS TO BIDDERS: All bidders should carefully review the Instructions to Bidders for more detailed information before submitting a Bid Proposal.

BY ORDER OF the Board of Supervisors, County of El Dorado, State of California.

Authorized by the Board of Supervisors on July 26, 2022 at Placerville, California.

Dated: _____

By: _____

Chair, Board of Supervisors

Kim Dawson
Clerk of the Board of Supervisors

By: _____ Dated: _____

Deputy Clerk

*** END OF NOTICE TO BIDDERS ***

THESE INSTRUCTIONS SUPPLEMENT THE NOTICE TO BIDDERS, PROPOSAL, DRAFT CONTRACT, AND CONDITIONS OF THE CONTRACT

SHAKORI GARAGE REPLACEMENT
BID #22-968-062

INSTRUCTIONS TO BIDDERS

1. The County of El Dorado will receive sealed bids through online submission to Quest from Bidders as stipulated in the Notice to Bidders. **The Proposal including the Bidder's Security shall be submitted through Quest.** Bidders are cautioned that the timing of their online submission is based on when the submittal is RECEIVED by Quest, not when a submittal is initiated by a bidder. Online submittal transmissions can be delayed in an "Internet Traffic Jam" due to file transfer size, transmission speed, etc. For these reasons, the County recommends that bidders allow sufficient time to upload their response and attachment(s) and to resolve any issues that may arise. The closing date and time shall be governed by the Quest web clock, which does not allow submittals after the closing date and time. Quest will send a message to the Bidder's message center in Quest advising that their online submission (vbid) was successfully submitted. If you do not receive a successful submission confirmation, you are advised to contact Quest at 952.233.1632 or info@questcdn.com for assistance.

2. Bidders must submit bids only on forms provided in the Contract Documents downloaded from the Quest website and shall be accompanied by all documents and information required to be submitted by these Instructions to Bidders, the Notice to Bidders, and by law. Bids not submitted on the required forms provided in the Contract Documents downloaded from Quest website will be deemed nonresponsive and will be disqualified.

3. Bidders must complete and submit the Proposal, Proposal Bid Price Schedule, Substitutions Listing, Subcontractors Listing, Public Contract Code Section 10285.1 Statement, Public Contract Code Section 10162 Questionnaire, Non-Collusion Affidavit, Confidentiality of Information Provided, Iran Contracting Act Certification, and page P-13, along with P-14 through P-16, as applicable. Bids submitted without the required documentation will be deemed nonresponsive and will be disqualified.

4. **Substitutions:** If the Bidder lists a manufacturer in its Proposal that is a substitute (i.e. "or equal"), such listing shall be considered a substitution request by the Bidder. If the Bidder is the apparent low Bidder, the Bidder shall, within two (2) business days following the bid opening, submit data substantiating the request for the substitution with the "or equal" item. Failure to submit such substantiating data within two (2) business days following the bid opening may result in the County deeming the apparent low Bidder non-responsive. If no substitute manufacturer is listed in its Proposal, the Bidder shall supply all materials as specified in the Plans & Specifications. NO substitution request will be considered beyond two (2) business days following the bid opening.

5. Bidders must supply all information required by the Contract Documents and specifications. Bids must be complete. Late bids, unsealed bids, unlabeled bids, incomplete bids, or bids otherwise not in compliance with these bid documents will be rejected. The County reserves the right at its sole discretion to reject any bid as nonresponsive as a result of any error or omission in the bid.

6. Bidders may not modify the Proposal Document or qualify their bids.

7. Submission of a bid signifies that the Bidder has done a careful examination of the Contract Documents and has a complete understanding of the nature, extent, and location of Work to be performed. Bidder must complete the tasks listed below in subsections "a - c" as a condition to bidding, and submission of bid shall constitute the Bidder's express representation to the County that Bidder has fully completed the following:

    a. Bidder has downloaded all documents related to the project from the Quest website and takes responsibility for their completeness;

b. Bidder has attended the mandatory pre-bid site visit and has examined thoroughly and understands the nature and extent of the Contract Documents, Work, Site, locality, actual conditions, as-built conditions, and all local conditions and federal, state and local laws and regulations that in any manner may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto;

c. Bidder has given the County representative during the bid period prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents and as built and actual conditions and the written resolution thereof by County is acceptable to Bidder.

8. The following represents the schedule for this Project and is subject to change. All times listed are Pacific Time:

Bid Issuance	AUGUST 2, 2022
Pre-Bid Site Visit (Mandatory)	AUGUST 11, 2022 11:00 A.M.
Deadline for Final Questions	AUGUST 15, 2022 5:00 P.M.
Bid Submission Deadline	AUGUST 25, 2022 2:00 P.M.

9. No Bid may be withdrawn after the time established for receiving bids or before the award and execution of the Contract, unless the award is delayed for a period exceeding sixty (60) calendar days.

10. Bids must be executed in accordance with the instructions given and forms provided in the Contract Documents furnished by the County of El Dorado, Procurement and Contracts Division, through Quest.

11. **BUSINESS LICENSE**: The County Business License Ordinance provides that it is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Ordinance Code Section 5.08.070. The Bidder to whom an award is made shall comply with all of the requirements of the County Business License Ordinance, where applicable, prior to beginning work under this Contract and at all times during the term of this Contract.

12. **REQUIRED LISTING OF PROPOSED SUBCONTRACTORS**: Each Bid shall have listed therein the name and address of each subcontractor, to whom the Bidder proposes to subcontract portions of the work in an amount in excess of 1/2 of one percent of its total bid in accordance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code. The Bidder shall also describe in the Subcontractor Listing the work to be performed by each subcontractor listed. The work to be performed by the subcontractor shall be shown by listing the description of the work, and portion of the work to be performed by the subcontractor in the form of a percentage calculated by dividing the work to be performed by the subcontractor by the lump sum bid price. At the time the bids are submitted all listed subcontractors shall be properly licensed to perform their designated portion of the work. The Bidder's attention is invited to other provisions of the Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

13. **EMISSIONS REDUCTION**: Successful bidder shall comply with emission reduction regulations mandated by the California Air Resources Board, sign the certification of knowledge in the Agreement, and provide County a Certificate of Reported Compliance when road legal diesel vehicles with a gross vehicle weight over 14,000 pounds are included in their fleet. Contractor must require all sub-contractors to comply with such regulations and provide County a Certificate of Reported Compliance for each sub-contractor with road legal diesel vehicles over 14,000 pound gross vehicle weight.

14. **NONDISCRIMINATION**: Attention is directed to the following Notice that is required by Government Code section 12990, et seq./ which shall also be included in any subcontract agreements:

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOVERNMENT CODE SECTION 12990)

Your attention is called to the Nondiscrimination Clause set forth or referred to herein, which is applicable to all nonexempt state construction contracts and subcontracts and to the Standard California Nondiscrimination Construction Contract Specifications set forth herein. The specifications are applicable to all nonexempt state construction contracts and subcontracts of $5,000 or more.

(2 CCR section 11119.)

NONDISCRIMINATION CLAUSE

1. During the performance of this contract, contractor and its subcontractors shall not unlawfully discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status. Contractors and subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination. Contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, § 12900 et seq.) and the applicable regulations promulgated thereunder (Cal. Code Regs., tit. 2, § 11000 et seq.). The applicable regulations of the Fair Employment and Housing Council implementing Government Code section 12990, set forth in Subchapter 5 of Division 4.1 of Title 2 of the California Code of Regulations are incorporated into this contract by reference and made a part hereof as if set forth in full. Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

2. Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

(2 CCR section 11105.)

STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOV. CODE SECTION 12990)

These specifications are applicable to all state contractors and subcontractors having a construction contract or subcontract of $5,000 or more.

1. As used in the specifications:

   a. "Act" means the Fair Employment and Housing Act.

   b. "Administrator" means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority;

2. Whenever the contractor or any subcontractor subcontracts a portion of the work, it shall include in each subcontract of $5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.

3. The contractor shall implement the specific nondiscrimination standards provided in paragraphs 6(a) through (e) of these specifications.

4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer members of any group protected by the Act shall excuse the contractor's obligations under these specifications, Government Code section 12990, or the regulations promulgated pursuant thereto.

5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.

6. The contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor must be able to demonstrate fully its efforts under steps a. through e. below:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the contractor's employees are assigned to work. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the contractor's obligations to maintain such a working environment.

b. Provide written notification within seven days to the director of the DFEH when the referral process of the union or unions with which the contractor has a collective bargaining agreement has impeded the contractor's efforts to meet its obligations.

c. Disseminate the contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.

d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.

e. Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the contractor's obligations under these specifications are being carried out.

7. Contractors are encouraged to participate in voluntary associations that assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on equal employment opportunity in the industry, ensures that the concrete benefits of the program are reflected in the contractor's workforce participation, and can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's.

8. The contractor is required to provide equal employment opportunity for all persons. Consequently, the contractor may be in violation of the Fair Employment and Housing

Act (Government Code section 12990 et seq.) if a particular group is employed in a substantially disparate manner.

9. The contractor shall not use the nondiscrimination standards to discriminate against any person because race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status.

10. The contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code section 12990.

11. The contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code section 12990 and its implementing regulations by the awarding agency. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code section 12990.

12. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

(2 CCR section 11122.)

15. **AWARD OF CONTRACT:** The County reserves the right after opening bids to reject any or all bids, to waive any irregularity in a bid, or to make award to the lowest responsive, responsible Bidder(s). The Purchasing Agent will recommend the bid for award by the Board of Supervisors. As a condition of award, the successful Bidder will be required to submit bonds and evidence of insurance prior to execution of the Agreement by the County. Failure to meet this requirement shall constitute abandonment of the Bid by the Bidder and forfeiture of Bidder's security. Award will then be made to the next lowest responsible, responsive bidder.

16. **BIDDERS PROTEST PROCEDURES:** The Chief Administrative Office, Procurement & Contracts Division, will notify all bidders in writing of its recommendation for award or rejection of bids, and the date and time on which the recommendation for award will be considered and acted upon by the Board of Supervisors ("Notice of Intent to Award"). All bidders may attend the Board of Supervisors meeting, address the Board, and be heard.

    Within 5 working days from the date of the Notice of Intent to Award, the Bidder protesting the recommendation for award must submit a formal written protest to the Procurement & Contracts Division, stating in detail the basis and reason for the protest. The Bidder must provide facts to support the protest including any evidence Bidder wishes to be considered together with the law, rule, regulation, or criteria on which the protest is based. The Bidder may attend the Board of Supervisors meeting at which the recommendation and bid protest will be considered. If the Bidder is not in attendance at that time, the bid protest may be dismissed by the Board of Supervisors without further consideration of the merits and the decision of the Board of Supervisors on the bid protest shall be final.

17. **PAYMENTS:** Attention is directed to Article 6.2 – APPLICATIONS FOR PAYMENT of Conditions of the Contract and Article 5 –PAYMENT of the Contract.

18. **RETAINAGE FROM PAYMENTS:** Attention is directed to Article 6.4 – WITHOLDING FROM PAYMENTS of the Conditions of the Contract and Article 24 – RETAINAGE of the Contract.

19. The following documents are to be executed and submitted by the apparent low Bidder after bids have been opened and duly inspected, and the County transmits the Notice of Award package to the successful Bidder. Failure to properly and timely submit these documents entitles the County to determine that the Bidder has abandoned the contract and the bidder's security shall be forfeited to County.

    Submit the following documents to Kady Leitner, Chief Administrative Office, Procurement and Contracts Division, 330 Fair Lane, Placerville, CA 95667 by 5:00 p.m. of the **TENTH** calendar day, following the date of the NOTICE OF AWARD OF CONTRACT letter. Execution of Contracts by the County depends upon approval of Insurance Certificates and Bonds, and associated contract documents.

    i. Contracts: The successful Bidder shall execute and submit the Agreements for the work associated with the Proposal Lump Sum Bid Price Schedule (See Draft Contract). Submit two (2) originals of Contract, each bearing an original signature.

    ii. County of El Dorado Performance Bond: To be executed by successful Bidder and surety each with notary acknowledgement. Successful Bidder shall furnish County with original copies of the Performance Bond and notary acknowledgment.

    iii. County of El Dorado Payment Bond: To be executed by successful Bidder and surety each with notary acknowledgement. Successful Bidder shall furnish County with original copies of the Payment Bond and notary acknowledgment.

    iv. Insurance certificates required by Conditions of the Contract, Article 8.

    v. California Form 590 – Withholding Exemption and County Payee Data Record Form

    vi. Certificate of Reported Compliance for road legal diesel vehicles over 14,000 pounds, if applicable.

SPECIAL INSTRUCTIONS

20. Drawing C3.1: South Tahoe Public Utility District will install the three taps to the water main in Kaska Street. Contractor will connect to those taps and provide all other improvements shown on the plans. All work must comply with STPUD details and specifications.

21. The work area available to the Contractor is depicted in *"work area 06-08-22.pdf"* and shall be separated from the DOT corporate yard by a temporary chain link fence. Contractor shall install, maintain, and remove the fence after completion.

22. Metal building insulation R-values and material are properly specified in section 07 21 00 of the Project Manual and take precedence over any notes to the contrary in the drawings. Formal addendum to be issued at a future date.

23. Section 01 21 00 Part 2.01 A. Allowances: This section is not used

24. Contractor to provide the concrete pad, protective enclosure, piping and bollards for the gas meter noted on Sheets M2.1, M4.1 and AS-101 as required by Southwest Gas Company approved details. Formal addendum to be issued at a future date.

* END OF INSTRUCTIONS TO BIDDERS *

THIS IS A SAMPLE OF WHICH DETAILS ALL THE NECESSARY INFORMATION NEEDED FOR A COMPLETE PROPOSAL. PLEASE LOG INTO QUEST AND COMPLETE ALL ELECTRONIC FORMS UNDER QUEST PROJECT #8219309. PLEASE NOTE THAT SOME FORMS WILL NEED TO BE DOWNLOADED AND RE-UPLOADED WITH ALL THE NECESSARY INFOMATION FILLED OUT. IF YOU ARE NOT UTILIZING SURETY 2000, THEN A PDF OF YOUR BIDDERS BOND WILL NEED TO BE UPLOADED AT THE TIME OF BID AND A HARD COPY WILL NEED TO BE DROPPED OFF TO THE PROCUREMENT AND CONTRACTS DIVISION LOCATED AT 330 FAIR LANE, PLACERVILLE, CALIFORNIA 95667 BY END OF BUSINESS ON THE FIRST BUSINESS DAY AFTER THE BID OPENING.

THE USE OF PENCIL OR CORRECTION FLUID OR TAPE IS NOT ACCEPTABLE.
BID DOCUMENTS COMPLETED IN PENCIL OR CONTAINING THE USE OF CORRECTION FLUID OR TAPE WILL BE REJECTED.

ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

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PROPOSAL

(to be submitted with Bidder's Security)

TO: CHIEF ADMINISTRATIVE OFFICE, PROCUREMENT and CONTRACTS DIVISION
COUNTY OF EL DORADO, STATE OF CALIFORNIA via Quest

for the completion of

SHAKORI GARAGE REPLACEMENT

BID #22-968-062

NAME OF BIDDER: _____

BUSINESS MAILING ADDRESS: _____

CITY, STATE, ZIP: _____

BUSINESS STREET ADDRESS: _____
(Please include even if P.O. Box used)

CITY, STATE, ZIP: _____

TELEPHONE NO: AREA CODE ( ) _____

FAX NO: AREA CODE ( ) _____

EMAIL ADDRESS _____

The work for which this Proposal is submitted is for the construction in accordance with these Contract Documents (including the payment of not less than the State general prevailing wage rates set forth herein), the Project Plans described below, including any addenda thereto, the Contract annexed hereto, and also in accordance with the Labor Surcharge and Equipment Rental Rates in effect on the date the work is accomplished, and in accordance with the General Prevailing Wage rates. The Project Plans and other Contract Documents for the work to be done are entitled:

SHAKORI GARAGE REPLACEMENT

BID #22-968-062

Bids are to be submitted for the entire work. The work includes LUMP SUM BID with a cost escalation clause. Failure to submit a bid for the entire work will result in the bid being deemed non-responsive. The County reserves the right to reject all bids.

The Bidder shall set forth a lump sum total with a cost amount for the metal building and mezzanine (See escalation language on page P-5), in clearly legible figures in the respective space provided for this purpose.

If the item total for the lump sum is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing lump sums. The written lump sum in numbers will be interpreted according to the number of digits and, if applicable, decimal placement.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error, or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the County, and that discretion will be exercised in the manner deemed by the County to best protect the public interest in the prompt and economical completion of the work. The decision of the County respecting the amount of a bid, or the existence or treatment of any irregularity in a bid, shall be final.

If this Proposal is accepted and the undersigned Bidder shall fail to enter into the Contract and furnish the two bonds in the sums required by the State Contract Act, with surety satisfaction to the County in accordance with the Special Provisions within ten (10) calendar days of the date of the letter notice from the County that the Contract has been awarded, the County may, at its option, determine that the Bidder has abandoned the Contract, and thereupon this Proposal and the acceptance thereof shall be null and void and the forfeiture of such security accompanying this Proposal shall operate and the same shall be the property of the County.

The undersigned Bidder acknowledges that a bid security must be submitted in the amount of not less than ten percent (10%) of the total Lump Sum Bid.

The undersigned, as Bidder, declares under penalty of perjury under the laws of the State of California that the only persons or parties interested in this Proposal, as principals, are those named herein; that this Proposal is made without collusion with any other person, firm, or corporation; that it has carefully examined the location of the proposed work, the annexed proposed form of Contract, and the Plans therein referred to; and that it proposes, and agrees if this Proposal is accepted, that it will contract with the County, in the form of the copy of the Draft Agreement annexed hereto, to provide all necessary machinery, tools, apparatus, and other means of construction, and to do all the work and furnish all the materials specified in the Contract, in the manner and time therein prescribed, and according to the requirements of the Architect and County as therein set forth, and that it will take in full payment therefore the following item prices, to wit:

For the project site, Bidder's scope of work shall include: Demolition of the existing equipment garage and the construction of a new building as shown or required per the Contract Documents. Should Bidder find relevant details missing from the original drawings, Bidder shall alert the County.

THE REMAINDER OF THIS PAGE LEFT INTENTIONALLY BLANK

THE USE OF PENCIL OR CORRECTION FLUID OR TAPE IS NOT ACCEPTABLE.
BID DOCUMENTS COMPLETED IN PENCIL OR CONTAINING THE USE OF CORRECTION FLUID OR TAPE WILL BE REJECTED.

ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

PROPOSAL BID PRICE SCHEDULE

SHAKORI GARAGE REPLACEMENT

BID #22-968-062

Note: Bid will be awarded on the basis of the lowest responsive, responsible bidder based upon the total of the LUMP SUM bid and meeting all other requirements.

Lump Sum Bid Amount: $_____

NOTICE: Bidder's failure to execute the questionnaire and statements contained in this Bid as required by applicable laws and regulations, or the determinations by the County based upon those questionnaires and statements, may prohibit award of the subject Contract to the Bidder.

THE REMAINDER OF THIS PAGE LEFT INTENTIONALLY BLANK

The Lump Sum Bid includes a Cost* of $_____ for the metal building and mezzanine materials exclusive of the stairs, handrails, doors, windows, louvers, and insulation

* The Cost as listed above may be adjusted accordingly by Change Order based on the percent change of the Producer Price Index "Prefabricated Metal Buildings and Components Manufacturing: Prefabricated Metal Buildings and Component Systems (Excluding Farm Service Buildings, Residential Buildings, and Parts" as reported by the U.S. Bureau of Labor Statistics and published here https://fred.stlouisfed.org/series/PCU3323113323111. The value to be used for calculating the adjustment shall be the index published for the month of the formal Notice to Proceed issuance date, or the date of the previous index adjustment, whichever is later divided by the PPI index published for the month of the Bid date. Adjustments shall be calculated according to the percentage change as reflected in the above-stated index. This one-time price adjustment process described herein shall not change for the life of the Agreement.

THE REMAINDER OF THIS PAGE LEFT INTENTIONALLY BLANK

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ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

SUBSTITUTIONS LISTING

The Bidder shall list any proposed substitutions in accordance with Section 4 of the "Instructions to Bidders".

Name			Description of Work

THE USE OF PENCIL OR CORRECTION FLUID OR TAPE IS NOT ACCEPTABLE.
BID DOCUMENTS COMPLETED IN PENCIL OR CONTAINING THE USE OF CORRECTION FLUID OR TAPE WILL BE REJECTED.

ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

SUBCONTRACTORS LISTING

The Bidder shall list the name and address, contractor license number, and DIR registration number of each subcontractor to whom the Bidder proposes to subcontract portions of the work, in an amount in excess of one-half (½) of one percent (1%) of the total bid in accordance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code and as required by the provisions in "Required Listing of Proposed Subcontractors" in the Notice to Bidders. **The Bidder shall list the description of work and state the percentage of work to be performed by each subcontractor as subcontracted amount divided by LUMP SUM BID amount.**

Name	Location of Business	Contractor License No. / DIR Registration No.	Description of Work and Percentage of Work Subcontracted

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ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT

In accordance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the Bidder hereby declares under penalty of perjury under the laws of the State of California that the Bidder has_____, has not _____ been convicted within the preceding three years of any offenses referred to in that Section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100. The term "Bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

NOTE: The Bidder must place a check mark after "has" or "has not" in one of the blank spaces provided.

The above Statement is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Statement.

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

Signature: _____ Date: _____

Name: _____

Title: _____

Firm: _____

THE USE OF PENCIL OR CORRECTION FLUID OR TAPE IS NOT ACCEPTABLE.
BID DOCUMENTS COMPLETED IN PENCIL OR CONTAINING THE USE OF CORRECTION FLUID OR TAPE WILL BE REJECTED.

ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury under the laws of the State of California, the following questionnaire:

Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes: _____ **No**: _____

If the answer is yes, explain the circumstances in the following space:

PUBLIC CONTRACT CODE SECTION 10232 STATEMENT

In accordance with Public Contract Code Section 10232, the Bidder hereby states under penalty of perjury under the laws of the State of California, that no more than one final unappealable finding of contempt of court by a Federal Court has been issued against the Bidder within the immediate preceding two year period because of the Bidder's failure to comply with an order of a Federal Court which orders the Bidder to comply with an order of the National Labor Relations Board.

NOTE:

The above Questionnaire and Statement are part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Questionnaire and Statement.

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

NONCOLLUSION AFFIDAVIT
(Title 23 United States Code Section 112 and
Public Contract Code Section 7106)

In accordance with Title 23 United States Code, Section 112 and Public Contract Code Section 7106, the Bidder declares that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the Contract of anyone interested in the proposed Contract; that all statements contained in the bid are true; and, further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

NOTE:

The above Noncollusion Affidavit is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Noncollusion Affidavit.

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

Signature: _____ Date: _____

Name: _____

Title: _____

Firm: _____

CONFIDENTIALITY OF INFORMATION PROVIDED

Contractor shall maintain the confidentiality and privileged nature of all records. Upon completion of all Services, ownership and title to all reports, documents, plans, maps, specifications, estimates, compilations and any and all other materials or data given to Contractor as part of the Services requested shall be returned to the County.

Signature: _____ Date: _____

Name: _____

Title: _____

Firm: _____

IRAN CONTRACTING ACT CERTIFICATION

(Public Contract Code Section 22000 *et seq.)*

As required by California Public Contract Code Section 2204, I certify subject to penalty for perjury that: (i) I am duly authorized to execute this certification on behalf of Bidder/Proposer; and (ii) the option checked below relating Bidder/Proposer's status in regard to the Iran Contracting Act of 2010 (Public Contract Code Section 2200 *et seq*.) is true and correct:

__ Bidder/Proposer is not:

(i) Identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code Section 2203; or

(ii) A financial institution that extends, for 45 days or more, credit in the amount of $20,000,000 or more to any other person or entity identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code Section 2203, if that person or entity uses or will use the credit to provide goods or services in the energy sector in Iran.

__ The County has exempted Bidder/Proposer from the requirements of the Iran Contracting Act of 2010 after making a public finding that, absent the exemption, the County will be unable to obtain the goods and/or services to be provided pursuant to the contract.

Signature: _____ Date: _____

Name: _____

Title: _____

Firm: _____

NOTE: In accordance with Public Contract Code Section 2205, false certification of this form shall be reported to the California Attorney General and may result in civil penalties equal to the greater of $250,000 or twice the contract amount, termination of the contract and/or ineligibility to bid on public contracts for three (3) years.

Accompanying this proposal is _____

(NOTICE: INSERT THE WORDS "CASH ($_____),"CASHIER'S CHECKS," "CERTIFIED CHECKS," OR "BIDDERS BONDS," AS THE CASE MAY BE)

in amount equal to at least ten percent (10%) of the total amount bid.

The names of all persons interested in the forgoing Proposal as principals are as follows:

IMPORTANT NOTICE: If the Bidder or other interested person is a corporation, state legal name of corporation and place of incorporation, also names of the president, secretary, treasurer, and executive officer thereof; if a partnership, state name of partnership, also names of all individual partners; if Bidder or other interested person is an individual, state first and last names in full.

_____

_____

_____

_____

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

License No. _____ Classification(s) _____

A copy of the afore-referenced license must be attached hereto.

ADDENDA: This Proposal is submitted with respect to the changes to the Contract included in addenda number(s)

_____

(Fill in addenda numbers if addenda have been received and insert, in this Proposal, any Proposal Pay Items and Bid Price Schedules that were received as part of the addenda)

By my signature on this Proposal I certify, under penalty of perjury under the laws of the State of California, that the foregoing questionnaire and statements of Public Contract Code Sections 10162, 10232, and 10285.1 are true and correct and that I have complied with the requirements of Section 8103 of the Fair Employment and Housing Commission Regulations (Chapter 5 of Division 4 of Title 2 of the California Code of Regulations). By my signature on this Proposal I further certify, under penalty of perjury under the laws of the State of California and the United States of America that the Noncollusion Affidavit required by Title 23 United States Code, Section 112 and Public Contract Code Section 7106 is true and correct.

The person or persons executing this Proposal on behalf of a corporation or partnership shall be prepared to demonstrate by resolution, article, or otherwise, that such person is or that such persons are appropriately authorized to act in these regards for such corporation or partnership. Such authority shall be demonstrated to the satisfaction of the County of El Dorado.

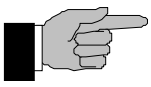
If the signature is by an agent other than an officer of a corporation or a member of a partnership, a power of attorney authorizing said act by the agent on behalf of his principal shall be submitted with the bid forms; otherwise, the bid may be disregarded as irregular and unauthorized.

The Bidder's execution on the signature portion of this Proposal shall constitute an endorsement and execution of those affidavits, declarations and certifications which are part of this Proposal.

Executed this _____ day of _____, 20__

at: _____ County, State of _____

Date: _____



SIGN HERE: _____

Name and Title of Bidder: _____

Name of Firm: _____

END OF PROPOSAL

COUNTY OF EL DORADO

BIDDER'S BOND

this form MUST be used

KNOW ALL PEOPLE BY THESE PRESENTS, THAT WE _____

_____, as **PRINCIPAL**, and

_____

_____

as Surety are held and firmly bound unto the County of El Dorado (Obligee), in the penal sum of **TEN (10) PERCENT OF THE AMOUNT OF THE TOTAL LUMP SUM BID PRICE** of the Principal above named, submitted by said Principal to the Obligee for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made to the Obligee, we the Principal and Surety bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents. In no case shall the liability of the Surety hereunder exceed the sum of

TEN PERCENT (10%) OF THE AMOUNT OF THE TOTAL LUMP SUM BID PRICE

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT:

WHEREAS, the Principal has submitted the above-mentioned Bid to the Obligee, as aforesaid, for certain construction specifically described as follows, for which bids are to be opened at Placerville, El Dorado County, California, for the construction of the:

SHAKORI GARAGE REPLACEMENT
BID #22-968-062

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

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

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

(seal) _____
Principal

_____

(seal) _____
Surety

Address: _____

_____

(NOTE: Signature of those executing for the Surety shall be properly acknowledged, and accompanied by a Certificate of Acknowledgment.)

PRINCIPAL

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct

WITNESS my hand and official seal.

Signature _____

(Seal)

SURETY

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

County of El Dorado

BID #22-968-062

SHAKORI GARAGE REPLACEMENT

THIS AGREEMENT ("Agreement") approved by the County of El Dorado Board of Supervisors, this _____ day of _____, in the year of 20__, made and concluded, in duplicate, between the COUNTY OF EL DORADO, a political subdivision of the State of California, by the Chief Administrative Office, Facilities Division thereof, the party of the first part hereinafter called "County," and (Contractor) party of the second part hereinafter called "Contractor.

R E C I T A L S

WHEREAS, County has caused the above-captioned project to be let to formal bidding process; and

WHEREAS, Contractor has duly submitted a bid response for the captioned project upon which County has awarded this Contract.

NOW, THEREFORE, the parties hereto have mutually covenanted and agreed, and by these presents do covenant and agree, each with the other, as follows:

Article 1. THE WORK

The improvement contemplated in the performance of this Contract is an improvement over which the County of El Dorado shall exercise general supervision. The County therefore, shall have the right, but not the duty to assume full and direct control over this Contract whenever the County at its sole discretion, shall determine that its responsibility is so required.

The Contractor shall complete the Work as specified or indicated under the County's Contract Documents entitled:

SHAKORI GARAGE REPLACEMENT

The project is located at 1121 Shakori Drive, Meyers, California in El Dorado County. The Work to be done as described in the Plans & Specifications, generally consists of, but is not limited to: furnishing of all labor, materials, and equipment for the Shakori Garage Replacement. The Work shall include:

Demolish existing equipment garage and the construction of a new equipment garage. For additional scope of work information, see Plans & Specifications. Should Bidder find relevant details missing from the original drawings, Bidder shall alert the County.

Article 2. CONTRACT DOCUMENTS

The Contract Documents consist of: the Notice to Bidders; Instructions to Bidders; the bid forms which include the accepted Proposal, Proposal Bid Price Schedule, Substitutions Listing, Subcontractors Listing, Section 10285.1 Statement, Section 10162 Questionnaire, Section 10232 Statement, Noncollusion Affidavit, Confidentiality of Information Provided, the Iran Contract Act Certification; the Contract which includes this Agreement with any Exhibits thereto, the Performance Bond and Payment Bond; Conditions of the Contract; the General Requirements, Drawings, Specifications, Geotechnical Investigation, Work Area, Tahoe Regional Planning Agency Permit, and Owner Furnished And Installed Equipment, listed and identified as the Plans & Specifications; all Addenda incorporated in those documents before their execution, all Contract Change Orders, Architect's Supplemental Instructions, and Construction Change Directives issued in accordance with the Contract Documents which may be delivered or issued after the Effective Date of this Agreement and are not attached hereto; the

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prevailing Labor Surcharge And Equipment Rental Rates (when required) as determined by the Department of Industrial Relations to be in effect on the date the Work is accomplished; all the obligations of County and of Contractor which are fully set forth and described therein; and all Contract Documents which are hereby specifically referred to and by such reference made a part hereof. All Contract Documents are intended to cooperate so that any work called for in one and not mentioned in the other is to be executed the same as if mentioned in all Contract Documents. Contractor agrees to perform all of its promises, covenants, and conditions set forth in the Contract Documents, and to abide by and perform all terms and conditions set forth therein. In case of conflict between this Agreement and any other contract document, this Agreement shall take precedence.

Article 3. CONTRACT PRICE

As compensation agreed upon for said Work, County shall pay or cause to be paid to Contractor, in full, and for the full contract price and compensation for said completion of the Work, including without limitation, all bonds and insurance, THE NOT TO EXCEED SUM OF (insert dollar amount in words) DOLLARS ($(insert dollar amount in numbers)) which sum constitutes the Contract Price, exclusive of Cost adjustment, for the complete Project (the "Contract Price"). The Contract Price may be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the bid price for the cost item multiplied by the published US Bureau of Labor Statistics PPI for pre-fabricated metal buildings (NAICS 332311) at the time the Notice to Proceed is given divided by published US Bureau of Labor Statistics PPI for pre-fabricated metal buildings (NAICS 332311) as of the bid date.

Article 4. COMMENCEMENT AND COMPLETION

The Work to be performed under this Contract shall commence on the date specified in the Notice to Proceed issued by County. The work shall be diligently prosecuted to substantial completion by November 1, 2023, commencing from the date shown on the Contractor Notice to Proceed.

County and Contractor recognize that time is of the essence of the Agreement and that County will suffer loss if the Work is not completed within the time specified in the above paragraph, plus any extensions thereof allowed in accordance with Article 4.3.5 of the Conditions of the Contract. The parties also recognize delays, expense, and difficulties involved with proving in a legal proceeding the actual loss suffered by County if the Work is not completed on time. Accordingly, instead of requiring any such proof, County and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay County the sum of **ONE THOUSAND FIVE HUNDRED DOLLARS AND ZERO CENTS ($1,500.00)** for each and every calendar day, as liquidated damages and not as a penalty, for each and every calendar day's delay in finishing the Work in excess of the contract time prescribed herein; and Contractor agrees that County may deduct the amount thereof from any monies due or that may become due Contractor under this contract.

Article 5. PAYMENT

Payment shall be made to Contractor as follows:

Progress payments are to be made monthly based on the percentage of completion method reached by the Contractor and invoiced using Exhibit A marked "Application and Certificate for Payment" incorporated herein and made by reference a part hereof.

Retention of 5% of the total Contract price will be held until the work is 50% complete, and thereafter at the option of County. Payment by County as herein provided shall not be construed as an absolute acceptance of defects in the work or improper materials.

Article 6. SAFETY

Contractor shall maintain safe conditions at the jobsite for the duration of the Work for the public, County staff, and all persons performing the Work. Contractor shall comply fully with all laws, orders, citations, rules, regulations, standards, and statutes with respect to occupational health and safety, the handling and storage of hazardous materials, accident prevention, safety equipment and practices. Contractor shall be solely responsible for providing a safe place to work for its employees and for employees of its subcontractors and suppliers or material and

equipment, for adequacy of and required use of all safety equipment, and for full compliance with aforesaid laws, orders, citations, rules, regulations, standards, and statutes.

Other safety measures shall include, but not be limited to the following:

A. Providing safe accessibility to all building entrances, keeping all sidewalks, active doors, corridors or other walkways, driveways, or any emergency vehicle access clear for the duration of the project.

B. Keeping flammable rags, if applicable, in a sealed container and removing them from the site at the end of each work day.

Article 7. INDEMNITY

To the fullest extent allowed by law, Contractor shall defend, indemnify, and hold the County and its officers, directors, and employees harmless against and from any and all claims, suits, losses, damages, and liability for damages, including attorney's fees and other costs of defense brought for or on account of injuries to or death of any person, including but not limited to, workers and the public, or on account of injuries to or death of County employees, or damage to property, or any economic, consequential or special damages which are claimed or which shall in any way arise out of or be connected with Contractor's services, operations or performance hereunder, regardless of the existence or degree of fault or negligence on the part of the County, the Contractor, subcontractors or employees of any of these, except for the active, or sole negligence of the County, its officers and employees, or where expressly prescribed by statute.

The duty to indemnify and hold harmless the County specifically includes the duties to defend set forth in Section 2778 of the Civil Code. The insurance obligations of the Contractor are separate, independent obligations under the Contract Documents, and the provisions of this defense and indemnity are not intended to modify nor should they be construed as modifying or in any way limiting the insurance obligations set forth in the Contract Documents.

Article 8. GUARANTEES

Contractor shall repair or replace any or all work provided hereunder which is defective due to faulty materials, poor workmanship, or defective equipment at no expense to County, ordinary wear or tear and unusual abuse or neglect excepted, during the term of the Contract and for a period of one (1) year after Notice of Acceptance. Contractor shall be required to repair or replace any and all adjacent facilities or areas which have been damaged or displaced due to Contractor work performed under this Agreement at no expense to County during the term of this Contract and for a period of one (1) year after Notice of Acceptance.

If a warranty or guarantee exceeding one (1) year is provided by the supplier or manufacturer of any equipment or materials used in this Project, or if a warranty or guarantee exceeding one (1) year is required elsewhere in these Contract Documents, then the guarantee for such equipment or materials shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials, and Contractor shall supply County with all warranty and guaranty documents relative to equipment and materials incorporated in the job and guaranteed by its suppliers or manufacturers.

The parties agree that this guarantee and the rights and obligations accruing therefrom shall be in addition to, and not by way of limitation in any manner whatsoever to, the rights, obligations, warranties or remedies otherwise provided for by law.

In the event of Contractor's failure to comply with the above mentioned conditions within ten (10) calendar days after being notified in writing by County, Contractor hereby authorizes County to proceed to have said defects repaired and made good at Contractor's expense, and Contractor will honor and pay all costs and charges therefore upon written demand.

Article 9. NOTICE

Any notice or other correspondence required to be given under this Agreement by either party to the other may be affected by personal delivery in writing or by mail, postage prepaid. Notices personally delivered during normal business hours shall be deemed received on the actual date of delivery; mailed notices shall be deemed received one (1) day after affixed postmark. Notices and correspondence to County shall be delivered to it as follows:

DRAFT

To County:

County of El Dorado
Chief Administrative Office
3000 Fairlane Court, Suite One

Attn.: Russ Fackrell
Facilities Manager

Notices and correspondence to Contractor shall be delivered when personally delivered to, or if mailed, addressed to Contractor at:

Contractor's Business Name
Street Address
City, State Zip

Attn.: Name of Notices Recipient
Title of Notices Recipient

Either party may change its address for notices by giving written notice pursuant to this Article.

Article 10. VENUE

The Contract Documents and all provisions thereto shall be governed by the laws of the State of California. Any litigation arising out of this Contract shall be brought in El Dorado County.

Article 11. PERFORMANCE BOND

As a part of the execution of this Contract, Contractor shall furnish a bond of a surety company authorized to do business in the State of California, conditioned upon the faithful performance of all covenants and stipulations under this Contract. The amount of this bond shall be one hundred percent (100%) of the total Contract Price and shall be executed upon the form provided by County.

Article 12. PAYMENT BOND

As a part of the execution of this Contract, Contractor shall furnish a bond of a surety company authorized to do business in the State of California, conditioned upon the payment in full of all claims for labor and materials in accordance with the provisions of the law of the State of California. The amount of this bond shall be one hundred percent (100%) of the total Contract Price and shall be executed upon the form provided by County.

Article 13. NOTIFICATION OF SURETY COMPANY

The surety company shall familiarize itself with all of the conditions and provisions of this Contract, and shall waive the right of special notification of any change or modifications of this Contract or extension of time, or of decreased or increased work, or of the cancellation of the Contract, or of any other act or acts by County or its authorized agents, under the terms of this Contract; and failure to so notify the aforesaid surety company of changes shall in no way relieve the surety company of its obligation under this Contract.

Article 14. ASSIGNMENT OF ANTITRUST ACTIONS

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor offers and agrees and will require all of its subcontractors and suppliers to agree to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15

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U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgment by the parties.

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Government Code Sections 4550-4554, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under Government Code Sections 4550-4554 if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

Article 15. TERMINATION BY COUNTY FOR CONVENIENCE

County reserves the right to terminate the Contract at any time upon determination by County's representative that termination of the Contract is in the best interest of County. County shall issue Contractor a written notice specifying that the Contract is to be terminated.

Upon receipt of said written notice, Contractor shall stop all work under the Contract except: (1) work specifically directed to be completed prior to termination, (2) work the County deems necessary to secure the project for termination, (3) removal of equipment and plant from the site of the Work, (4) action that is necessary to protect materials from damage, (5) disposal of materials not yet used in the Work as directed by County, and (6) clean up of the site.

If the Contract is terminated for County's convenience as provided herein, all finished or unfinished work and materials previously paid for shall, at the option of County, become its property. Contractor shall be paid an amount which reflects costs incurred for work provided to the date of notification of termination. In addition, Contractor shall be paid the reasonable cost, as solely judged by County, and without profit, for all work performed to secure the project for termination.

Article 16. TERMINATION BY COUNTY FOR CAUSE

If Contractor is adjudged as bankrupt or insolvent, or makes a general assignment for the benefit of its creditors or if a trustee or receiver is appointed for Contractor or for any of its property, or if Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or on more than one occasion fails to supply sufficient skilled workmen or suitable material or equipment, or on more than one occasion fails to make prompt payments to subcontractors for labor, materials, or equipment, or disregards the authority of the County's representative, or the Engineer, if one is appointed, or otherwise violates any provision of the Contract Documents, then County may, without prejudice to any other right or remedy and after giving Contractor and its Surety a minimum of ten (10) calendar days from delivery of a written termination notice, terminate the services of Contractor and take equipment and machinery thereon owned by Contractor and finish the Work by whatever method County may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the Work is finished.

Without prejudice to other rights or remedies County may have, if Contractor fails to begin delivery of materials and equipment, to commence Work within the time specified, to maintain the rate of delivery of material, to execute the Work in the manner and at such locations as specified, or fails to maintain a work program which will ensure County's interest, or, if Contractor is not carrying out the intent of the Contract, an Inspector's written notice may be served upon Contractor and the Surety on its faithful performance bond demanding satisfactory compliance with the Contract. If Contractor or its Surety does not comply with such notice within five (5) calendar days after receiving it, or after starting to comply, fails to continue, County may exclude it from the premises and take possession of all material and equipment, and complete the Work by County's own forces, by letting the unfinished Work to another Contractor, or by a combination of such methods.

Where Contractor's services have been so terminated by County, said termination shall not affect any right of County against Contractor then existing or which may thereafter accrue. Any retention or payment of monies by County due Contractor will not release Contractor from compliance with the Contract Documents.

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If the unpaid balance of the Contract price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to Contractor. If the sums under the Contract are insufficient for completion, Contractor or Surety shall pay to County within five (5) calendar days after the completion, all costs in excess of the Contract price. In any event, the cost of completing the Work shall be charged against Contractor and its Surety and may be deducted from any money due or becoming due from County.

The provisions of this Article shall be in addition to all other rights and remedies available to County under law.

If after notice of termination, it is determined for any reason that Contractor was not in default, the rights and obligations of the parties shall be the same as if the notice of termination had not been issued. The Contract shall be equitably adjusted to compensate for such termination.

Article 17. SUCCESSORS AND ASSIGNS

This Agreement shall bind and inure to the heirs, devisees, assignees, and successors in interest of Contractor and to the successors in interest of County in the same manner as if such parties had been expressly named herein.

Article 18. SHORING PLAN

Excavation for any trench five (5) feet or more in depth shall not begin until Contractor has received approval, from the Contract Administrator, of Contractor's detailed shoring plan for worker protection from the hazards of caving ground during the excavation of that trench, and any design calculations used in the preparation of the detailed plan. The detailed plan shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during the excavation. No plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the California Division of Occupational Safety and Health. If the plan complies with the shoring system standards established by the Construction Safety Orders, the plan shall be submitted at least five (5) days before Contractor intends to begin excavation for the trench. If the plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California, and the plan and design calculations shall be submitted at least three (3) weeks before Contractor intends to begin excavation for the trench. Nothing in this Article shall be deemed to allow the use of a shoring, sloping or protective system less effective than that required by the Construction Safety Orders.

Article 19. NOTICE OF DISCOVERY OF HAZARDOUS WASTE OR UNUSUAL CONDITIONS

A. Contractor shall promptly, and before the following conditions are disturbed, notify County in writing, in the event Contractor encounters, after excavating to a depth of greater than four (4) feet, any of the following:

1. Material that Contractor believes may be hazardous waste, as defined in section 25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; or

2. Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or

3. Unknown physical conditions at the site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in this Agreement.

B. County shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for performance of any part of the Work, an adjustment, excluding loss of anticipated profits, will be made and this Agreement will be modified by a Change Order. County will notify Contractor of County's determination as to whether or not an adjustment of this Agreement is warranted.

C. In the event a dispute arises between County and Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for, performance

of any part of the Work, Contractor shall not be excused from any scheduled completion date provided for by this Agreement, but shall proceed with all Work to be performed under this Agreement. Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between Contractor and County.

Article 20. REPORTING ACCIDENTS

Contractor shall prepare and submit (within 24 hours of such incidents) reports of accidents at the site and anywhere else the work is in progress in which bodily injury is sustained or property loss in excess of Five Hundred Dollars ($500.00) occurs.

Article 21. EMISSIONS REDUCTION

Contractor and its subcontractors shall comply with emission reduction regulations mandated by the California Air Resources Board, and sign a certification of knowledge thereof:

CERTIFICATE OF KNOWLEDGE – EMISSIONS REDUCTION REGULATIONS

I am aware of the emissions reduction regulations being mandated by the California Air Resources Board (CARB). I will comply with such regulations before commencing the performance of the Work and maintain compliance throughout the duration of this Contract.

Signed: _____Date_____

Contractor shall indemnify County against any fines or penalties imposed by CARB or any other governmental or regulatory agency for violations of applicable laws, rules, and regulations by Contractor, its subcontractors, or others for whom Contractor is responsible under its indemnity obligations provided for in this Agreement.

Article 22. WORKERS' COMPENSATION CERTIFICATION

Contractor shall comply with Labor Code Sections 3700 et seq., requiring it to obtain Workers' Compensation Insurance, and sign a certificate of knowledge thereof.

CERTIFICATE OF KNOWLEDGE - LABOR CODE SECTION 3700

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

Signed: _____ Date: _____

Article 23. WARRANTY

Contractor warrants to County that materials and equipment furnished for the Work will be of good quality and new, unless otherwise required or permitted under the Contract Documents, that the Work will be free from defects or flaws and is of the highest quality of workmanship and that the Work will conform with the requirements herein. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective.

Article 24. RETAINAGE

The retainage from payments is set forth in Section 6.4 "WITHHOLDINGS FROM PAYMENTS" of the Conditions of the Contract. Contractor may elect to receive one hundred percent (100%) of payments due as set forth in the Contract

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Documents, without retention, by depositing securities of equivalent value with County, in accordance with, and as set forth in Section 22300 of the Public Contract Code. Securities eligible for deposit hereunder shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit.

Article 25. RESOLUTION OF CLAIMS

Contractor's attention is directed to California Public Contract Code Section 9204, which describes procedures for the resolution of claims on public works projects. Among other things, Section 9204 requires the claimant to furnish reasonable documentation to support a claim, requires the public entity to respond to the claim within forty-five (45) days of receipt of the claim, and allows for the claimant to demand an informal meet and confer conference for settlement of the issues in dispute. For any portion of a claim that remains in dispute, Section 9204 requires submission of the claim to nonbinding mediation. Additionally, Section 9204 requires the public entity to make any payment due on an undisputed portion of the claim within sixty (60) days of the public entity's written response and to pay interest at the rate of seven percent (7%) per annum on any amounts not paid in a timely manner. The provisions of Sections 20104 et seq. also apply to the resolution of claims under this Contract to the extent those sections are not in conflict with Section 9204.

Article 26. APPRENTICES

26.1 For purposes of this Article 26, the term Subcontractor shall not include suppliers, manufacturers, and distributors.

26.2 Only apprentices, as defined in the State of California Labor Code Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4, Division 3, of the State of California Labor Code, are eligible to be employed by Contractor and Subcontractors as apprentices. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and written apprentice agreements under which the apprentice is training and in accordance with prevailing wage law pursuant to the Labor Code, including but not limited to Section 1777.5. The Contractor bears responsibility for compliance with this section for all apprenticeable occupations.

26.3 Every apprentice shall be paid the standard wage to apprentices, under the regulations of the craft or trade at which the apprentice is employed, and shall be employed only at the Work in the craft or trade to which the apprentice is indentured.

26.4 When Contractor or Subcontractors employ workers in any apprenticeship craft or trade on the Work, Contractor or Subcontractors shall 1) send contract award information to the applicable joint apprenticeship committee that can supply apprentices to the site of the public work and 2) apply to the joint apprenticeship committee, which administers the apprenticeship standards of the craft or trade in the area of the Project site, for a certificate approving Contractor or Subcontractors under the apprenticeship standards for the employment and training of apprentices in the area of the Project site. The committee will issue a certificate fixing the number of apprentices or the ratio of apprentices to journeypersons who shall be employed in the craft or trade on the Work. The ratio will not exceed that stipulated in the apprenticeship standards under which the joint apprenticeship committee operates; but in no case shall the ratio be less than 1 hour of **apprentice** work for every 5 hours of journeyperson work, except as permitted by law. Contractor or Subcontractors shall, upon the issuance of the approval certificate in each such craft or trade, employ the number of apprentices or the ratio of apprentices to journeypersons fixed in the certificate issued by the joint apprenticeship committee or present an exemption certificate issued by the Division of Apprenticeship Standards.

26.5 "Apprenticeship craft or trade," as used in this Article 26, shall mean a craft or trade determined as an apprenticeship occupation in accordance with rules and regulations prescribed by the Apprenticeship Council.

26.6 If Contractor or Subcontractors employ journeyworkers or apprentices in any apprenticeship craft or trade in the area of the Project site, and there exists a fund for assisting to allay the cost of the apprenticeship program in the trade or craft, to which fund or funds other contractors in the area of the Project site are contributing, Contractor and Subcontractors shall contribute to the fund or funds in each craft or trade in which they employ journeyworkers or apprentices on the Work in the same amount or upon the same basis and in the same manner done by the other

contractors. Contractor may include the amount of such contributions in computing its bid for the Contract; but if Contractor fails to do so, it shall not be entitled to any additional compensation therefor from County.

26.7 In the event Contractor willfully fails to comply with this Article 26, it will be considered in violation of the requirements of the Contract.

26.8 Nothing contained herein shall be considered or interpreted as prohibiting or preventing the hiring by Contractor or Subcontractors of journeyworker trainees who may receive on-the-job training to enable them to achieve journeyworker status in any craft or trade under standards other than those set forth for apprentices.

Article 27. PREVAILING WAGE REQUIREMENTS

In accordance with the provisions of California Labor Code Sections 1770 et seq., the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, P.O. Box 420603, San Francisco, CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at http://www.dir.ca.gov/dlsr/PWD. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the county in which the Work is to be done are also on file at the Chief Administrative Office, Facilities Division, and are available upon request.

In accordance with the provisions of Labor Code 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

Article 28. NON-DISCRIMINATION

A. County may require Contractor's services on projects involving funding from various state and/or federal agencies, and as a consequence, Contractor shall comply with all applicable nondiscrimination statutes and regulations during the performance of this Agreement including but not limited to the following: Contractor and its employees and representatives shall not unlawfully discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, military and veteran status of any person, marital status, age, sex, gender, gender identity, gender expression, or sexual orientation. Contractor shall, unless exempt, comply with the applicable provisions of the Fair Employment and Housing Act (Government Code, Sections 12900 et seq.) and applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Sections 11000 et seq.); the applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990, set forth in Subchapter 5 of Chapter 5 of Division 4 of Title 2 of the California Code of Regulations incorporated into this Agreement by reference and made a part hereof as if set forth in full; and Title VI of the Civil Rights Act of 1964, as amended. Contractor and its employees and representatives shall give written notice of their obligations under this clause as required by law.

B. Where applicable, Contractor shall include these nondiscrimination and compliance provisions in any of its agreements that affect or are related to the services performed herein.

C. Contractor's signature shall provide any certifications necessary under the federal laws, the laws of the State of California, including but not limited to Government Code Section 12990 and Title 2, California Code of Regulations, Section 8103.

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Article 29. CONTRACTOR REGISTRATION

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

The contractor must post job site notices as prescribed by regulation 8 California Code of Regulations Section 16451. All contractors and subcontractors must furnish electronic certified payroll records directly to the Department of Industrial Relations (DIR). The work is subject to compliance monitoring and enforcement by the DIR.

Article 30. AUDIT BY CALIFORNIA STATE AUDITOR

Audit by California State Auditor: Contractor acknowledges that if total compensation under this agreement is greater than $10,000.00, this Agreement is subject to examination and audit by the California State Auditor for a period of three (3) years, or for any longer period required by law, after final payment under this Agreement, pursuant to California Government Code §8546.7. In order to facilitate these potential examinations and audits, Contractor shall maintain, for a period of at least three (3) years, or for any longer period required by law, after final payment under the contract, all books, records and documentation necessary to demonstrate performance under the Agreement.

Article 31. TAXES

Contractor certifies that as of today's date, it is not in default on any unsecured property taxes or other taxes or fees owed by Contractor to County. Contractor agrees that it shall not default on any obligations to County during the term of this Agreement.

Article 32. CHILD SUPPORT COMPLIANCE ACT

For any Agreement in excess of $100,000.00, the Contractor acknowledges in accordance with Public Contract Code 7110, that:

a) The Contractor recognizes the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with section 5200) of Part 5 of Division 9 of the Family Code; and

b) The Contractor, to the best of its knowledge is fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.

Article 33. LICENSES

Contractor warrants and represents that it holds a valid California license pursuant to the Contractors' State License Law (Business and Professions Code Sections 7000, et seq.), that its license is in good standing and that it possesses a Class B – General Building Contractor's License as required by the categories and type of the Work. Copies of Contractor's State Contractors' license must be provided with this Agreement.

In addition, Contractor hereby represents and warrants that Contractor and any of its subcontractors employed under this Agreement has all the applicable licenses, permits, and certifications that are legally required for Contractor and its subcontractors to practice its profession or provide the services or work contemplated under this Agreement in the State of

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California. Contractor and its subcontractors shall obtain or maintain said applicable licenses, permits, or certificates in good standing throughout the term of this Agreement

Article 34. BUSINESS LICENSE

The County Business License Ordinance provides that it is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Ordinance Code Section 5.08.070. Contractor warrants and represents that it shall comply with all of the requirements of the County Business License Ordinance, where applicable, prior to beginning work under this Contract and at all times during the term of this Contract.

Article 35. CONTRACT ADMINISTRATOR

The County Officer or employee with responsibility for administering this Agreement is Russ Fackrell, Facilities Manager, Chief Administrative Office, or successor.

Article 36. AUTHORIZED SIGNATURES

The parties hereto represent that the undersigned individuals executing this Agreement on their behalf are fully authorized to do so by law or other appropriate instrument and to bind upon said parties the obligations set forth herein.

Article 37. PARTIAL INVALIDITY

If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way.

Article 38. SUBCONTRACTORS

38.1 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

38.1.1 Unless otherwise stated in the Contract Documents, Contractor shall submit in writing, prior to entering into subcontract agreements, the names and addresses of all Subcontractors proposed for the Work that were not previously listed in Contractor's Bid.

38.1.2 Any Subcontractor may be disqualified if County or County's Representative determines that such Subcontractor fails to meet the requirements of the Contract Documents or for any other reason.

38.1.3 In accordance with the Subletting and Subcontracting Fair Practices Act, nothing herein shall be deemed to entitle Contractor, without the approval of County, to substitute other subcontractors for those named in Contractor's List of Subcontractors and List of Changes in Subcontractors Due to Alternates contained in the completed Bid Form; and, except with such approval, no such substitution shall be made.

38.1.4 Except as hereinafter provided, any increase in the cost of the Work resulting from the replacement or substitution of a Subcontractor, as required by County or County's Representative pursuant to Article 38.1.1 shall be borne solely by Contractor and Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time on account of such replacement or substitution.

38.2 SUBCONTRACTUAL RELATIONS

38.2.1 Any part of the Work performed for Contractor by a first-tier Subcontractor shall be pursuant to a written subcontract. Each such subcontract shall require the Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to Contractor by the terms of the Contract Documents, to assume toward Contractor all

the obligations and responsibilities which Contractor assumes towards County by the Contract Documents, and to perform such portion of the Work in accordance with the Contract Documents. Each such subcontract shall preserve and protect the rights of County under the Contract Documents, with respect to the Work to be performed by Subcontractor, so that subcontracting thereof will not prejudice such rights. Contractor shall cause each such subcontract to expressly include the following requirements:

38.2.1.1 Subcontractor waives all rights that Subcontractor may have against County for damages caused by fire or other perils covered by builder's risk property insurance carried by Contractor or County.

38.2.1.2 County and entities and agencies designated by County will have access to and the right to audit and the right to copy at County's cost all of Subcontractor's books, records, contracts, correspondence, instructions, drawings, receipts, vouchers, purchase orders, and memoranda relating to the Work. Subcontractor shall preserve all such records and other items for a period of at least 3 years after Final Completion.

38.2.2 Upon the request of County, Contractor shall promptly furnish to County a true, complete, and executed copy of any subcontract.

Article 39. ENTIRE AGREEMENT

This document and the documents referred to herein or exhibits hereto are the entire Agreement between the parties and they incorporate or supersede all prior written or oral agreements or understandings.

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IN WITNESS WHEREOF, the County and Contractor have executed this Agreement on the dates indicated below, the latest shall be deemed to be the effective date of this Agreement.

COUNTY OF EL DORADO

By: _____ Dated: _____

, Chair
Board of Supervisors
County of El Dorado

Board Date: _____

ATTEST:
Kim Dawson, Clerk
Of the Board of Supervisors

By: _____ Dated: _____

Deputy Clerk

Board Date: _____

CONTRACTOR

By: _____ Dated: _____

President

By: _____ Dated: _____

Secretary

License No.: _____ Federal Employer Identification No. _____

NOTE: If Contractor is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if Contractor is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if Contractor is an individual, his/her signature shall be placed above. Contractor executing this document on behalf of a corporation or partnership shall be prepared to demonstrate by resolution, article, or otherwise that it is appropriately authorized to act in these regards. For such corporation or partnership, such authority shall be demonstrated to the satisfaction of County. If signature is by an agent, other than officer of a corporation or a member of a partnership, an appropriate Power of Attorney shall be on file with the Department prior to signing this document.

Mailing Address: _____

Business Address: _____

City, Zip: _____

Phone: _____ Fax: _____

*** END OF AGREEMENT ***

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EXHIBIT "A"

APPLICATION AND CERTIFICATE FOR PAYMENT - EXHIBIT A

TO OWNER:
El Dorado County
3000 Fairlane, #2
Placerville, CA 95667
FROM CONTRACTOR:

PROJECT:

APPLICATION #: 1
PERIOD TO:
PROJECT NOS:

CONTRACT DATE:

Distribution to:
☐ County
☐ Cont Adm
☐ Contractor
☐
☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet is attached.

1. ORIGINAL CONTRACT SUM----------	$	
2. Net change by Change Orders----------$	$	
3. CONTRACT SUM TO DATE (Line 1 +/- 2)	$	
4. TOTAL COMPLETED & STORED TO DATE-$ (Column G on Continuation Sheet)		
5. RETAINAGE:		
a. _____ of Completed Work (Columns D+E on Continuation Sheet)	$	
b. _____ of Stored Material (Column F on Continuation Sheet)	$	
Total Retainage (Line 5a + 5b or Total in Column 1 of Continuation Sheet--------)	$	
6. TOTAL EARNED LESS RETAINAGE---------- (Line 4 less Line 5 Total)	$	
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)----------	$	
8. CURRENT PAYMENT DUE----------	$	
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Contract Administrator		
Total approved this Month		
TOTALS		
NET CHANGES by Change Order		

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown therein is now due.

CONTRACTOR:

By: _____ Date: _____

State of: California
County of: El Dorado

____ _____

_____

CERTIFICATE FOR PAYMENT

In accordance with Contract Documents, based on on-site observations and the data comprising application, the Contract Administrator certifies to El Dorado County that to the best of the Contract Administrator's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ---------- $_____

(Attach explanation if amount certified differs from the amount applied for. Initial all figures on this application and on the Continuation Sheet that are changed to conform to the amount certified.)

CONTRACT ADMINISTRATOR

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

EXHIBIT "A"

CONTINUATION SHEET

ATTACHMENT TO PAY APPLICATION

PROJECT:

APPLICATION NUMBER: 1
APPLICATION DATE:
PERIOD TO:
CONTRACTOR'S PROJECT NO:

A	B	C	D	E	F	G		H	I
Item No.	**Description of Work**	**Scheduled Value**	**Work Completed**		**Materials Presently Stored (Not In D or E)**	**Total Completed And Stored To Date (D + E + F)**	**% (G/C)**	**Balance To Finish (C - G)**	**Retainage**
			From Previous Application (D + E)	**This Period**					
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	SUBTOTALS PAGE 2								

COUNTY OF EL DORADO

PAYMENT BOND

(Section 3247, Civil Code)

Bond No. _____

WHEREAS, the County of El Dorado, a political subdivision of the State of California, hereafter referred to as "Obligee", has awarded to Contractor

_____

hereafter referred to as "Principal", a contract for the work described as follows:

SHAKORI GARAGE REPLACEMENT
BID #21-968-062

AND, WHEREAS, said Principal is required to furnish a bond in connection with said contract, guaranteeing the faithful performance thereof:

NOW, THEREFORE, we the undersigned Principal and Surety are held and firmly bound unto the Obligee, in the sum of _____Dollars, ($_____) to be paid to the Obligee, for which payment we bind ourselves, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH,
That if said Principal or its subcontractors shall fail to pay any of the persons named in Civil Code Section 3181, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by such claimant, or any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Principal and his subcontractors pursuant to Section 18806 of the Revenue and Taxation Code, with respect to such work and labor, that the Surety herein will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, the Surety will pay a reasonable attorney's fee to be fixed by the court.

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

Dated: _____

Correspondence or Claims relating to this bond should be sent to the Surety at the following address:

_____ _____
PRINCIPAL

_____ _____
SURETY

_____ _____
ATTORNEY-IN-FACT

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

NOTARY ACKNOWLEDGMENTS ATTACHED

PRINCIPAL

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

ACKNOWLEDGMENT

State of California

County of _____

On_____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

SURETY

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

ACKNOWLEDGMENT

State of California

County of _____

On_____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

COUNTY OF EL DORADO

PERFORMANCE BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, that we _____

the Contractor in the Contract hereto annexed, as Principal, and _____

as Surety, are held firmly bound unto the County of El Dorado, a political subdivision of the State of California, hereinafter called the "Obligee" in the sum of _____DOLLARS, ($_____) lawful money of the United States, for which payment, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

Signed, sealed and dated: _____

The condition of the above obligation is such that if said Principal as Contractor in the Contract hereto annexed shall faithfully perform each and all of the conditions of said Contract to be performed by him, and shall furnish all tools, equipment, apparatus, facilities, transportation, labor and material, other than material, if any, agreed to be furnished by the Obligee, necessary to perform and complete, and to perform and complete in a good and workmanlike manner, the work of **BID #21-968-062** for the **SHAKORI GARAGE REPLACEMENT** in strict conformity with the terms and conditions set forth in the Contract hereto annexed, then this obligation shall be null and void; otherwise this bond shall remain in full force and effect and the said Surety will complete the Contract work under its own supervision, by Contract or otherwise, and pay all costs thereof for the balance due under terms of the Contract, and the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work.

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

This guarantee shall insure the Obligee during the work required by any Contract and for a period of one (1) year from the date of acceptance of the work against faulty or improper materials or workmanship that may be discovered during that time.

No right of action shall accrue under this bond to or for the use of any person other than the Obligee named herein.

Dated:_____, 20_____.

Correspondence or Claims relating to this bond should be sent to the Surety at the following address:

_____ _____

PRINCIPAL

_____ _____

SURETY

_____ _____

ATTORNEY-IN-FACT

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

NOTARY ACKNOWLEDGMENTS ATTACHED

PRINCIPAL

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

SURETY

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

Print and Reset Form | Reset Form

YEAR 20☐☐

Withholding Exemption Certificate

CALIFORNIA FORM 590

(This form can only be used to certify exemption from nonresident withholding under California R&TC Section 18662. This form cannot be used for exemption from wage withholding.)

File this form with your withholding agent.
(Please type or print)

Withholding agent's name

Vendor/Payee's name

Vendor/Payee's ☐ Social security number ☐ SOS no. ☐ California corp. no. ☐ FEIN

Note: Failure to furnish your identification number will make this certificate void.

Vendor/Payee's address (number and street) | APT no. | Private Mailbox no. | Vendor/Payee's daytime telephone no. ( )

City | State | ZIP Code

I certify that for the reasons checked below, the entity or individual named on this form is exempt from the California income tax withholding requirement on payment(s) made to the entity or individual. Read the following carefully and check the box that applies to the vendor/payee:

☐ **Individuals — Certification of Residency:**
I am a resident of California and I reside at the address shown above. If I become a nonresident at any time, I will promptly inform the withholding agent. See instructions for Form 590, General Information D, for the definition of a resident.

☐ **Corporations:**
The above-named corporation has a permanent place of business in California at the address shown above or is qualified through the California Secretary of State to do business in California. The corporation will withhold on payments of California source income to nonresidents when required. If this corporation ceases to have a permanent place of business in California or ceases to be qualified to do business in California, I will promptly inform the withholding agent. See instructions for Form 590, General Information E, for the definition of permanent place of business.

☐ **Partnerships:**
The above-named partnership has a permanent place of business in California at the address shown above or is registered with the California Secretary of State, and is subject to the laws of California. The partnership will file a California tax return and will withhold on foreign and domestic nonresident partners when required. If the partnership ceases to do any of the above, I will promptly inform the withholding agent. **Note:** For withholding purposes, a Limited Liability Partnership is treated like any other partnership.

☐ **Limited Liability Companies (LLC):**
The above-named LLC has a permanent place of business in California at the address shown above or is registered with the California Secretary of State, and is subject to the laws of California. The LLC will file a California tax return and will withhold on foreign and domestic nonresident members when required. If the LLC ceases to do any of the above, I will promptly inform the withholding agent.

☐ **Tax-Exempt Entities:**
The above-named entity is exempt from tax under California R&TC Section 23701 _____ (insert letter) or Internal Revenue Code Section 501(c) _____ (insert number). The tax-exempt entity will withhold on payments of California source income to nonresidents when required. If this entity ceases to be exempt from tax, I will promptly inform the withholding agent.
Note: Individuals cannot be tax-exempt entities.

☐ **Insurance Companies, IRAs, or Qualified Pension/Profit Sharing Plans:**
The above-named entity is an insurance company, IRA, or a federally qualified pension or profit-sharing plan.

☐ **California Irrevocable Trusts:**
At least one trustee of the above-named irrevocable trust is a California resident. The trust will file a California fiduciary tax return and will withhold on foreign and domestic nonresident beneficiaries when required. If the trustee becomes a nonresident at any time, I will promptly inform the withholding agent.

☐ **Estates — Certification of Residency of Deceased Person:**
I am the executor of the above-named person's estate. The decedent was a California resident at the time of death. The estate will file a California fiduciary tax return and will withhold on foreign and domestic nonresident beneficiaries when required.

CERTIFICATE: Please complete and sign below.

Under penalties of perjury, I hereby certify that the information provided herein is, to the best of my knowledge, true and correct. If conditions change, I will promptly inform the withholding agent.

Vendor/Payee's name and title (type or print) _____

Vendor/Payee's signature ▶ _____ Date _____

For Privacy Act Notice, get form FTB 1131 (individuals only).

59004103

Instructions for Form 590

Withholding Exemption Certificate

References in these instructions are to the California Revenue and Taxation Code (R&TC).

General Information

A Purpose

Use Form 590 to certify an exemption from nonresident withholding. Complete and present Form 590 to the withholding agent. The withholding agent will then be relieved of the withholding requirements if the agent relies in good faith on a completed and signed Form 590 unless told by the Franchise Tax Board (FTB) that the form should not be relied upon.

Important – This form cannot be used for exemption from wage withholding. Any questions regarding wage withholding should be directed to the California Employment Development Department.

Do not use Form 590 if you are a seller of California real estate. Sellers of California real estate should use Form 593-C, Real Estate Withholding Certificate.

B Law

R&TC Section 18662 requires withholding of income or franchise tax on payments of California source income made to nonresidents of California.

Withholding is required on:

- Payments to nonresidents for services rendered in California;
- Distributions of California source income made to domestic nonresident partners and members and allocations of California source income made to foreign partners and members;
- Payments to nonresidents for rents if the payments are made in the course of the withholding agent's business;
- Payments to nonresidents for royalties for the right to use natural resources located in California;
- Distributions of California source income to nonresident beneficiaries from an estate or trust; and
- Prizes and winnings received by nonresidents for contests in California.

For more information on withholding and waiver requests, get FTB Pub. 1017, Nonresident Withholding Partnership Guidelines, and FTB Pub. 1023, Nonresident Withholding Independent Contractor, Rent and Royalty Guidelines. To get a withholding publication see General Information G.

C Who can Execute this Form

Form 590 can be executed by the entities listed on this form.

Note: In a situation where payment is being made for the services of a performing entity, this form can only be completed by the performing entity or the performing entity's partnership or corporation. It **cannot** be completed by the performing entity's agent or other third party.

Note: The grantor of a revocable/grantor trust shall be treated as the vendor/payee for withholding purposes. Therefore, if the vendor/payee is a revocable/grantor trust and one or more of the grantors is a nonresident, withholding is required. If all of the grantors of a revocable/grantor trust are residents, no withholding is required. Resident grantors can check the box on Form 590 labeled "Individuals — Certification of Residency."

D Who is a Resident

A California resident is any individual who is in California for other than a temporary or transitory purpose or any individual domiciled in California who is absent for a temporary or transitory purpose.

An individual domiciled in California who is absent from California for an uninterrupted period of at least 546 consecutive days under an employment-related contract is considered outside California for other than a temporary or transitory purpose.

Note: Return visits to California that do not total more than 45 days during any taxable year covered by the employment contract are considered temporary.

This provision does not apply if an individual has income from stocks, bonds, notes, or other intangible personal property in excess of $200,000 in any taxable year in which the employment-related contract is in effect.

A spouse who is absent from California for an uninterrupted period of at least 546 days to accompany a spouse who is under an employment-related contract is considered outside of California for other than a temporary or transitory purpose.

Generally, an individual who comes to California for a purpose which will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident. For assistance in determining resident status, get FTB Pub. 1031, Guidelines for Determining Resident Status, or call the Franchise Tax Board at (800) 852-5711 or (916) 845-6500 (not toll-free).

E What is a Permanent Place of Business

A corporation has a permanent place of business in California if it is organized and existing under the laws of California or if it is a foreign corporation qualified to transact intrastate business by the California Secretary of State. A corporation that has not qualified to transact intrastate business (e.g., a corporation engaged exclusively in interstate commerce) will be considered as having a permanent place of business in California only if it maintains a permanent office in California that is permanently staffed by its employees.

F Withholding Agent

Keep Form 590 for your records. Do not send this form to the FTB unless it has been specifically requested.

Note: If the withholding agent has received Form 594, Notice to Withhold Tax at Source, only the performing entity can complete and sign Form 590 as the vendor/payee. If the performing entity completes and signs Form 590 indicating no withholding requirement, you must send a copy of Form 590 with Form 594 to the FTB.

For more information, contact the Withholding Services and Compliance Section. See General Information G.

The vendor/payee must notify the withholding agent if:

- The individual vendor/payee becomes a nonresident;
- The corporation ceases to have a permanent place of business in California or ceases to be qualified to do business in California;
- The partnership ceases to have a permanent place of business in California;
- The LLC ceases to have a permanent place of business in California; or
- The tax-exempt entity loses its tax-exempt status.

The withholding agent must then withhold. Remit the withholding using Form 592-A, Nonresident Withholding Remittance Statement, and complete Form 592, Nonresident Withholding Annual Return, and Form 592-B, Nonresident Withholding Tax Statement.

G Where to get Publications, Forms, and Additional Information

You can download, view, and print FTB Publications 1017, 1023, 1024, and nonresident withholding forms, as well as other California tax forms and publications not related to nonresident withholding from our Website at:

www.ftb.ca.gov

To have publications or forms mailed to you or to get additional nonresident withholding information, please contact the Withholding Services and Compliance Section.

WITHHOLDING SERVICES AND COMPLIANCE SECTION
FRANCHISE TAX BOARD
PO BOX 942867
SACRAMENTO CA 94267-0651

Telephone: **(888)** 792-4900
(916) 845-4900 (not toll-free)
FAX: (916) 845-9512

Assistance for persons with disabilities:
We comply with the Americans with Disabilities Act. Persons with hearing or speech impairments please call TTY/TDD (800) 822-6268.

Asistencia bilingüe en español
Para obtener servicios en español y asistencia para completar su declaración de impuestos/formularios, llame al número de teléfono (anotado arriba) que le corresponde.

County of El Dorado

OFFICE OF AUDITOR-CONTROLLER

360 FAIR LANE
PLACERVILLE, CALIFORNIA 95667
Phone: (530) 621-5487 FAX: (530) 295-2535

JOE HARN, CPA
Auditor-Controller

BOB TOSCANO
Assistant Auditor-Controller

PAYEE DATA RECORD

(Required in lieu of IRS W-9 when receiving payment from the County of El Dorado) Version: April 2014

PAYEE DATA RECORD

INSTRUCTIONS: Complete all information on this form. Sign, date, and return to the address shown at the bottom of this page. Prompt return of the **fully completed** form will prevent delays in processing payments. Information provided in this form will be used by the County of El Dorado to prepare Information Returns (Forms 1099), for withholding on payments to nonresident payees, and for reporting to the Employment Development Department (EDD).

NAME AND ADDRESS

Name (as shown on your income tax return)

Business name/Doing business as/Disregarded entity name, if different from above

Physical address (number, street, and apt. or suite)	Remittance address (if different than physical)
City, state, zip code	City, state, zip code

Phone number	Fax number (optional)	Email (optional)

FEDERAL TAX CLASSIFICATION & EXEMPTIONS

Check appropriate federal tax classification

◯ Individual / sole proprietor ◯ Partnership ◯ Trust / estate ◯ Other (see instructions) ► ____

◯ C Corporation ◯ S Corporation If you are a corporation, do you provide legal or medical services? ◯ Yes ◯ No

◯ Limited liability company. Enter the tax classification (C=C Corporation, S=S Corporation, P=Partnership) ____

NOTE: IF YOU ARE A SINGLE MEMBER LLC (DISREGARDED ENTITY), ENTER THE TAX CLASSIFICATION OF THE OWNER IDENTIFIED ON THE NAME LINE.

Exempt payee code (if any) – see instructions ___ Exemption from FATCA reporting code (if any) – see instructions ___

TAX IDENTIFICATION NUMBER

Tax identification number (TIN)

Enter your TIN in the appropriate box. If you are an individual or sole proprietor, you must enter your SSN. You may choose to provide your EIN in addition to, but not instead of, the SSN. Single member LLCs (disregarded entities) must enter the TIN of the owner identified on the Name line.

Social Security Number

			-			-				
			-			-				

Employer Identification Number

		-							
		-							

RESIDENCY STATUS

Check appropriate box for residency status

◯ California resident / exempt from nonresident withholding – qualified to do business in California or maintains a permanent place of business in California (attach CA Form 590)

◯ California nonresident (see instructions)

NOTE: Payments to California **nonresidents** for services performed in California and for certain rents derived from properties located in California that exceed $1,500 in a calendar year will be subject to 7% nonresident withholding unless you have obtained a waiver or have been approved for reduced withholding by the Franchise Tax Board. There is no withholding on payments for product and for services performed outside of California.

☐ Obtained Franchise Tax Board waiver of State withholding (attach a copy if applicable)

☐ Obtained Franchise Tax Board approval for reduced withholding (attach a copy if applicable)

California sales tax permit number
(required only for California nonresident vendors that charge California sales tax)

CERTIFICATION

Under penalties of perjury, I certify that:
1) the TIN shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me) **and**
2) I am not subject to backup withholding **and 3**) I am a U.S. citizen or other U.S. person **and 4)** the FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Authorized Payee Representative's Name (Type or Print)		**Title**
Signature	**Date**	**Telephone**

Should my residency status or any other information provided above change, I will promptly notify County of El Dorado at the address listed above.

RETURN FORM TO

Please return completed form to:

Department/office:	
Mailing address:	

Phone:		**Fax:**		**Email:**	

COUNTY OF EL DORADO, PAYEE DATA RECORD (REVERSE)

PAYEE DATA RECORD	A completed Payee Data Record is required for payments to all entities and will be kept on file at the County of El Dorado Auditor-Controller's Office. Payees who do not wish to complete the Payee Data Record may elect to not do business with the County of El Dorado. If the payee does not complete the form and the required payee data is not otherwise provided, payment may be reduced for federal backup withholding, California backup withholding and California nonresident withholding.
FEDERAL TAX CLASSIFICATION	Check the applicable federal tax classification. Note that if an LLC is disregarded as an entity separate from its owner, enter the appropriate tax classification of the owner identified on the "Name" line. **Individual:** Enter the name shown on your income tax return. If the account is in joint names, list first, and then circle, the name of the person or entity whose SSN you entered on the form. **Sole proprietor:** Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as" name on the "Business name/Doing business as/Disregarded entity name" line. **Partnership, C Corporation, or S Corporation:** Enter the entity's name on the "Name" line and any business, trade, or "doing business as" name on the "Business name/Doing business as/Disregarded entity name" line. **Disregarded entity:** Enter the owner's name on the "Name" line. The name of the entity entered on the "Name" line should never be a disregarded entity. The name on the "Name" line must be the name shown on the income tax return on which the income should be reported. Check the appropriate box for the U.S. federal tax classification of the person whose name is entered on the "Name" line (individual/sole proprietor, partnership, C corporation, S corporation, trust/estate). **Limited liability company (LLC):** If the person identified on the "Name" line is an LLC, check the "Limited Liability Company" box only and enter the appropriate code for the U.S. federal tax classification. **Other entities:** Enter your business name as shown on required U.S. federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade or DBA name on the "Business name/Doing business as/Disregarded entity name" line.
EXEMPTIONS	**Exemptions**: If you are exempt from backup withholding and/or FATCA reporting, enter in the exemptions box any code(s) that may apply to you. Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends. Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions. The following codes identify payees that are exempt from backup withholding: **1** – an organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2); **2** – The United States or any of its agencies or instrumentalities; **3** – A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities; **4** – A foreign government or any of its political subdivisions, agencies, or instrumentalities; **5** – A corporation; **6** – A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States; **7** – A futures commission merchant registered with the Commodity Futures Trading Commission; **8** – A real estate investment fund; **9** – An entity registered at all times during the tax year under the Investment Company Act of 1940; **10** – A common trust fund operated by a bank under section 584(a); **11** – A financial institution; **12** – A middleman known in the investment community as a nominee or custodian; **13** – A trust exempt from tax under section 664 or described in section 4947. **Exemption from FATCA reporting**. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. **A**—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37); **B**—The United States or any of its agencies or instrumentalities; **C**—A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities; **D**—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Reg. section 1.1472-1(c)(1)(i); **E**—A corporation that is a member of the same expanded affiliated group as a corporation described in Reg. section 1.1472-1(c)(1)(i); **F**—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state.
TAX IDENTIFICATION NUMBER	Enter your tax identification number (TIN) in the appropriate box. If you are a single member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN. **The TIN for individuals and sole proprietors is the Social Security Number (SSN).** Sole proprietors may provide their EIN in addition to but not instead of a SSN. The County of El Dorado requires that all parties entering into business transactions that may lead to payment(s) from the County provide their Taxpayer Identification Number (TIN). The TIN is also required by the California Revenue and Taxation Code Section 18646 to facilitate tax compliance enforcement activities and the preparation of Form 1099 and other information returns as required by the Internal Revenue Code Section 6109(a).
RESIDENCY STATUS	**Are you a California resident or nonresident?** A **corporation** will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California. A **partnership** is considered a resident partnership if it has a permanent place of business in California. An **estate** is a resident if the decedent was a California resident at time of death. A **trust** is a resident if at least one trustee is a California resident. For **individuals** and **sole proprietors**, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident. **Payments to all nonresidents may be subject to withholding.** Nonresident payees performing services in California or receiving certain rent, lease, or royalty payments from property (real or personal) located in California will have 7% of their total payments withheld for State income taxes. However, no withholding is required if total payments to the payee are $1,500 or less for the calendar year or if payment is for product. Nonresidents who have been granted a waiver on payments of California source income from the California Franchise Tax Board must submit a copy of the waiver. For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below: Withholding Services and Compliance Section: 1-888-792-4900 E-mail address: wscs.gen@ftb.ca.gov For hearing impaired with TDD, call: 1-800-822-6268 Website: www.ftb.ca.gov California nonresidents charging California sales tax are required to provide their California sales tax number.
CERTIFICATION	Provide the name, title, signature, and telephone number of the authorized individual completing this form. Provide the date the form was completed. **NOTE**: You must cross out item 2 in the certification block if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return.

CERTIFICATE OF INSURANCE FORM FOR CONTRACTORS, ARCHITECTS AND/OR ENGINEERS

CERTIFICATE ISSUER PHONE ( )	DATE EXECUTED: THIS CERTIFICATE DOES NOT AMEND, EXTEND, OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. COMPANIES AFFORDING COVERAGE		
INSURED PHONE ( )	COMPANY A LETTER COMPANY B LETTER COMPANY C LETTER COMPANY D LETTER COMPANY E LETTER	COMPANY RATING COMPANY RATING COMPANY RATING COMPANY RATING COMPANY RATING	
PROJECT DESCRIPTION PROJECT TITLE: PROJECT NUMBER: LOCATION:			

THIS IS TO CERTIFY that policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusion and conditions of such policies.

CL	Type of Insurance Coverage	Policy Number	Policy Effective Date	Policy Expiration Date	Limits of Liability (in Thousands)
	GENERAL LIABILITY [ ] Commercial General Liability [ ] Occurrence [ ] Claims Made [ ] Owner's & Contractor's Protective [ ] General Aggregate * [ ] Per Project [ ] Per Location				GENERAL AGGREGATE $ PRODUCTS-COMP/OPS AGGREGATE $ PERSONAL & ADVERTISING INJURY $ EACH OCCURRENCE $ FIRE DAMAGE (ANY ONE FIRE) $ MEDICAL EXPENSES (ANY ONE PERSON) $ DEDUCTIBLE $
	ARCHITECT'S AND/OR ENGINEER'S PROFESSIONAL LIABILITY [ ] Claims Made [ ] Project				GENERAL AGGREGATE $ EACH CLAIM $ DEDUCTIBLE $
	AUTOMOBLE LIABILITY [ ] Any Auto [ ] All Owned Autos [ ] Scheduled Autos [ ] Hired Autos [ ] Non-Owned Autos [ ] Garage Liability				 COMBINED SINGLE LIMIT $ BODILY INJURY (PER PERSON) $ BODILY INJURY (PER ACCIDENT) $ PRPERTY DAMAGE $ DEDUCTIBLE $
	EXCESS LIABILITY [ ] Umbrella Form [ ] Other Than Umbrella Form				 EACH OCCURRENCE $ AGGREGATE $
	[ ] WORKER'S COMPENSATION				----------STATUTORY----------
	EMPLOYER'S LIABILITY				(EACH ACCIDENT) $ (DISEASE - POLICY LIMIT) $ (DISEASE - EACH EMPLOYEE) $
	OTHER [ ] Installation Floater [ ] Builder's Risk [ ]				 $ $ $

* The General Aggregate limit, under Limits of Insurance, applies separately to each of the projects away from premises owned by or rented by you.

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS/ADDITIONAL INSURED:
The County of El Dorado its officers, officials, employees and volunteers are made additional insured, but only insofar as the operations under this contract are concerned.
OTHER ADDITIONAL ISSURED:

CERTIFICATE HOLDER	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED OR TERMINATED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL GIVE THIRTY (30) CAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, IN ADVANCE OF THE EFFECTIVE DATE OF SUCH CANCELLATION OR TERMINATION.
	AUTHORIZED REPRESENTATIVE SIGNATURE, TITLE, TYPED NAME, SSN AND PHONE NUMBER:

SHAKORI WAY GARAGE REPLACEMENT

BID #22-968-062

CONDITIONS OF THE CONTRACT

ARTICLE 1

GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 County: The County of El Dorado, a political subdivision of the State of California.

1.1.2 Owner: The County of El Dorado is the Owner and is identified as the Owner in the Contract and these Contract Conditions. The term Owner, and pronouns in place of the same shall mean the County of El Dorado acting by and through its duly authorized representative.

1.1.3 Owner's Representative: The Chief Administrative Office, Facilities Division Manager, or designated representative.

1.1.4 Architect: The person holding a valid California State Architect's license, whose firm has been designated within the Contract Documents as the Architect to provide services on the Project. When the Architect is referred to within the Contract Documents and no Architect has in fact been designated, then the matter shall be referred to the County and shall be interpreted as Owner's Representative.

1.1.5 Project Manager: Project Manager or such other designated representative of the Owner. The Project Manager has such duties and authority as may be set forth in the Contract Documents.

1.1.6 Contractor: The person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. The term Contractor refers to the Contractor or the Contractor's authorized representative.

1.1.7 Inspector: The individual designated by the Owner as the Inspector as set forth in Paragraph 2.1.2.

1.1.8 Subcontractor: Those contractors, of whatever tier, furnishing labor or material, or both, for the Work under the Contract with the Contractor.

1.1.9 Substantial Completion: The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

1.1.10 Final Acceptance: Conditions upon which the County will accept Work as satisfactorily completed in accordance with the Contract Documents. Requirements include, but are not limited to:

1. All Systems having been tested and accepted as having met requirements of the Contract Documents.

2. One (1) PDF format and one (1) hard copy of all as-builts, manufacturer's product data and maintenance manuals having been submitted by the Contractor and reviewed and accepted by the Owner.

3. All punch list work, as directed by the Owner, having been completed by the Contractor.

4. Acceptance of the Work by the Owner.

1.1.11 Final Payment: The Final Payment shall be the only Payment made to Contractor and shall not be considered to be the payment of any or all of the retention.

1.1.12 Architect's Supplemental Instructions/Instruction Bulletins: A written order of the Architect and reviewed by the Owner's Representative directing the Contractor to provide supplemental instructions, interpretations, or conduct minor changes in work involving neither extra cost nor extra time and being consistent with the scope and functioning of the project, if applicable.

1.1.13 Construction Change Directive: A written order issued by the Owner directing a change in the Work and stating a proposed basis for adjustment, if any, of Contract Time or Sum. The Owner may by Change Directive, without invalidating the Contract and without Contractor's agreement, order changes in the Work. This procedure will be used in the absence of agreement between Owner and Contractor, for subsequent inclusion in a Change Order.

1.1.14 Change Order: A Change Directive signed by the Owner and Contractor stating their agreement upon all of the following: 1) a change in the Work, 2) the amount of the adjustment in the Contract Price, if any, and 3) the extent of the adjustment in the Contract Time, if any.

1.1.15 Contract Documents: The Contract Documents shall include the documents described in Article 2 of the Contract, including Architect's Supplemental Instructions, Construction Change Directives, and Change Orders.

1.1.16 Work: The construction and services required by the Contract Documents, including all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations.

1.1.17 Project: The total construction of the Work performed under the Contract Documents.

1.1.18 Plans: The graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams, specifically the plans and specifications for this Project..

1.1.19 Technical Specifications: That portion of the Contract Documents Division 1 through 33 consisting of the technical written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.20 Claim: A demand or assertion by the Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time, or other relief with respect to the terms of the Contract. Claims must be made by written notice and shall include a demand for the Owner's decision. The responsibility to substantiate claims and to resolve the claims of subcontractors of whatever tier shall rest with the Contractor.

1.1.21 Work Not Included: Except for such auxiliary work as shown or specified, or is necessary as part of the construction, the following is NOT included in this contract: Any work shown but marked "Not in Contract" (NIC) or otherwise designated to be done under another contract or by Owner.

1.1.22 Furnish (material): To supply and deliver to the project ready for installation and in operating condition.

1.1.23 Install (Service or Labor): To place in final position, complete, anchored, connected, and in operable condition with respect to required codes and/or governing agency requirements.

1.1.24 Provide: To furnish and install complete. When "Furnish", "Install", or "Provide" is stated, "Provide" is implied.

1.1.25 Construct: To "Furnish" materials to "Install" in final position, complete, anchored, and connected with respect to required codes, requirements, Contract Documents, and details.

1.1.26 Day(s): All references to "day" or "days" in these Contract Documents shall be defined as calendar-day or calendar-days.

1.1.27 Normal Working Hours: Includes the hours from 7:30 a.m. to 4:30 p.m. Monday through Friday, except for County holidays.

1.1.28 Contract: The Agreement for Construction Services between Contractor and Owner.

1.2 CONTRACT DOCUMENTS

1.2.1 One Document: The Contract Documents are one document and any work shown or mentioned shall be performed or furnished. The Contractor admits and agrees that the Contract Documents exhibit the intent and purpose of the Owner in regard to the Work, and that they are not complete in every detail and are to be considered as showing the purpose and intent only; and Contractor further agrees to furnish all labor or material for any detail that is necessary to carry out the intent and purpose of the Specifications without extra charge.

1.2.2 Misuse of Words or Punctuation: The misplacement, addition, or omission of any word, letter, or punctuation mark will not in any way change the intent or meaning of the Contract Documents. Any part of the Work, or any article pertaining thereto which is not specifically set forth in these Contract Documents, but which is necessary for the proper completion of the Work, is to be supplied and set in place at the Contractor's expense, the same as if it had been mentioned in these Contract Documents. The Contractor shall furnish all things necessary to make a good and workmanlike job in accordance with the intent and purpose of the Contract Documents.

1.3 ASSIGNMENT OF CONTRACT

1.3.1 Mutual Consent: Neither party to the Contract shall assign the Contract without the written consent of the other party, nor shall the Contractor assign any moneys due or to become due to him hereunder without the written consent of the Owner.

1.3.2 Assignment Under Anti-Trust Claims: In accordance with Section 4552 of the California Government Code, and Section 7103 of the Public Contract Code, Contractor and subcontractors shall conform to the following requirements:

1. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractors offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C Section 15) or under the Cartwright Act, [Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code], arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the Owner tenders Final Payment to the Contractor, without further acknowledgment by the parties.

2. If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Government Code Sections 4550-4554, the

assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under Government Code Sections 4550-4554 if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

1.4 WAIVER OF "COMMON PRACTICE"

1.4.1 The Contractor shall waive "common practice" and "common usage" as construction criteria wherever the Contract Documents details, plans, technical specifications, governing codes, or ordinances require greater quantity or better quality than common practice or common usage would require.

1.5 EXCESSIVE COSTS

1.5.1 Failure to Comply with Contract: If Contractor fails to comply with any Contract requirements, including any required coordination with other contractors, and that failure results in additional costs to Owner, then Contractor shall be liable for such additional costs.

1.5.2 Construction Methods: If Contractor's construction methods and techniques result in additional costs to Owner, after notice, such Contractor shall be responsible for cost attributable to his methods and techniques.

ARTICLE 2

OWNER

2.1 OWNER'S REPRESENTATIVE

2.1.1 Owner Representative: The Owner will be represented by the Owner's Representative who shall oversee the performance of the Contract on behalf of the Owner.

2.1.2 Owner May Appoint Inspector: Owner shall be entitled to appoint an agent as Inspector who shall see that the performance of the Work is in strict accordance with the Contract Documents on behalf of the Owner.

2.1.3 Communication: In order that the Owner may act upon expert advice and upon good procedure, all communications from the Contractor shall be in writing and will be through said Owner's Representative or Inspector, as the Owner may direct, and all communications and instructions from the Owner to the Contractor will be so routed. The Owner reserves the right to alter this procedure without the consent of the Contractor. All communications not in compliance herewith, shall be considered non-binding on the Owner.

2.2 RIGHTS OF OWNER

2.2.1 Right to Clean Up: Subject to the strict prohibition against maintaining a nuisance, if a dispute arises between the Contractor, Subcontractors, or separate contractors as to the responsibility under their respective Contracts for maintaining the premises and surrounding area free from waste materials and rubbish the Owner may, but need not, clean up and allocate the cost among those responsible as the Inspector determines to be just.

2.2.2 Right to Accept Imperfect Work: If any part or portion of the Work completed under this Contract is defective and not in accordance with the Plans or Contract Documents, and if the imperfection is judged by Owner to be not of sufficient magnitude or importance so as to make the Work unacceptable, then Owner shall have the right and authority to retain such Work but will make such deductions in Contract Price as may be equitable and reasonable. However, Owner does not by this section; waive any other rights provided for herein.

2.2.3 Right to do Adjacent Work: The Owner reserves the right to perform construction or operations on the site of the Work. In doing this Owner may use its own forces or award separate contracts in connection with other construction or operations on the site but not covered by the Contract Documents. Contractor shall defend, indemnify, and hold Owner harmless for costs incurred by Owner that are payable to a separate contractor because of delays, improperly timed activities, or defective construction by the Contractor, unless such costs are incurred due to the sole or active negligence of Owner.

2.2.4 Right to Finish Contractor's Work: If the Contractor defaults or neglects to carry out all or any part of the Work in accordance with the Contract Documents, the Owner has the right, exercisable solely at Owner's discretion, to commence and continue completion of the Work with diligence and promptness. In such an event, if the Owner's cost to complete to Work exceeds the remaining balance of the Contract with the Contractor, Contractor shall reimburse the Owner for such excess costs.

2.2.5 Right of Partial Use of Project: The Owner may occupy or use any completed or partially completed portion of the Work at any stage, upon agreement of Owner and Contractor.

1. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents.

2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld.

3. Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

4. Unless otherwise agreed upon in writing, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of work not complying with the requirements of the Contract Documents.

5. No claim for acceleration, delay, or hindrance, may be made by Contractor on his own behalf or that of any of his subcontractors, for any delays, accelerations, or hindrances that may arise out of Owner's partial occupancy of the Project.

2.2.6 Right to Audit: Contractor shall maintain and make available to the County, State Auditor, or to any of their duly authorized representatives all books, papers, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractor records, and financial records related to or which arise out of the Work or under terms of this Contract. Contractor shall maintain such books, records, data and documents in accordance with generally accepted accounting principles and in accordance with these Contract Conditions and federal and state requirements. These books, papers, records, claims, and accounts shall be made available for examination during normal business hours and shall be readily available and accessible at Contractor's principal place of business in California, for audit during normal business hours at such place of business. Contractor shall provide office space, photocopies and other assistance to enable audit or inspection representatives to conduct such audits or inspections. This right to audit books and records directly related to this Contract shall also extend to any first-tier subcontractors employed under this Contract. Contractor shall incorporate this provision in any

subcontract entered into as a result of this Contract and shall require its subcontractors to agree to cooperate with the above-listed agencies by making all appropriate and relevant Project records available to those agencies for audit and copying.

All of Contractor's books, papers, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractor records, and financial records related to or which arise out of the work or under terms of this Contract shall be retained for access, inspection and/or audit by the County, the State Auditor, or their duly authorized representatives for at least three (3) years after County's final payment to Contractor and/or the final resolution of any claims under this Contract. Contractor shall incorporate this provision in any subcontract entered into as a result of this Contract.

2.3 RESPONSIBILITIES OF OWNER

2.3.1 Removal, Relocation, or Protection of Underground Infrastructure: If the Contractor while performing the contract discovers utility facilities not identified by the Owner in the contract plans or specifications, Contractor shall immediately notify the Owner in writing. Owner shall have the sole discretion to perform the repairs or relocation work itself, or to permit the Contractor to do such repairs or relocation work at a reasonable price. In the event that the Owner authorizes the Contractor to perform the work, the parties shall proceed with a written Change Order as set forth in Article 5 herein. Compensation to the Contractor for said costs shall be in accordance with Section 4215 of the Government Code.

Nothing herein shall be construed to require the Owner to locate the presence of any existing services not expressly included in Government Code Section 4215, nor to limit the Owner's rights or remedies set forth therein.

In accordance with the provisions of Section 4215 of the California Government Code, Contractor shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of the Owner or owner of the utility to provide for the removal or relocation of such utility facilities.

ARTICLE 3

CONTRACTOR'S RESPONSIBILITIES

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS

3.1.1 Reporting Errors in Contract Documents: The Contractor shall carefully study and compare the Contract Documents with each other and shall at once report to the Inspector errors, inconsistencies, or omissions discovered. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency, or omission in the Contract Documents without such notice to the Owner, the Contractor shall assume responsibility for such performance and shall bear all costs for correction.

3.1.2 Reporting Errors in Field Conditions: The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies, or omissions discovered shall be reported to the Owner at once.

3.1.3 No Implied Warranty: No warranty is to be implied nor shall any warranty arise by operation of law, or by interpretation of this Contract, that the Plans and Contract Documents are adequate and sufficient to construct the Project.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 Supervision of Work: The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

3.2.2 Acts of Employees and Agents: The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

3.2.3 Acts Do Not Waive Contractor's Obligation: The Contractor shall not be relieved of obligations to perform the Work in strict accordance with the Contract Documents either by activities or duties of the Owner's Representative or the Inspector in the administration of the Contract, or by tests, inspections, or approvals

3.2.4 required or performed by persons other than the Contractor.

3.3 PROSECUTION OF WORK

3.3.1 Time of the Essence: It is expressly understood and agreed that the time of beginning, rate of progress, and time of completion of the Work are of the essence. The time for substantial completion of this contract shall be November 1, 2023. No work shall begin prior to the issuance of a Contractor Notice to Proceed and in accordance with the dates specified on the Contractor Notice to Proceed.

3.3.2 Owner and Contractor recognize that time is of the essence of the Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified, plus any extensions thereof. They also recognize the delays, expense, and difficulties involved with proving in a legal proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that Contractor shall pay Owner the sum of **One Thousand Five Hundred Dollars ($1,500) per day**, as liquidated damages and not as a penalty, for each and every calendar day's delay in finishing the Work in excess of the contract time prescribed herein.

3.3.3 Work During Operational Hours: The Facility will be operational during the Work. The Contractor shall not interfere or hinder government center operations. The Contractor shall keep all equipment and materials within designated work areas and out of hallways and doorways. Emergency exit routes shall be maintained at all times.

3.3.4 Construction Schedule: The Contractor shall coordinate the final critical path method (CPM) construction schedule with the Owner. The CPM schedule is required to be submitted within five (5) calendar days of issuance of Notice to Proceed. The CPM schedule will be for Owner's information only. Silence or inaction with regard to Contractor's schedule shall not be construed as acquiescence or acceptance of the schedule as being binding on Owner. Contractor's schedule shall provide for the completion date not to exceed nor shall it provide for the completion date earlier than the time limits for completion set forth in the Contract Documents. Float, whether for the entire Project or for specific tasks therein, shall be deemed to be for the benefit of the Owner. The Contractor shall keep the construction schedule current, and shall submit weekly updates to the Owner's Representative and Inspector, if any. The Contractor shall further prepare and keep current a schedule of submittals which is coordinated with the construction schedule, and which allows the Owner reasonable time to review the submittals.

3.4 SUBMITTALS

3.4.1 Use of Listed Manufacturers; Review of "Or Equals": Contractor shall utilize only the manufacturer designated in its Proposal for major equipment items listed therein. In accordance with the provisions of Section 3400 of the California Public Contract Code, but subject to Subsection (b) thereof, if requesting approval of an “or equal” product, Contractor shall within two (2) business days following the bid opening

submit data substantiating its request. Failure to submit such substantiating data within two (2) business days following the bid opening shall constitute submission of a non-responsive bid.

3.5 STATE AND FEDERAL LABOR REQUIREMENTS

3.5.1 Hours of Work:

1. Eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated that no workman employed at any time by the Contractor, or by any subcontractor under this Contract, upon the Work, shall be required or permitted to work thereon more than eight (8) hours in any one (1) calendar day and/or more than forty (40) hours in any one (1) calendar week except as provided in Section 1815 of the Labor Code of California, and it is further expressly stipulated that for each and every violation of said last named stipulation, said Contractor shall forfeit, as penalty to the said Owner, $25.00 for each workman employed in the execution of this Contract, or by any subcontractor under this Contract, for each calendar day during which said workman is required or permitted to labor more than eight (8) hours in any one (1) calendar day or more than forty (40) hours in any one (1) calendar week in violation of the provisions of said Labor Code.

2. In accordance with the provisions of Section 1776 of the Labor Code of the State of California, the Contractor, and each subcontractor, shall also keep an accurate record showing the names and actual hours worked for all workers employed by him in connection with the Work contemplated by the Agreement, which record shall be open at all reasonable hours to the inspection of the Owner or its officers or agents, and to the Chief of the Division of Labor Statistics and Law Enforcement or the Department of Industrial Relations, his deputies or agents.

3.5.2 Apprentice Employment:

1. Pursuant to the provisions of Section 1777.5 of the Labor Code as amended, the Contractor or subcontractor employing tradesmen in any apprenticeable occupation shall apply to the joint apprenticeship committee nearest the site of the public works project and which administers the apprenticeship program in that trade for a Certificate of Approval. The certificate will also fix the ratio of apprentices to journeymen that will be used in the performance of the Contract. All requirements and exceptions to those requirements set forth herein for Apprenticeship Employment are contained in Labor Code Section 1777.5 and are available from the applicable Joint Apprenticeship Committee.

2. The Contractor shall make contributions to funds established for the administration of the apprenticeship programs if he employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

3. The Contractor and any subcontractor under him shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

3.5.3 Wage Rates:

1. Pursuant to Labor Code Section 1770 et seq., each laborer or mechanic of Contractor or any subcontractor engaged in work on the Project under this Contract shall be paid not less than the hourly wage rate of per diem wages set forth in the prevailing wage rate schedule published by the Director of Industrial Relations regardless of any contractual relationship which may be alleged to exist between Contractor or any subcontractor and such laborers and mechanics.

2. Any laborer or mechanic employed to perform work on the Project under this Contract, which work is not covered by any of the foregoing classifications, shall be paid not less than the prevailing rate of per diem wages specified herein for the classification which most nearly corresponds to the work to be performed by him.

3. The foregoing specified prevailing wage rates are minimum rates only, and the Contractor may pay any wage rate in excess of the applicable rate contained in this Contract.

4. Pursuant to Labor Code Section 1775, the Contractor as a penalty to the Owner shall forfeit $50.00 for each calendar day, or portion thereof for each worker paid less than prevailing rate established by the Department of Industrial Relations for such work or craft in which such worker is employed. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which the worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor.

5. An error on the part of an awarding body does not relieve the Contractor from responsibility for payment of the prevailing rate of per diem wages and penalties pursuant to Labor Code Sections 1770 - 1775.

6. All Contractors and subcontractors are subject to the provisions of Sections 1810-1814 of the California Labor Code which provide that the maximum hours a worker is to be employed is limited to eight (8) hours a day and forty (40) hours a week and the Contractor or subcontractor shall forfeit, as a penalty, $25.00 for each worker employed in the execution of the Contract for each calendar day during which a worker is required or permitted to labor more than eight (8) hours in any calendar day or more than forty (40) hours in any calendar week and is not paid overtime.

7. Section 1815 of the California Labor Code requires that not withstanding the provisions of Sections 1810-1814, employees of Contractors who work in excess of eight (8) hours per day and forty (40) hours per week shall be compensated for all hours worked in excess of eight (8) hours per day at not less than 1-1/2 times the basic rate of pay.

8. In the case of federally funded projects, where federal and state prevailing wage requirements apply, compliance with both is required. This project is funded in whole or part by federal funds. Contractor's attention is directed to the requirements of, and compliance with the Copeland Act (18 U.S.C. 874 and 29 CFR Part 3), the Davis-Bacon Act (40 U.S.C. 276a to 276a-7 and 29 CFR Part 5), and the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330 and 29 CFR Part 5).

9. If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by Contractor and subcontractors, Contractor and subcontractors shall pay not less than the federal minimum wage rate which most closely approximates the duties of the employees in question.

10. Interested parties can obtain the current wage information by submitting requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at http://www.dir.ca.gov/dlsr/PWD. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

11. Copies of the applicable state prevailing wage rates are on file with the County of El Dorado, Chief Administrative Office, Facilities Division, 3000 Fairlane Court, Placerville, CA 95667, and they are available to any interested party on request.

3.5.4 Certified Payroll: As required under the provisions of Labor Code Section 1776 Contractor and subcontractors shall keep accurate payroll records:

1. The payroll records shall show the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee by him or her in connection with the Project.

2. A certified copy of all payroll records enumerated above shall be available for inspection at all reasonable hours at the principal office of the Contractor as follows:

   a. Make available or furnish to the employee or his or her authorized representative on request.

   b. Make available for inspection or furnished upon request to a representative of the Owner, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

   c. Make available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the Owner, the Division of Labor Standards Enforcement, or the Division of Apprenticeship Standards. The requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractor, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the Contractor.

3.5.5 Discrimination In Employment: No discrimination shall occur in the employment of persons upon the Work because of race, color, sex, national origin, or ancestry or religion of such persons.

3.5.6 Convict-Made Materials: Except as may be provided by law, the Contractor agrees that no materials manufactured or produced in a penal or correctional institution shall be incorporated in the construction under this Contract.

3.6 TAXES

3.6.1 Contractor Pays Taxes: The Contractor and subcontractors shall pay all local, state, and federal taxes upon labor or materials involved in their branch of the Work, cost of same to be included in the Contract price.

3.7 COMPLIANCE WITH LAW AND LOCAL REQUIREMENTS

3.7.1 Regulations: The Contractor and all subcontractors shall conform to and abide by all city, county, and state laws, ordinances, rules, and regulations, as the same pertain to the Work contemplated by said Plans and Contract Documents.

3.7.2 Permits, Licenses, and Fees: The County shall procure and pay for all permits and inspection fees that may be required to commence, carry on, and complete the Contract. Contractor shall be responsible for all applicable license fees.

3.7.3 Patent Rights, Copyrights, Trade Names, and Royalties: The Contractor shall indemnify and save harmless the Owner and all persons acting under him for all liability on account of any patent rights, copyrights, or trade names which may affect the articles or materials or their application under the Contract Documents. The Contractor shall pay all royalties, or other charges that may arise, due to methods, types of

construction, processes, materials or use of equipment, and shall hold the Owner harmless from any charges whatsoever which may arise, and shall furnish written assurance, satisfactory to the Owner, that such charges have been paid.

3.8 GUARANTEE

3.8.1 Final Guarantee: The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year. Contractor warrants and guarantees for a period of one year from the date of the Notice of Acceptance that the Work is free from all defects due to faulty materials or workmanship and Contractor shall promptly make such corrections as may be necessary, including repairs of any damage to other parts of the Work resulting from such defects. Owner will give notice of observed defects with reasonable promptness. In the event that Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects within ten (10) calendar days after being notified in writing by Owner, Owner may do so and charge Contractor the cost thereby incurred.

3.8.2 Extended Guarantees: If a guaranty exceeding one year is provided by the supplier or manufacturer of any equipment used in this Project, then the guarantee for such materials shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials, and Contractor shall supply Owner with all warranty and guaranty documents relative to equipment and materials incorporated in the job and guaranteed by their suppliers or manufacturers.

3.9 WARRANTY

3.9.1 Contract Warranty: The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new, unless otherwise required or permitted by the Contract, that the Work will be free from defects or flaws and is of the highest quality of workmanship and that the Work will conform with the requirements of the Contract. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective.

3.10 INDEMNIFICATION

3.10.1 Owner Not Liable for Damages: The Owner or its authorized representative shall not in any way or manner be answerable or suffer loss, damage, expense, or liability for any loss or damage that may happen to said Work, or part thereof, or in or about the same during its construction and before acceptance and the said Contractor shall assume all liabilities of every kind or nature arising from said Work, either by accident, negligence, theft, vandalism, or any cause whatever; and shall hold the Owner and its authorized representatives harmless from all liability of every kind and nature arising from accident, negligence, or any cause whatever, other than for the active negligence of the Owner, its officers, agents and employees.

3.10.2 Owner Not Liable for Debts: Indebtedness incurred for any cause in connection with this Work must be paid by the Contractor, and the Owner is hereby relieved at all times from any indebtedness or claim other than the Contract price.

3.10.3 Indemnity: To the fullest extent allowed by law, Contractor shall defend, indemnify, and hold the County and its officers, directors, and employees, harmless against and from any and all claims, suits, losses, damages, and liability for damages, including attorney's fees and other costs of defense brought for or on account of injuries to or death of any person, including but not limited to, workers and the public, or on account of injuries to or death of County employees or damage to property, or any economic, consequential or special damages which are claimed or which shall in any way arise out of or be connected with Contractor's services, operations or performance hereunder, regardless of the existence or degree of fault or negligence on the part of the County, the Contractor, subcontractors or employees of any of these, except

for the active, or sole negligence of the County its officers and employees, or where expressly prescribed by statute.

The duty to indemnify and hold harmless the County specifically includes the duties to defend set forth in Section 2778 of the Civil Code. The insurance obligations of Contractor are separate, independent obligations under the Contract Documents, and the provisions of this defense and indemnity are not intended to modify nor should they be construed as modifying or in any way limiting the insurance obligations set forth in the Contract Documents.

3.10.4 Environmental Indemnification: To the fullest extent allowed by law, from and after recording of the Notice of Acceptance, Contractor shall indemnify, defend, and save harmless Owner from all losses or damages resulting from injury to or death of any person and damage to property, and any fine, which is occasioned by or arises out of any breach of Environmental and Toxics Warranty, representations, or covenants of Contractor under this Contract. Contractor further agrees to indemnify and hold harmless Owner, its officers, employees, and agents, from and against any and all liability as follows:

1. Including all foreseeable and all unforeseeable consequential damages, directly or indirectly arising out of the use, generation, storage, or disposal of hazardous materials in any location by Contractor, and

2. Including, without limitation, the cost of any required or necessary repair, cleanup, or detoxification and the preparation of any closure or other required plans, whether such action is required or necessary prior to or following filing of the Notice of Acceptance to the full extent that such action is attributable, directly or indirectly, to the presence or use, generation, storage, release, threatened release, or disposal of hazardous materials by any person on the Project prior to filing of the Notice of Acceptance. Contractor's obligations pursuant to the foregoing indemnity shall survive the filing of the Notice of Acceptance of the Project.

3. This agreement as to indemnity and reimbursement as above set forth to be undertaken by the Contractor shall survive the performance of the remainder of said Contract and shall remain in full force and effect notwithstanding such performance.

4. The foregoing duties of indemnity shall not apply to loss, damage, expense, or liability caused solely by the active negligence of the Owner or the Owner's agents, servants or independent contractors.

3.11 WORK REQUIREMENTS

3.11.1 Conduct of Work: The Contractor shall confine the storage of his equipment and materials to limits as designated. He shall at all times exercise due caution and provide all necessary barricades and other safety equipment around the Work to protect the general public from injury to person and property during the entire time of performance of the Work. The Contractor shall not create excessive dust or noise.

3.11.2 Maintenance of Site: Strict prohibition against committing nuisances in or about the Work shall be maintained, and the Contractor shall not in any way obstruct or interfere with movements of traffic on any public right of way without first obtaining the necessary approval of the proper public agency.

3.11.3 Clean Up of Site: The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.11.4 Cutting and Patching:

1. The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.12 SUBCONTRACTORS

3.12.1 Contractor Responsible for Subcontractor's Acts: Contractor shall be fully responsible to Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

3.12.2 Contractor's Subcontract: Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to Contractor by the terms of the Contract Documents insofar as applicable to the Work of subcontractors and to give Contractor the same power as regards terminating any subcontract that Owner may exercise over Contractor under any provisions of the Contract Documents. The percentage of retention withheld from any subcontractor by the Contractor shall not exceed the percentage of retention withheld from the Contractor as provided herein.

3.12.3 Ineligible Subcontractor: Contractor is prohibited from performing work with a subcontractor who is ineligible to perform work pursuant to Labor Code Section 1777.1 or 1777.7.

3.13 SUPERINTENDENT

3.13.1 Work Superintendent: The Contractor will employ and maintain on the worksite a qualified supervisor or Superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the sites. The Superintendent shall have full authority to act on behalf of the Contractor, and all communications given to the Superintendent shall be as binding as if given to the Contractor. The Superintendent shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

3.14 LABOR AND MATERIALS

3.14.1 Skilled Labor: All labor must be especially skilled for each kind of work, and must be thorough and first class in all respects. Any person whom the Inspector or Owner may deem incompetent or disorderly shall be promptly discharged from the Project and not re-employed.

3.14.2 Quality of Materials: All materials used on this Contract shall be new and the best market quality, unless specified or shown otherwise. All Work executed under this Contract shall be done in the best, most thorough, substantial and workmanlike manner and without flaws. All materials and labor shall be subject to the approval of the Inspector as to its quality and fitness, and shall be immediately removed if it does not meet with his approval. The Inspector may refuse to issue the Certificate for Payment until all defective materials or work have been removed and other material of proper quality substituted therefore. All removal and replacement with same shall be done at the Contractor's expense. Manufactured articles,

materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

ARTICLE 4

ADMINISTRATION OF CONTRACT

4.1 ADMINISTRATION OF CONTRACT

4.1.1 Contract Communications: Unless otherwise provided in the Contract or when direct communications have specifically been authorized, all parties shall communicate through the Owner's Representative or the Inspector if the Owner so directs. Communications by and with the subcontractors and material suppliers shall be through the Contractor. Communications by Contractor to separate contractors, architect, or County employees shall be through the Owner's Representative or Project Manager.

4.1.2 Control of Work: The Owner's Representative or the Inspector will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Owner's Representative or the Inspector will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner's Representative or the Inspector will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.1.3 Recommendation for Payments: Based on his or her observations and evaluations of the Contractor's Applications for Payment, the Owner's Representative will review amounts due the Contractor and will recommend to Owner, payments to Contractor as set forth in the section entitled CERTIFICATION FOR PAYMENTS.

4.1.4 Inspector's Authority: The Inspector will have the authority to stop work whenever necessary to ensure a proper execution of the Work. The Inspector will also have authority to reject Work which does not conform to the Contract Documents. Whenever the Inspector considers it necessary or advisable for implementation of the intent of the Contract Documents, the Inspector will have authority to require additional inspection or testing of the Work in accordance with the following section whether or not such Work is fabricated, installed, or completed. However, neither this authority of the Inspector nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Inspector to the Contractor, subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work. In the event an Inspector is not appointed by the Owner, the Owner's Representative shall have the authority set forth herein.

4.2 INSPECTION AND TESTING

4.2.1 Advance Notice: Contractor shall provide Owner's Representative seventy-two (72) hours' notice prior to beginning work at a specific location and for a specific department. Contractor shall notify Owner's Representative and Inspector forty-eight (48) hours prior to any day in which Contractor will 1) require an inspection of any portion of the Work, 2) work in excess of eight (8) hours or any time Contractor intends to work weekends, and 3) require shut down of all or any portion of building systems (electrical, plumbing, fire, mechanical, etc.). Any work not performed subject to inspection will not be accepted and will be rejected and/ or ordered removed by Owner, or Inspector.

4.2.2 Access to Work: The Owner's Representative, the Architect, the Project Manager, and the Inspector will at all times have access to the Work. In addition, authorized representatives and agents of any participating Federal or State Agency shall be permitted to inspect all Work, materials, payrolls, and records on

personnel, invoices of materials, and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the Work and also for any inspection or testing thereof.

4.2.3 Costs of Tests: The Owner shall bear all costs related to testing for conformance of the Work to the Contract requirements. However, if the Contractor has called for any testing, and that test fails, subsequent tests, and all related costs, shall be borne by the Contractor.

4.2.4 Preparation of Change Directives/Orders: The Owner's Representative or the Inspector, if one is appointed, will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in the section entitled CHANGES IN WORK.

4.3 CLAIMS

4.3.1 Concealed or Unforeseen Conditions: It is understood by both parties that Contractor has made a pre- contract investigation of the site. All concealed, unforeseen, or materially differing conditions are the responsibility of the Contractor in the absence of an actual material, intentional misrepresentation by the Owner as to the conditions on the site. Contractor shall give written notice of any conditions encountered at the site which are unforeseen, concealed, or materially different from those set forth in the Plans or Contract Documents, or ordinarily encountered and generally recognized as inherent in the Work. Such written notice shall be given within five (5) calendar days of his discovery of any such facts.

4.3.2 Notice of Discovery of Hazardous Waste or Unusual Conditions:

1. The Contractor shall promptly, and before the following conditions are disturbed, notify the Owner in writing, in the event the Contractor encounters any of the following:

   a. Material that the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

   b. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in the contract.

2. The Owner shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work shall issue a change order under the procedures described herein.

3. In the event a dispute arises between the Owner and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for in the contract, but shall proceed with all work to be performed under the Contract. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the Contractor and the Owner.

4.3.3 Time Limits on Claims: Claims by Contractor must be made within ten (10) calendar-days after occurrence of the event giving rise to such Claim, except that claims made due to delay or hindrances which Contractor claims was caused by Owner shall be made within five (5) calendar-days after occurrence of the event giving rise to such Claim. Claims must be made by written notice. Failure to make such claim in writing in the time set forth herein shall bar Contractor from recourse for such claim. All claims must be filed on or before the payment date of Final Payment.

4.3.4 Claims for Additional Costs:

1. If Contractor wishes to make a Claim for an increase in the Contract Price, he shall give the Owner written notice thereof within the time set forth in Paragraph 4.3.3. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall, as soon as possible, advise Owner of his intent to do the Work.

2. Increases in Contract Price due to Claims shall be calculated based on the Cost Reimbursement method detailed in Paragraph 5.4.1.3.

3. Under no circumstances shall Contractor recover any administrative overhead costs or recover on the basis of any "Home Office" damages formula, "Total Cost" recovery formula, or any other such formula.

4.3.5 Claims for Additional Time:

1. If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate probable effect of delay on progress of the Work.

2. If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction.

3. The Owner shall not be liable for any damages on account of any reasonable delay or hindrance of the Owner. However, Contractor shall be entitled to an extension of time for any delay or hindrance caused by the Owner. Any delay or hindrance by Owner which is unreasonable and not within the contemplation of the parties may subject Owner to a claim for damages. Contractor shall make any claims in writing within the time set forth in Paragraph 4.3.3., for any unreasonable delay or hindrance caused by Owner, and specifying the cause thereof as required in paragraph "Submittal of Claims".

4.3.6 Submittal of Claims: Any disputes relating to this Contract, or its breach, which is not disposed of by agreement shall be promptly submitted as a claim to the Owner's Representative who shall issue a written response on the dispute. Claims shall be submitted by the Contractor to the Owner's Representative with adequate supporting data and include a demand for the Owner's Representative's decision. Adequate supporting data shall include, but is not limited to, a statement of the reasons for the asserted entitlement, the certified payroll, invoice for material and equipment rental, and an itemized breakdown of any adjustment sought.

4.3.7 Submission Under Penalty of Perjury: The Contractor shall certify, at the time of submission of a claim, as follows:

"I certify under penalty of perjury under the laws of the State of California, that the claim is made in good faith, that the supporting data are accurate and complete, and that the amount requested accurately reflects the contract adjustment for which the Owner is liable.

By: _____

"(Contractor's signature)"

4.3.8 Third Party Claims: Owner will notify Contractor of receipt of any third party claim relating to the contract within five (5) calendar days of receipt of such claim.

4.4 DISPUTE RESOLUTION

4.4.1 Continue Work During Dispute: In the event of any dispute between the Owner and the Contractor, the Contractor will not stop Work but will prosecute the work diligently to completion in the manner directed by the Owner, and the dispute shall be resolved as set forth herein after completion of the Work. However, all disputes must be submitted by Contractor in accordance with the subsequent provisions of this section.

4.4.2 Requirements for Filing a Claim: For any claim subject to this Article, the following requirements apply: the claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by this contract for the filing of claims.

1. For claims of less than fifty thousand dollars ($50,000.00), the Owner shall respond in writing to any written claim within forty five (45) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claims or relating to defenses or claims the Owner may have against the Contractor, any additional documentation supporting the claim or relating to defenses to the claim the Owner may have against the Contractor.

   If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner and the Contractor.

   The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time not greater than that taken by the Contractor in producing the additional information, whichever is greater.

2. For claims of over fifty thousand dollars ($50,000.00) and less than or equal to three hundred seventy-five thousand dollars ($375,000.00), the Owner shall respond in writing to all written claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to the defenses or claims the Owner may have against the Contractor.

   If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner and the Contractor.

   The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within thirty (30) days of receipt of the further documentation, or a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3. If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, the Contractor may so notify the Owner, in writing, either within fifteen (15) days of receipt of the Owner's written response or within fifteen (15) days of Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the Owner shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

4. If following the meet and confer conference the claim or any portion remains in dispute, the Contractor may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code, and in accordance with Section 20104.2 of the Public Contract Code.

4.4.3 Owner's Review of Claim: The Owner's Representative shall review the facts pertinent to the claim, secure assistance from legal and other advisors, coordinate with the contract administrators, and promptly provide a written response. The response shall be furnished to the Contractor by certified mail, return receipt

requested, or any other method that provides evidence of receipt. The Owner's Representatives' response shall be final and conclusive except as is otherwise provided herein.

4.4.4 Claims Exempt from Review: The procedures and remedies provided in this Section 4.4 do not apply to:

1. Any claims by the Owner.

2. Any claim for or respecting personal injury or death or reimbursement or other compensation arising out of or resulting from liability for personal injury or death.

3. Any claim or dispute relating to stop payment requests or stop notices.

4. Any claim related to the approval, refusal to approve, or substitution of subcontractors, regardless of tier, and suppliers.

4.4.5 Suit in El Dorado County Only: Any litigation arising out of this Contract shall be brought in El Dorado County. The Owner and the Contractor shall follow procedures established for all civil actions filed to resolve claims pursuant to Public Contract Code Section 20104 et seq., including but not limited to Section 20104.4.

4.4.6 Payment of Undisputed Portion of Claim: Payment by Owner of undisputed portion of claim; interest on arbitration award or judgment.

1. Owner shall pay Contractor such portion of a claim which is undisputed except as otherwise provided in the contract.

2. In any suit filed pursuant to Public Contract Code Section 20104.4, the provisions of Section 20104.6 shall apply.

3. The rate of interest payable on unpaid and undisputed claims shall be 6 percent per annum. Interest shall begin to accrue sixty-one (61) days after the Contractor submits to the Owner information in sufficient detail to enable the Owner to accept the claim statement.

4. The rate of interest payable on any judgment or award in arbitration shall not exceed 6% per annum in accordance with Civil Code Section 3287 et seq.

ARTICLE 5

CHANGES IN WORK

5.1 WAIVER

5.1.1 Waivers of Contract Provisions: It is expressly understood and agreed that no waiver granted by the Inspector or the Owner of any term, provision, or covenant of this Contract shall constitute a precedent for breach of the same or any other terms, provisions, or covenants of this Contract.

5.2 CHANGES

5.2.1 Owner May Order Changes in Work: The Contractor agrees that the Owner, without invalidating the Contract, may order changes in Work by altering, adding to, or deducting from the Work, the Contract Amount and Time being adjusted according to the provisions of Section 5.4 and Section 5.5. Contractor agrees to enter into a modification of his original Contract for such changes.

5.2.2 Cost Proposals: Upon request of the Owner for a quotation on the change to the Work, the Contractor shall promptly submit to Owner's Representative, and the Inspector, if one is appointed, in writing a detailed breakdown of the work and of the amount of deduction or addition claimed. In no case shall Cost Proposals be provided later than ten (10) calendar days from the date requested. The Owner's request for quotations on alterations to the Work shall not be considered authorization to proceed with the work prior to issuance of a Change Order, nor shall such request justify any delay in existing work. If Contractor fails to provide Cost Proposals within ten (10) calendar days, Owner may prepare the Cost Proposal based on estimates of labor, materials, and equipment. This proposal, prepared by Owner, shall be binding on the Contractor, will become the basis for Contract Price adjustment, and shall not be subject to dispute or claim.

5.2.3 Contract Change Instrument: Changes in work involving a change in Contract Price or Contract Time shall be done only pursuant to an Architect's Supplemental Instructions (if applicable), Change Order, or Construction Change Directive as set forth below in this article.

5.2.4 Changes Shall Conform to Contract: Changes in work shall be performed in conformance with applicable provisions of the Contract Documents, and the Contractor shall proceed promptly unless otherwise provided in the Architect's Supplemental Instructions (if applicable), Change Order, or Change Directive.

5.3 CONTRACT CHANGE INSTRUMENTS

5.3.1 Architect's Supplemental Instructions (ASI) (if applicable): The Owner's Representative or the Architect, may order minor changes in work by use of an Architect's Supplemental Instruction. These minor changes will involve neither changes in the Contract Price or Contract Time. If the Contractor disagrees that the change does not involve a change in cost or time, then a Change Order or Change Directive shall be used.

5.3.2 Change Order (CO): The Change Order shall be used in cases where Owner and Contractor agree on the change in work, the amount of or method of computing the Contract Amount, and the amount of adjustment in Contract Time.

5.3.3 Construction Change Directive (CCD): In the event that the Owner and Contractor do not agree on the proposed change in work, and/or the proposed adjustment of Contract Price and Time, or in the event it is essential that the Contractor proceed expeditiously and without delay, then Owner may, by issuance of a Construction Change Directive, order changes in work, and the Contractor shall promptly proceed with the change in work involved.

1. Acceptance of Change Directive: If Contractor agrees with the Change Directive, the Contractor shall by his signature thereon, indicate his acceptance of the terms of the Directive, including adjustments to price and time, and the Change Directive shall then be followed by a Change Order.

2. Non-Acceptance of Change Directive: If the Contractor disagrees with the method of computing an increase in Contract Price, then the amount of adjustment shall be computed by the Cost Reimbursement method detailed in Basis for Adjustment. Disagreements with amounts or credits, under the Cost Reimbursement method, or time, shall be considered a dispute, and processed under the section on Disputes Resolution.

5.4 BASIS OF ADJUSTMENT

5.4.1 Methods of Adjustment: The amount of adjustments to Contract Price, whether a credit or payment, shall be computed by one of the methods detailed below. The method used shall be at the sole determination of the Owner.

1. Unit Prices: Those prices stipulated in the Bid Proposal shall be utilized where they are applicable. In the event the change in original quantity is in excess of twenty five (25) percent of the original bid quantity, and the total dollar value of that bid is greater than $5,000, the Owner shall review the unit price to determine if a new unit price shall be renegotiated. Unit prices for new items shall be negotiated and mutually agreed upon.

2. Lump Sum: A total lump sum for the Work has been negotiated between Owner and Contractor, as described more fully in Article 3 of the Agreement for Construction Services. Changes to the lump sum contract price sought may be made pursuant to a Change Order, subject to Contractor demonstrating satisfaction of the criteria set forth in Article 3.

3. Cost Reimbursement (Extra Work): In this method, the payment for Extra Work shall be made on a time and expense basis that is on an accounting of the Contractor's forces, materials, equipment, and other items of cost as required and used to do the Work. Payment will be made for the documented actual cost of the following:

   a. Costs of direct labor, excluding supervisory personnel, including social security, old age and unemployment insurance, fringe benefits required by agreement, labor insurance and labor taxes established by law.

   b. Costs of materials, supplies, and equipment, including cost of transportation and sales tax, whether incorporated if paid for by the Contractor or his subcontractor.

   c. Rental costs, prevailing in the area, of machinery and equipment for the actual time used, and including transportation costs for items having value in excess of $100.00.

   d. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

   To the above cost the Contractor shall be allowed a markup of fifteen (15) percent on direct labor charges and fifteen (15) percent for all other cost items. When any or all of the Extra Work is done by one of the Contractor's subcontractors, the markups set forth above shall be applied to the subcontractor's actual costs to which a five (5) percent markup shall be allowed the Contractor. These markups shall be considered to be full compensation, covering the cost of general supervision, administration, overhead, profit, and any and all other general expenses, including, but not limited to, uniforms, hand tools, safety equipment, travel and lodging.

5.5 EXTENSION OF TIME FOR COMPLETION

5.5.1 Contractor Delayed or Hindered: Should the Contractor be delayed or hindered in the completion of the Work by the neglect of the Owner, or by fire, by strikes, lockouts, embargoes or earthquakes, and any other causes the Countyapproves as not having been reasonably foreseeable at the time of execution of the Contract Documents, then the time allowance herein fixed for the completion of the Work shall be extended for a period equivalent to the time lost by reason of any or all of the causes aforesaid. Time extensions must be requested in accordance with Section 4.3.

5.5.2 Agreement on Time Extension: In addition, the Contractor and the Owner reserve the right to mutually agree in writing upon an extension of time for completion for causes other than enumerated above.

5.5.3 Time Extension Not Waiver: The granting of an extension of time by the Owner for performance by the Contractor shall not operate as a waiver or stop the Owner from claiming damages due to any other delays, prior or subsequent, which were not approved by the Owner as provided herein.

ARTICLE 6

PAYMENTS AND COMPLETION

6.1 GENERAL

6.1.1 Contract Price: The Contract Price stated in the Contract is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents as defined and subject to the provisions set forth, in Article 3 of the Agreement of Construction Services between Contractor and Owner.

6.1.2 Waiver: Neither the acceptance of the Work by the Owner nor the payment of any part or all of the sum due the Contractor hereunder shall constitute a waiver by the Owner of any claim which the Owner may have against the Contractor or Surety under this Contract or otherwise.

6.1.3 Manner of Paying Warrants: Payment becomes due under the terms of this Contract in the manner prescribed by law. The Auditor shall cause a warrant for the Certified amount to be drawn upon the proper fund of the Treasurer of the Owner, which warrant shall be approved and issued to Contractor within that period of time customarily required to process said warrants in the ordinary course of Owner's business.

6.2 APPLICATIONS FOR PAYMENT

6.2.1 Submittal of Applications: The Contractor shall submit to the Owner or Owner's Representative, an Application for Payment form, which will be provided by the Owner. Such application shall be supported by such data substantiating the Contractor's right to payment as the Owner may require, such as copies of requisitions from subcontractors and material suppliers.

6.2.2 Basis for Payment: The Payment shall be based upon the total Contract price and upon percentage of completion of the Work at the time of the submittal of the application for payment.

6.2.3 Before submitting an Application for Payment (Final or Partial) the Contractor shall reach an agreement with the Project Manager concerning the percentage complete of the Work and the dollar value for which the Application for Payment may be submitted.

6.2.4 Work Free of Liens: The Contractor warrants that upon submittal of an Application for Payment, all work for which Certificates for Payment have been previously issued and payments received from the Owner shall be free and clear of liens, claims, security interests, or encumbrances against Contractor by subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment in relation to the Work.

6.3 CERTIFICATION FOR PAYMENT

6.3.1 Certification Determination: The Owner's Representative will review as soon as practicable for the purpose of determining whether it is a proper payment request and shall within seven (7) days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certification for Payment, with a copy to the Contractor, for such amount as determined to be properly due, or notify the Contractor of the reasons why the payment request is not proper and for withholding certification of payment in whole or in part as provided in Section 6.4.1.

6.3.2 The Owner shall pay or cause to be paid to Contractor, an amount equal to ninety five percent (95%) as noted in Section 6.4.3 of the amount set forth in the approved Certificate for Payment within thirty (30) days of receipt of an Application for Payment approved by the Owner's representative as provided for in Paragraph 6.3.1 above, and shall retain the remaining five percent (5%) as noted in 6.4.3 until the time provided for in Section 6.6.4. The Owner shall withhold amounts pursuant to stop notices received in

addition to the retainage. Failure of Owner to make payments provided herein in a timely manner shall not constitute a default by the Owner of the Contract, but may entitle the Contractor to interest as provided by law.

6.4 WITHHOLDING FROM PAYMENTS

6.4.1 Reasons for Withholding: The Owner may withhold payments, or on account of subsequently discovered evidence nullify the whole or a part of any progress or retention payments to such extent as may be necessary to protect the Owner from loss on account of:

1. Defective work or material not remedied or replaced.
2. The filing of claims or Stop Notices to withhold, or reasonable evidence indicating probable filing of such claims or notices.
3. Failure of the Contractor to make payments properly to subcontractors, or for materials or labor.
4. Failure to make payments to any person or entity for financial obligations of the Contractor under terms of this Contract.
5. A reasonable doubt that the Contract can be completed for the balance then unpaid.
6. Damage to another contractor.
7. Performance of work in violation of the terms of the Contract Documents.
8. Excessive costs to Owner.
9. Failure of Contractor to comply with requirements for timely submittal of specified documentation, including but not limited to construction schedules, cost proposals, and submittals.

6.4.2 Release of Payment: When the above grounds for withholding are removed, payment shall be made for amounts withheld because of them.

6.4.3 Method of Retainage: The Department will retain 5% of the value of each progress payment from each progress payment. The retained funds shall be retained until thirty-five (35) days after recordation of the Notice of Acceptance, as applicable.

6.5 SUBSTITUTE SECURITIES FOR RETENTION

6.5.1 Substitution of Securities: Bidders are hereby put on notice that the successful bidder may substitute securities for any monies withheld by the County of El Dorado to insure performance of the Contract pursuant to Public Contract Section 22300. This section provides that the Contractor may elect to receive 100 percent of payments due under the Contract Documents from time to time, without retention from any portion of the payment by the County of El Dorado, by depositing eligible securities of equivalent value with the County of El Dorado or qualified escrow agent in accordance with the provisions of Public Contract Code Section 22300. Eligible securities shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit from a qualified institution. Any such escrow agreement shall follow the form set forth in Public Contract Code Section 22300(f) and provided by the Owner.

6.6 FINAL COMPLETION AND PAYMENT OF RETAINAGE

6.6.1 Affidavit of Payment: After the date of Substantial Completion of the Work, and before final acceptance of the Work, the Contractor shall file with the Owner his affidavit, sworn to before a Notary Public, stating that all workmen and persons employed, all firms supplying materials, and all subcontractors upon the project for either labor or material have been paid in full, except certain items, if any, to be set forth in such affidavit covering disputed claims, including claims for acceleration, disruption, delays, inefficiencies, and hindrance, or items in connection with which Stop Notices have been filed under the provisions of the Statutes of the State of California. The filing of such affidavit by the Contractor shall be one of the prerequisites to the making, by the Owner, of the final retainage payment on the Contract.

6.6.2 Final Inspection: Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of the Application for Payment, the Owner will promptly make such inspection. The Contractor shall complete all punch list items within two (2) weeks of receipt of the written punch list. When the Owner's Representative finds the work acceptable under the Contract Documents and the Contract fully performed, the Owner's Representative will promptly recommend to Owner that Owner may consider the Project complete, accept the project, and that the Notice of Acceptance may be issued.

6.6.3 Final Certification: Before issuance of payment, Contractor shall file, with Owner, a certificate in which he certifies that to the best of the Contractor's knowledge, information, and belief, and on the basis of observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents.

6.6.4 Payment of Retention: Thirty-five (35) days after the Notice of Acceptance has been filed, provided the Work is fully completed and the Contract fully performed, the balance due under the Contract shall be paid, less any monies held for stop notices. Payment shall not be construed as an absolute acceptance of the work done up to the time of such payment. The Contractor, if requested by the Owner, shall furnish receipts or other vouchers showing his payments for materials and labor. Owner may withhold from payment an amount not to exceed 150 percent of any amount in dispute.

6.6.5 Notice of Acceptance: The Work shall be accepted in writing in the form of a Notice of Acceptance when the whole of the work has been completed satisfactorily to the Owner. In judging the Work, no allowance for deviations from the original Contract Documents will be made unless already approved in writing at the proper times and in the manner as called for herein.

ARTICLE 7

PROTECTION OF PERSONS AND PROPERTY

7.1 PROTECTION OF WORK, PROPERTY, AND PERSONS

7.1.1 Responsible for Damage to Owner's Property: The Contractor shall be entirely responsible for any damage to the property of the Owner due to careless handling of tools and/or materials or other causes attributed to the Contractor's Work in performing this Contract.

7.1.2 Responsible for Safety: The Contractor will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury, or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

7.1.3 Safety and Convenience: The Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction. The Contractor will erect and maintain, as

required by the conditions and progress of the Work, all necessary safeguards for safety and protection. The Contractor will notify owners of adjacent utilities when prosecution of the Work may affect them.

7.1.4 Remedy Damages: The Contractor will remedy all damage, injury, or loss to any property caused, directly or indirectly, in whole or part, by the Contractor, any subcontractor, or anyone directly or indirectly employed by any of them or anyone of whose acts any of them would be liable, except damage or loss attributable to the sole or active negligence of the Owner or the Inspector or anyone employed by them and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

ARTICLE 8

INSURANCE AND BONDS

8.1 INSURANCE

GENERAL INSURANCE REQUIREMENTS

The Contractor shall provide proof of a policy of insurance satisfactory to the El Dorado County Risk Management Division and documentation evidencing that the Contractor maintains insurance that meets the following requirements:

1. Full Workers' Compensation and Employers' Liability Insurance covering all employees of the Contractor as required by law in the State of California.

2. Commercial General Liability Insurance of not less than Two Million Dollars ($2,000,000) combined single limit per occurrence for bodily injury and property damage, including but not limited to endorsements for the following coverage: Premises, personal injury, operations, products and completed operations, blanket contractual, and independent contractors liability. This insurance can consist of a minimum $1 Million primary layer of CGL and the balance as an excess/umbrella layer, but only if the County is provided with written confirmation that the excess/umbrella layer "follows the form" of the CGL policy. County, including, without limitation, its officers, officials, employees, and volunteers shall be named as an additional insured on ISO form CG 2010 1185, or its equivalent.

3. Automobile Liability Insurance of not less than One Million Dollars ($1,000,000) is required in the event motor vehicles are used by the Contractor in performance of the contract.

4. In the event Contractor is a licensed professional and is performing professional services under this contract, Professional Liability Insurance is required with a limit of liability of not less than One Million Dollars ($1,000,000).

5. Explosion, Collapse and Underground coverage is required when the scope of work includes XCU exposures. For the purpose of this contract, XCU coverage is not required.

PROOF OF INSURANCE REQUIREMENTS

1. Contractor shall furnish proof of coverage satisfactory to the El Dorado County Risk Management Division as evidence that the insurance required herein is being maintained. The insurance will be issued by an insurance company acceptable to the Risk Management Division, or be provided through partial or total self-insurance likewise acceptable to the Risk Management Division.

2. The County of El Dorado, its officers, officials, employees, and volunteers shall be included as additional insureds, but only insofar as the operations under this Contract are concerned. This provision shall apply to all general liability and excess liability policies. Proof that the County is named additional insured shall be made by providing the Risk Management Division with a certified copy, or other acceptable evidence, of an endorsement to Contractor's insurance policy naming the County additional insured.

3. In the event Contractor cannot provide an occurrence policy, Contractor shall provide insurance covering claims made as a result of performance of this contract for not less than three (3) years following completion of performance of this Contract.

4. Any deductibles or self-insured retentions must be declared to and approved by the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the County, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

5. Contractor shall also require each of its subcontractors to names Contractor and County, including, without limitation, its officers, officials, employees, and volunteers, as an additional insured on Subcontractor's insurance policies using ISO form CG 2010 1185, or its equivalent. Copies of endorsements from each Subcontractor will be obtained and maintained by Contractor for the duration of the Work, and for ten years following completion of the Work.

INSURANCE NOTIFICATION REQUIREMENTS

1. Contractor agrees no cancellation or material change in any policy shall become effective except upon thirty (30) days prior written notice to the County of El Dorado, Chief Administrative Office, Russell Fackrell, Facilities Division Manager, at 3000 Fairlane Court, Placerville, CA 95667.

2. Contractor agrees that the insurance required herein shall be in effect at all times during the term of this agreement. In the event said insurance coverage expires at any time or times during the term of this Contract, Contractor shall immediately provide a new certificate of insurance as evidence of the required insurance coverage. In the event Contractor fails to keep in effect at all times insurance coverage as herein provided, County may, in addition to any other remedies it may have, terminate this Contract upon the occurrence of such event. New certificates of insurance are subject to the approval of the Risk Management Division.

   ADDITIONAL STANDARDS
   Certificates shall meet such additional standards as may be determined by the Department either independently or in consultation with the Risk Management Division, as essential for protection of the County.

   COMMENCEMENT OF PERFORMANCE
   Contractor shall not commence performance of this Contract unless and until compliance with each and every requirement of the insurance provisions is achieved.

   MATERIAL BREACH
   Failure of Contractor to maintain the insurance required herein, or to comply with any of the requirements of the insurance provisions, shall constitute a material breach of the entire Contract.

   REPORTING PROVISIONS
   Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

   PRIMARY COVERAGE
   The Contractor's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officers, officials, employees or volunteers shall be in excess of the Contractor's insurance and shall not contribute with it.

   PREMIUM PAYMENTS
   The insurance companies shall have no recourse against the County of El Dorado its officers, agents, employees, or any of them for payment of any premiums or assessments under any policy issued by any insurance company.

CONTRACTOR'S OBLIGATIONS
Contractor's indemnity and other obligations shall not be limited by the insurance required herein and shall survive the expiration of this Contract.

8.2 BONDS

8.2.1 General Requirements for Bonds: Before commencing any Work under the Contract, the Contractor shall provide all bonds to the Owner. These bonds shall be in the amounts and for the purposes specified below. They shall be Surety bonds and shall be issued by corporations duly and legally licensed and qualified to transact business in the State of California. They shall be maintained by him and at his expense during the entire life of the Contract or later as provided.

8.2.2 Performance Bond: One bond shall be in the amount of 100 percent of the Awarded Contract and shall guarantee the faithful performance of the Contract and shall insure the Owner during the life of the Contract and the Guarantee period. The Contractor may provide, subject to approval by the Owner, a separate guarantee bond upon completion of and acceptance of the work.

8.2.3 Payment Bond: One bond shall be in the amount of 100 percent of the Awarded Contract and shall guarantee the payment in full of all claims for labor and materials in accordance with the provisions of the laws of the State of California.

8.2.4 Change of Surety: If, at any time a Surety on such bonds becomes irresponsible or loses its right to do business in the State of California, the Owner may require another Surety which the Contractor shall furnish within ten (10) calendar days after receipt of written notice to do so.

8.2.5 Authentication of Bonds: Evidence of authority of an attorney-in-fact acting for the corporate Surety must be provided in the form of a certificate as to his power of attorney and to the effect that it is not terminated and remains in full force and effect on the date of the bonds. The form of the bonds shall be in accordance with those provided in the Draft Agreement.

ARTICLE 9

UNCOVERING AND CORRECTION OF WORK

9.1 DEVIATION FROM CONTRACT DOCUMENTS

9.1.1 Improper Work: If the Contractor shall vary from the Contract Documents in the form or quality of the Work, or the amount or value of the materials herein provided for, the Owner shall have the right to order such improper work or materials removed, remade, or replaced. In the event that the Work is ordered changed, any other work disturbed or damaged by such alteration shall be made good at the Contractor's expense.

9.2 CORRECTION OF WORK

9.2.1 Covered or Completed Work: If any work is covered contrary to the written instructions of the Owner's Representative, or the Inspector, if one is appointed, it must, if requested, be uncovered for observation and replaced at the Contractor's expense.

9.2.2 Inspection of Covered Work: If the Owner's Representative or the Inspector, if one is appointed, considers it necessary or advisable that covered Work be inspected or tested by others, the Contractor, upon request, will uncover, expose, or otherwise make available for observation, inspection, or testing as the Inspector may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and

equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction; if, however, such Work is not found to be defective, the Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and construction, and an appropriate Change Order shall be issued.

9.2.3 Rejected Work: The Contractor shall promptly remove from the premises all Work rejected by Owner for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the work either during the term of the Contract or during the warranty period, in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all Work of other contractors destroyed or damaged by such removal or replacement.

9.2.4 Cost of Correction: All removal and replacement Work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected Work within ten (10) days after receipt of written notice, the Owner may remove such Work and store the materials at the expense of the Contractor. Owner also may perform such Work or repairs itself and charge the expense to the Contractor.

ARTICLE 10

SUSPENSION OF CONTRACT

10.1 SUSPENSION OF WORK

10.1.1 Owner May Suspend: The Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by written notice to the Contractor which shall fix the date on which work shall be resumed.

10.1.2 Resumption of Work: The Contractor shall resume that Work on the dates so fixed. The Contractor shall be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributed to any suspension.

* END OF CONDITIONS OF THE CONTRACT*

SHAKORI GARAGE REPLACEMENT

DIVISION 1- GENERAL REQUIREMENTS

SECTION 01 1000 - SUMMARY

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work under separate contracts.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and Drawing conventions.

1.2 PROJECT INFORMATION

A. Project Identification: El Dorado County Shakori Garage Replacement

1. Project Location: 1121 Shakori Way, Meyers, CA 96150

B. Owner: El Dorado County.

1. Owner's Representative: Charles Harrell.

Representative: Charles Harrell.

C. Architect: Williams + Paddon Architects
2237 Douglas Blvd.
Suite 160
Roseville, CA 95661

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1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Demolition of the existing equipment garage and the construction of a replacement pre-engineered metal structure with structural steel mezzanine with concrete filled steel deck. Construct a new fire water line and a new domestic water service from Kaska Street. Connect to the existing storm water and electrical systems. Construct underground infrastructure originating from the existing administrative office for communication and data lines. Provide equipment pads and utilities to Owner furnished and installed brine making equipment

B. Type of Contract:

1. Project will be constructed under a single prime contract.
2. Lump sum contract with an allowance for the PEMB.
3. Final price from the PEMB will be adjusted using the BLS Producers Price Index for Pre-Fabricated Metal Buildings (NAISC 332311). Refer to Article 3, Contract Price, of the construction Agreement.

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of the construction areas and portions of the adjacent site for construction operations during construction period. Contractor is to coordinate their operations with those of the El Dorado County DOT. Contractor's parking is limited to the area east of the building. The Owner reserves the right to perform work or to retain other contractors on portions of Project.

1.5 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated or authorized by the County.

C. Nonsmoking Building: Smoking or the use of tobacco products is not permitted within the contract limit.

D. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 PERMITS AND FEES

A. County's responsibility:

1. The Architect will provide signed documents for the County to submit for agency review. The County will pay the following costs to be paid directly to the governing agency and entity upon request from the contractor:
    a. Plan check fees.
    b. Building Permits.
    c. TRPA Impact Fees
    d. Conditions Use Permit Fee (i.e. – gas, sewer, water, power)
    e. Utility unit labor and material costs for work not included with connection fees and normally performed by the utility company.
    f. Testing and observation services

B. Contractors responsibility:

1. The contractor will make arrangements to secure permits as necessary and will notify the County's project representative, in a timely manner, of the fee amount required to obtain the required permit. The contractor will be responsible for notifying the County Project Manager, in a timely manner of all costs to be paid by the County.
2. The contractor will be responsible for all bonding requirements.
3. The contractor will be responsible for any delegated design or deferred submittals, including the permit process. Including, but not limited to, fire sprinkler and alarm system and the pre-fabricated metal building and mezzanine. The County will compensate the contractor for the initial plan check process and permit fees only. Any additional plan reviews will be at the cost of the contractor.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

1.8 SPECIAL INSPECTIONS AND TESTING

A. The contractor will be responsible for coordinating and scheduling all inspections and disseminating all required reports to the proper parties.

A. All retesting for previously failed tests shall be paid for by the contractor.

1.9 CHANGES IN THE WORK

A. Any changes in the work of this contract due to discovered conditions or project scope modifications are subject to the following requirements:

1. A “Request for Proposal” shall be issued to the Contractor by the Architect clearly stating the exact conditions of the proposed change in the work or a “Request for Change” shall be issued to the Architect by the Contractor for review and acceptance.
2. The Contractor shall provide a written “Proposal” identifying the specific material and labor required to complete the change in the work. The Proposal shall completely itemize all material quantities, unit costs, labor estimates, hourly rates, and mark-up factors calculated in the overall cost. Material costs shall not exceed those listed at established market levels and labor costs shall not exceed those listed at Journeyman schedules as established for this region by current year R.S.Means.

    a. Direct subcontractor and/or contractor mark-up for profit, overhead and administrative costs shall not exceed a combined total of 15% of the itemized costs for material supplied and labor directly performed by that individual firm. Additional contractor mark-up on subcontractor work is limited to 5% of the work of those other subcontractor amount. A maximum additional performance bond mark-up of 1%, or the actual bond cost rate as verified by the bonding company, will also be allowed as valid mark-up as part of the Contractor’s submittals.
    b. No other mark-ups are allowed. (i.e. project management, supervision)

3. The County shall review and certify all Contractor’s proposals if there is reasonable justification for the proposed change.
4. Execution of formal change orders is a time consuming process which could delay action on critical work. Any work performed prior to the issuance of the official change order is at the contractor’s risk. However, the County Project Manager will endeavor to minimize that risk through the expeditious processing of all change order items. Full, complete and detailed information on each item by the contractor will aide in that process.
5. Change Authorizations: A construction change authorization form will be issued by the County under special circumstances, to authorize immediate completion of changes in the work. The form will be prepared and completed by the Architect when time limits are such that the formal change order will cause unreasonable delays or additional costs to the project. The form will include a fixed or estimated cost to be included as part of a change order at the earliest possible date. All forms should be numbered consecutively, beginning with number one of each project. Electronic format shall be used. The

Architect shall maintain a log for construction change authorizations throughout the entire construction phase.

1.10 PRODUCT APPROVALS

A. The intent of the product specifications and substitution process is not to exclude the use of other brands, articles or methods which may be acceptable and deserving of consideration. However, the County and the Architect must approve any product or material substitution prior to purchase or installation. Substitution requests are to be submitted immediately after bid opening for consideration. See **012500 Substitution Procedures** for more detailed instructions. In general:

1. Submit fully detailed technical data, samples, installation methods, test reports and certification, references and all other supporting documentation as may be requested by the Architect.
2. Prove to the Architect and the County that items held up as equal or superior to specified items meet project specification design and intent. Obtaining prior approval does not relieve the contractor from meeting the project specifications or any portion thereof.

1.11 SCHEDULE OF VALUES / LIST OF SUBCONTRACTORS

A. After the bid opening, the apparent low bidder, and if deemed advisable, the apparent second or third low bidders shall submit the schedule of values and the entire list of subcontractors, used in formulating their respective bids, to the County Project Manager within 48 hours.

1. If a bidder has any doubt regarding the correctness or acceptability of any subcontract proposal, the bidder may submit the names and amount of other competing subcontractors, making sure that the bidder clearly states which one was used in formulating his proposal.

B. Schedule of Values must be agreed to by all parties prior to first pay application. No changes to the approved Schedule of Values will be allowed except by change order.

C. Changes to the original List of Subcontractors involving major subcontractors will not be allowed except with the approval of the County.

1.12 CONTRACTOR SUPERVISION

A. The contractor shall designate and keep continuously on the project, during its progress and until the project is finally accepted, an experienced and competent superintendent and any necessary assistants, all satisfactory to the County's project representative. The superintendent shall not be changed except with the consent of the County's project representative unless the superintendent proves to be unsatisfactory to the contractor and ceases to be in his employ.

B. The superintendent shall represent the contractor in his absence and all notices, requests and instructions given to the superintendent shall be considered as having been given to the contractor.

C. The contractor shall give efficient supervision to the work, using his best skill and attention. The contractor shall carefully study and compare all drawings, specifications and other instructions giving prompt notice to the Architect of any errors, inconsistency, or omission which have been discovered, but shall not be held responsible for their existence or discovery.

1.13 CONTRACTOR DAILY RECORD

A. The contractor, at each scheduled progress meeting, shall provide the county project manager with a copy of their daily work log. This refers to the daily report that documents the number of staff on site, materials delivered, sub-contractor activity, etc. This report will provide information to be compared against the approved work schedule.

1.14 LIQUIDATED DAMAGES

A. It is recognized and agreed by the contractor and County that it is of importance to the County to have this project completed within the time schedule contained in the contract documents. Should the contractor fail to complete the work within the time stated in the Agreement or within such additional time as may have been allowed by change order extension, there shall be deducted from any moneys due, or that may become due the contractor, the sum per day (as defined in each contract), for each and every calendar day beyond the agreed or extended completion day, that the work remains uncompleted. Such sum is fixed and agreed upon by the County and the contractor as liquidated damages due the County by reason of the inconvenience and added costs of administration, loss of use and/or revenue and supervision resulting from the contractor's default, and not as penalty.

1. Permitting the contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the County or any of their rights under the contract.
2. Said liquidated damage provision shall remain in effect and continue until substantial completion and acceptance of the project by the County. The contractor hereby authorizes the County to retain sufficient amounts of money due it and remaining in the hands of the county to pay the damages caused by any such default or defaults.
3. Refer to Article 4 of the Agreement

PRODUCTS (Not Used)

EXECUTION (Not Used)

END OF SECTION 01 1000

SECTION 01 23 00 - ALTERNATES

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
2. Include as part of each alternate any construction schedule impacts associated with the scope of the alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PRODUCTS (Not Used)

EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. **Alternate #1: Not Used**

1. **Base Bid:**
2. **Additive Alternate**:.

B. **Alternate #2: RE Not Used**

1. **Base Bid:**
2. **Deductive Alternate**:

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.
3. Refer to Article 2, Contract Documents of the Contract Item and 9. of Instructions to Bidders

1.3 SUBSTITUTION REQUEST DATA

A. Substitution Requests: Submit substitution requests within two business days from of bid opening as noted in Division 00 'Instructions to Bidders'. Submit three copies of each request for consideration. Include supporting documentation as noted below. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as **performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated**. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
h. Research reports evidencing compliance with building code in effect for Project, from CBC..
i. Cost information, including a proposal of change, if any, in the Contract Sum.
j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within seven days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

   a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

3. Refer to Item 9. of Instructions to Bidders

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Substitution request is fully documented and properly submitted.
   c. Requested substitution will not adversely affect Contractor's construction schedule.
   d. Requested substitution has received necessary approvals of authorities having jurisdiction.
   e. Requested substitution is compatible with other portions of the Work.
   f. Requested substitution has been coordinated with other portions of the Work.
   g. Requested substitution provides specified warranty.
   h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed if not submitted within two days of bid opening per Division 00 ‘Instructions to Bidders’.

PRODUCTS (Not Used)

EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit within 5 working days after notice to proceed, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Contractor.
4. Contractor’s stamp, with date and signature indicated the submittal has been reviewed and is conformance with contract requirements.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Drawing number and detail references, as appropriate.
11. Location(s) where product is to be installed, as appropriate.
12. Other necessary identification.
13. Remarks.
14. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number, which should either have a sequential number or be the specification section. The submittal should reference the specification section.

E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submittals related to interior finishes should be held and submitted all together, at the same time, such that they can be reviewed together.
3. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
4. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 10 working days for review of each resubmittal.
3. Any submittal received after 3:00 pm will be considered as having been received in the next working day.
4. No extension of Contract Time will be authorized because of a failure to transmit submittals to the Architect in sufficient time before the work is to be performed.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams that show factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Physical samples of each finish/color provided must be on the actual material being used for the product. Digital color selections or brochures with printed color samples will not be reviewed for selection or approval processes.
3. Identification: Permanently attach label on unexposed side of Samples that includes the following:

    a. Project name and submittal number.
    b. Generic description of Sample.
    c. Product name and name of manufacturer.
    d. Sample source.
    e. Number and title of applicable Specification Section.
    f. Specification paragraph number and generic name of each item.

4. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit a minimum of two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return one sample with options selected.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

    1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required.

    1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

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B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PRODUCTS (Not Used)

EXECUTION (Not Used)

END OF SECTION 01 33 00

SECTION 01 33 19 – Project Meetings

GENERAL

1. SUMMARY
    a. The Contractor shall schedule and administer the per-construction meeting, periodic progress meetings, and specially called meetings throughout the progress of the work, and will:
        i. Prepare and distribute agenda to all participants 48 hours prior to the scheduled meeting.
        ii. Make physical arrangements for meetings including internet connectivity and platform for remote particiapnts
        iii. Preside at meetings
        iv. Record the minutes including significant proceedings and decisions
        v. Distribute the minutes electronically within two working days of the meeting to:
            1. Meeting participants
            2. County Project Administrator
            3. Parties affected by meeting decisions
            4. Owner
            5. Architect
    b. Representatives of the Contractor and subcontractors attending meetings shall be qualified and authorized to act on behalf of the entities that they represent
    c. Architect may attend meetings called by Owner to ascertain that work is performed consistent with Contract Documents and construction schedules.
2. PRE-CONSTRUCTION MEETINGS
    a. Timing: Within 14 days of Notice to Proceed
    b. Location: Central location approved by Owner
    c. Attendance:
        i. Owner's representatives
        ii. Architect and design team members as needed
        iii. Contractor's Project Manager and Superintendent
        iv. Major subcontractors and suppliers
        v. Others as deemed necessary by Owner or Architect
    d. Suggested agenda:
        i. Use of premises and access
        ii. Distribution of Project Directory
        iii. Distribution list of major subcontractors
        iv. Project Construction Schedule including timing of schedule updates and look ahead schedules
        v. Review of "Change" documents and administrative processing
        vi. Pay Application form and processing by Owner and Architect
        vii. Use of construction administration software
        viii. Distribution of Contract Documents
        ix. Maintaining Record Documents
3. PROGRESS MEETINGS AND SPECIALLY CALLED MEETINGS
    a. Contractor shall schedule regular periodic meetings as required by Owner
    b. Owner or Architect by hold specially called meetings as needed
    c. Location: Project field office
    d. Specially called technical meetings as called by Owner or Architect at their option
    e. Attendance:
        i. Owner's representatives
        ii. Architect and design team members as needed
        iii. Contractor's Project Manager and Superintendent
        iv. Major subcontractors and suppliers
        v. Others as deemed necessary by Owner or Architect
    f. Suggested agenda:

i. Review and approval of minutes of prior meeting
ii. Review of progress since last meeting
iii. Job site safety
iv. Field observations, problems and conflicts
v. Issues affecting construction schedule
    1. Corrective actions needed to maintain schedule
    2. Distribution of three week look ahead schedule
vi. Expected progress during next period
vii. Review of submittal schedules
viii. Adherence to quality standards
ix. Review of Change documentation
x. Other

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Subject to Owner's approval, water from Owner's existing water system if available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Subject to Owner's approval electric power from Owner's existing system if available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1. If power is required to be shut off for Contractor to perform work on that system, then the Contractor must make provisions for temporary generator to provide appropriate power for jobsite safety and work operations.

1.3 INFORMATIONAL SUBMITTALS

A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

B. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust-control partitions at each phase of work.

2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste-handling procedures.
5. Other dust-control measures.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

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

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices: Provided a conditioned job site trailer with restroom and internet connectivity adequate to support Contractor and Owner’s needs. Size the trailer to allow for monthly meetings with Contractor, Owner, Architect and other required participants .

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control as needed.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Building HVAC System: Building HVAC system shall NOT be used during construction.

EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. Building toilet rooms shall not be used.

C. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

D. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.2 SUPPORT FACILITIES INSTALLATION

A. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution." Use of County waste-collection containers is not allowed.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Instruct personnel in methods and procedures. Post warnings and information.

3.4 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.

2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

END OF SECTION

SECTION 01 73 00 - EXECUTION

GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

1.2 INFORMATIONAL SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

EXECUTION

3.1 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and [Owner] that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings and for Owner supplied equipment.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect promptly.

B. General: Contractor to lay out the Work using accepted practices.

1. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
2. Inform installers of lines and levels to which they must comply.
3. Check the location, level and plumb, of every major element as the Work progresses.
4. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

C. Building Lines and Levels: Locate and lay out control lines for structures, and grids, including those required for mechanical and electrical work.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Remove and replace damaged, defective, or non-conforming Work.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall

coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous construction waste.
2. Recycling nonhazardous construction waste.
3. Disposing of nonhazardous construction waste.

B. Hazardous materials abatement is described in 'Exhibit D'. Contractor to abate and dispose of hazardous materials according to all applicable laws and ordinances.

1.2 DEFINITIONS

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

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, 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.

1.3 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 5 days of date established for the Notice to Proceed.

B. Plan to be reviewed and accepted by the County Project Manager prior to implementation.

1.4 INFORMATIONAL SUBMITTALS

A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

PRODUCTS

2.1 NOT USED

EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.3 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner’s property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Substantial Completion procedures.
3. Final completion procedures.
4. Warranties.
5. Instruction of Owner's personnel.
6. Final cleaning.
7. Repair of the Work.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

D. Closeout Schedule: Prior to Substantial Completion submit a schedule indicating tasks, timelines, and milestones for project closeout.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 15 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

C. Closeout Schedule: Provide a comprehensive schedule indicating milestones, tasks to be finished, work not complete along with plan to complete, and tentative dates for Owner/Architect inspection of completed work.

D. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

E. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Advise Owner of pending insurance changeover requirements.
3. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
4. Complete startup and testing of systems and equipment.
5. Submit test reports to Owner and Architect.
6. Perform preventive maintenance on equipment used prior to Substantial Completion.
7. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
8. Advise Owner of changeover in utility services.
9. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Complete final cleaning requirements.
12. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

F. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. Cost for reinspections after initial and on follow up reinspection may be back-charged to Contractor.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
3. Instruct Owner’s personnel in operation, adjustment, and maintenance of equipment, and systems.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List (Digital File): Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project Name
    b. Date
    c. Name of Architect
    d. Name of Contractor
    e. Page Number

4. Submit list of incomplete items in one of the following formats:

    a. MS Excel electronic file. Architect will return annotated file.
    b. PDF electronic file. Architect will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Warranty language to match County standard format. All guarantees and warranties shall follow the same language.

B. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format and bound hard copy binder. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media PDF format.
2. Submit (1) 8 1/2 x 11 color copy in 3-ring binder, labeled. Include table of contents.

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

PRODUCTS

2.1 MATERIALS

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

EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
c. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
d. Sweep concrete floors broom clean in unoccupied spaces.
e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
f. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
g. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
h. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
i. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations, before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired.

Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.

C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

D. An orientation date shall be set up to instruct the Owner’s representative on the use of the operation and maintenance digital copy. A written report specifying times, dates, and names of personnel instructed shall be forwarded to the Owner’s representative.

E. Comply with Division 01 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. Intuitive: The digital instruction manual shall be intuitive to navigate and find information.
3. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
4. Add digital copies shall be authored with Adobe Acrobat or Bluebeam (or other Owner approved PDF editing software) and shall not be limited to include the following:
5. Icons shall be located on the PDF plans to link test and balance reports and mechanical operation and maintenance information to the design drawings.
6. All information shall be printable on 8.5” x 11” plain paper with the design drawings and automatic temperature control drawings printable on 11” x 17” paper.
7. Linked information such that the user can key work search for information.
8. Provide a hyper-text alphabetical index of all equipment and building products as outlined elsewhere.
9. Use of multimedia formatting (text, pictures, graphics, and sound, etc.) will be used to make the information more accessible and understandable.
10. All documentation shall be converted to a ‘locked’ PDF format file.
11. Digital file shall include a General Information Index screen to direct the user to the portion of the data desired. This index screen will consist of four (4) major groups. The groups will include:

    a. Contract Developers: This section is to include:

        1) Names of architects, engineers and contractors with address and telephone numbers.

    b. Equipment List: This section to include:

        1) A job specific alphabetical list of all items supplied to the project with names of the manufacturer, Item description including the plan number, model number and local supplier with current address and telephone number.

    c. Design drawings
    d. Manufacturer’s Operation and Maintenance Manuals:

12. Architectural section: This section to include:

    a. Building products, applied materials and finishes: Include product data with catalog number, size, composition, color and texture designations. Provide information for reordering custom manufactured products. Data shall include, but not limited to, information on finishes, builders’ hardware, etc.
    b. Instruction for care and maintenance to include manufacturer’s recommendation for cleaning agents and methods, precaution against detrimental agents and methods and recommended schedule for cleaning and maintenance.

13. Mechanical/Plumbing section:

    a. A general description of the mechanical system.

b. A step by step procedure to follow in putting each piece of mechanical equipment into operation.
c. Schematic control diagrams for each separate fans system, heating system, control panel, etc. Each diagram shall show locations of all control and operating components and devices.
d. Test and balance report
e. Valve tag schedule
f. All manufacturers operation and maintenance manual information
a. Maintenance instructions: This portion shall include a summary list of mechanical equipment requiring lubrication showing name of equipment and type and frequency of lubrication.

14. Special Maintenance Instructions to be summarized as follows:

a. Preventative Maintenance Procedures
b. Seasonal start-up and shut-down maintenance
c. Periodical inspection requirements

15. Electrical section:

a. Building products, applied materials and equipment: Include product data with catalog number. Provide information for reordering custom manufactured products.
b. Instruction for care and maintenance to include all manufacturers' recommendations.

16. Warranty section: Include all product warranties.

B. Manuals, Paper Copies: Submit two (2) manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual. The following table of contents should be common to all manuals and is based on ASI388 2 and Industry Best Practice.

1. Introduction and Scope:
   This is a basic introduction about the project, the builder, and the scope of work.
2. Assets Record Information:
   Describing items of equipment, assets, or elements of the work.
3. Maintenance Documents:
   The maintenance schedules and tasks required to maintain a piece of equipment/assets and hence prevent breakdown and/or meet compliance and manufacturer requirements.
4. Operations:
   This section should be used to record relevant information on the operations fo the system and/or assets. It should also include safety instructions, special tools, cleaning and operating instructions and trouble-shooting to assist in solving problems to prevent expensive call outs.
5. Warranties and Certificates:
   Record specific warranty and certificate reference information. Important test results and performance criteria relating to operations should also be included.
6. Spare Parts:
   Record any relevant information on the Spare Parts data for assets provided as part of the contract. It may also include information on spare parts suppliers.
7. Help and Contact:
   This section should be used to record information to allow the Client to call for expert assistance in relation to the assets included in the project. This would include the main contractors, sub-contractors and suppliers.
8. Drawings and References:
   This section allows you to attach/bind and or upload information like as-built plans, copies of specifications, complete product manuals and other documents relevant to the works and the O&M.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Information should be provided that covers the need of care, adjustment, maintenance, and operation of all equipment within the building, to include but not limited to: heating, air conditioning, ventilation, plumbing automatic temperature control systems, kitchen equipment, stage and theatrical equipment, electrical equipment, and building products requiring maintenance.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to

ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

H. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1.7 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PRODUCTS (Not Used)

EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one of file prints.

b. Final Submittal:

1) Submit PDF electronic files of scanned record prints and two (2) sets of prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Logs: Submit final approved submittal log and approved submittals.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue or black line white prints of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued. (Include CD with PDF files of each sheet and BIM drawings with each drawings digitally “bound” so all pertinent information displays when file is opened and each file drawn to meet the current version of the National BIM Standard).

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.

e. Mark Contract Drawings or Shops Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross reference on Contract Drawings.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Locations and depths of underground utilities.
d. Revisions to routing of piping and conduits.
e. Revisions to electrical circuitry.
f. Actual equipment locations.
g. Duct size and routing.
h. Locations of concealed internal utilities.
i. Changes made by Change Order or Construction Change Directive.
j. Changes made following Architect's written orders.
k. Details not on the original Contract Drawings.
l. Field records for variable and concealed conditions.
m. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets in PDF editing software with a color that is distinguishable or paper copy with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.

B. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Format: Annotated PDF electronic file with comment function enabled.
2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."

d. Name of Architect.
e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders**,** record Product Data**,** and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

C. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.5 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PRODUCTS (not used)

EXECUTION (not used)

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

1. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Systems and equipment operation manuals.
    b. Systems and equipment maintenance manuals.
    c. Product maintenance manuals.
    d. Project Record Documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

    a. Diagnostic instructions.
    b. Test and inspection procedures.

7. Maintenance: Include the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning.
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.

8. Repairs: Include the following:

    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

    1. Schedule training with Owner with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PRODUCTS (not used)

EXECUTION (not used)

END OF SECTION 01 79 00

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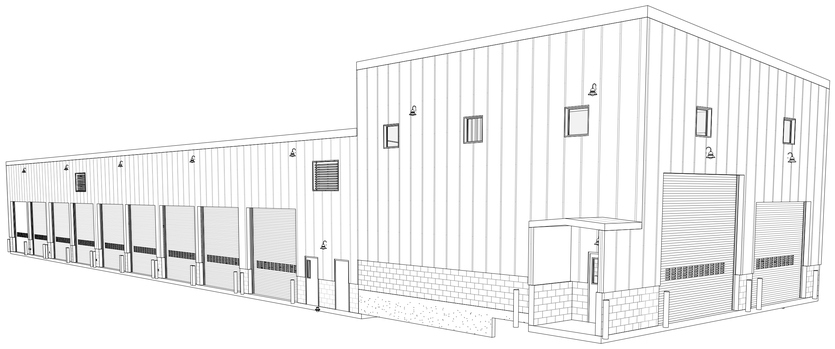
SHAKORI GARAGE REPLACEMENT



BUILDING & SITE INFORMATION

SCOPE OF WORK:

BUILDING INFORMATION:

PROJECT INFORMATION

SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE, MYERS, CA
EL DORADO COUNTY

APN: 035-181-009

EL DORADO COUNTY IS PLANNING ON REPLACING THE EXISTING DEPARTMENT OF TRANSPORTATION EQUIPMENT STORAGE BUILDING LOCATED AT 1121 SHAKORI WAY IN MEYERS, CA. THE EXISTING 6,580 SF BUILDING THAT IS STRUCTURALLY UNSOUND AND FUNCTIONALLY OBSOLETE CONSISTS OF 14 BAYS THAT HOUSE SNOW REMOVAL AND ROAD MAINTENANCE EQUIPMENT, SAND STORAGE AND SOME ANCILLARY EQUIPMENT. THE INTENT IS TO CONSTRUCT A SIMILAR, BUT SLIGHTLY LARGER STRUCTURE, PRE-ENGINEERED METAL BUILDING WITH PARTIAL HEIGHT CMU WALLS AND MEZZANINE LEVEL, GENERALLY CONSISTENT WITH CONCEPTUAL DESIGN EXHIBITS, DATED APRIL 14, 2021, ATTACHED.

VERIFIED LAND CAPACITY

PROJECT AREA (SF): 8,160 SF
VERIFIED LAND CAPABILITY DISTRICTS: CLASS 5 AND CLASS 6

NOTE:
SEE TRPA VERIFICATION OF LAND CAPABILITY AND LAND COVERAGE
LETTER DATED 04 DECEMBER 2020

PROJECT VICINITY MAP

1121 SHAKORI DRIVE, MYERS, CA N.T.S.

AGENCY APPROVALS

1. DEMOLITION PERMIT ""
2. FOUNDATION PERMIT ""
3. BUILDING PERMIT ""
4. FIRE SPRINKLER SYSTEMS ""
5. FIRE ALARM SYSTEMS ""

DEFERRED APPROVALS

1. CONTRACTOR SHALL PROVIDE AND SUBMIT ENGINEERING CALCULATIONS, SHOP DRAWINGS AND OTHER EXHIBITS AND PAY PLAN CHECK FEES REQUIRED FOR DEFERRED SUBMITTAL WORK AND TO OBTAIN PERMITS PRIOR TO COMMENCING INSTALLATION OF THE WORK ON SITE:
   A. FIRE SPRINKLER SYSTEMS
   B. FIRE ALARM SYSTEMS

SEPARATE PERMITS

1. TENANT SHALL PROVIDE APPLICATION, DRAWINGS AND OTHER EXHIBITS AND PAY PLAN CHECK FEES REQUIRED FOR SEPERATE PERMITS PRIOR TO COMMENCING INSTALLATION OF THE WORK ON SITE:
   A. TENANT SIGNAGE

PROJECT TEAM

OWNER
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3000 FAIRLANE COURT
PLACERVILLE, CA 95667

CONTACT: RUSSEL FACKRELL
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CIVIL ENGINEER
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1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762

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ANTHONY@WCEINC.COM

STRUCTURAL ENGINEER
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600 Q STREET
SACRAMENTO, CA 95811

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MECHANICAL / PLUMBING ENGINEER
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TRUCKEE, CA 96161

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KEN@SUGARPINEENG.COM

AGENCIES / UTILITIES

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EL DORADO COUNTY
2850 FAIRLANE COURT
PLACERVILLE, CA 95667

CONTACT:
PH. 530-621-5315

PLANNING DEPARTMENT
EL DORADO COUNTY
924B EMERALD BAY RD.
SOUTH LAKE TAHOE, CA 96150

CONTACT: BRENDAN FERRY
PH. 530-573-7905

FIRE DEPARTMENT
LAKE VALLEY FIRE PROTECTION
DISTRICT ADMIN HQ
2211 KEETAK STREET
SOUTH LAKE TAHOE, CA 96150

CONTACT:
PH. 530-577-3737

ENVIRONMENTAL HEALTH DEPARTMENT
TAHOE REGIONAL PLANNING AGENCY
P.O. BOX. 5310
STATELINE, NV 89449

CONTACT:
PH. 775-588-4547

REFUSE
SOUTH LAKE TAHOE REFUSE & RECYCLING
2140 RUTH AVENUE
SOUTH LAKE TAHOE, CA 96150

CONTACT:
PH. 530-541-1505

WATER COMPANY
SOUTH TAHOE PUBLIC UTILITIES DISTRICT
1275 MEADOWS DRIVE
SOUTH LAKE TAHOE, CA 96150

CONTACT:
PH. 530-544-6474

GAS COMPANY
SOUTHWEST GAS COMPANY
P.O. BOX 24531
OAKLAND, CA 94623-1531

CONTACT:
PH. 877-860-6020

ELECTRIC COMPANY
LIBERTY UTILITIES
933 ELOISE AVENUE
SOUTH LAKE TAHOE, CA 96150

CONTACT:
PH. 530-543-5281

SEWER SERVICES
SOUTH TAHOE PUBLIC UTILITIES DISTRICT
1275 MEADOWS DRIVE
SOUTH LAKE TAHOE, CA 96150

CONTACT:
PH. 530-544-6474

SYMBOLS

- XXX / 1 / A101 — SHEET NUMBER / DETAIL NUMBER
- 135.01 — DOOR NUMBER
- A — WINDOW/ DOOR FRAME TYPE
- Room name / 101 — ROOM NAME / ROOM NUMBER
- A / D / XXX / 1 / A101 / B / C — INTERIOR ELEV. REF. VIEW NUMBER AND SHEET NUMBER - UNFOLD CLOCKWISE
- 1 / A101 SIM — WALL OR BUILDING SECTION ID SHEET NUMBER
- 0 — GRID LINE - CENTERLINE OF STRUCTURE
- 0 — GRID LINE - BACK OF CONCRETE PANEL
- ? — FINISH MATERIAL TAG
- Name / Elevation — REFERENCE MARK
- ALIGN
- WP — WORK POINT
- A — ACCESSORY DESIGNATION
- 1 Comment / Description — AGENCY OR OWNER REVISION
- 1 — SHEET NOTE
- 09900.01 — KEYNOTE
- W1 — WALL TYPE TAG - REFER TO WALL FLOOR PLAN AND WALL SCHEDULE.
- CEILING JOINT SPAN DIRECTION
- EQ / 101 / comment — EQUIPMENT NUMBER, REFER TO EQUIPMENT SCHEDULE

ABBREVIATIONS

A.F.F.	Above Finish Floor
A.F.G.	Above Finish Grade
ACOUST	Acoustical
ADDL	Additional
ADJ	Adjustable
AGGR	Aggregate
ALUM	Aluminum
AKD	Aluminum Knock Down
ADA	Americans with Disabilities Act
&	and
L	Angle
APPROX	Approximate
ARCH	Architectural
ACP	Asphalt Concrete Paving
ASSY	Assembly
@	at
AV	Audio Visual
ADO	Automatic Door Opener
BR	Backer Rod
BKG	Backing
BM	Beam
BMP	Best Management Practices
BTWN	Between
BITUM	Bituminous
BLKG	Blocking
BD	Board
B.O.	Bottom of / Back of
BLDG	Building
CAB	Cabinet
CBC	California Building Code
CR	Card Reader
C.O.	Cased Opening
CIP	Cast-in-Place
CLG	Ceiling
CTR	Center
CL	Centerline
CLR	Clear
CASAM	Cold Applied Self Adhering Waterproof Membrane
CW	Cold Water
COL	Column
CONC	Concrete
CMU	Concrete Masonry Unit
CONT	Continuous
CFCI	Contractor Furnished Contractor Installed
CFOI	Contractor Furnished Owner Installed
CJ	Control Joint
CORR	Corridor
CNTR	Counter
CTSK	Countersunk
CUST	Custodial
DEG	Degree
DEPT	Department
DTL	Detail
Ø	Diameter
DIA	Diameter
DIM	Dimension
DISP	Dispenser
DR	Door
D.O.	Door Opening
DBL	Double
DN	Down
DS	Downspout
DWG	Drawing
DF	Drinking Fountain
EA	Each
EW	Each Way
E	East
ELEC	Electrical
EL	Elevation
ELEV	Elevator
EMER	Emergency
ENCL	Enclosure
EQ	Equal
EQUIP	Equipment
ETC	Et Cetera
i.e.	Example
(E)	Existing
EXP	Expansion
EJ	Expansion Joint
EXT	Exterior
F.O.	Face of
FRP	Fiber Reinforced Plastic
FIN	Finish
F.F.	Finish Floor
FA	Fire Alarm
FE	Fire Extinguisher and Bracket Mount with Signage
FEF	Fire Extinguisher and Fully Recessed Cabinet with Signage
FES	Fire Extinguisher and Semi-Recessed Cabinet with Signage
FHC	Fire Hose Cabinet
FLR	Floor
FD	Floor Drain
FM	Floor Mounted
FLG	Flooring
FT	Foot or Feet
FTG	Footing
FND	Foundation
FURN	Furniture
FURR	Furring
(F)	Future
GALV	Galvanized
GSM	Galvanized Sheet Metal
GD	Garbage Disposal
GA	Gauge
GC	General Contractor
GLB	Glue Laminated Beam
GR	Grade
GYP	Gypsum
HDWR	Hardware
HVAC	Heating, Ventilating, and Air Conditioning
HT	Height
HC	Hollow Core
HMS	Hollow Metal
HOR	Horizontal
HB	Hose Bibb
IT	Information Technology
I.D.	Inside Diameter.
IOR	Inspector of Record
INSUL	Insulation
INT	Interior
JT	Joint
KIT	Kitchen
LAB	Laboratory
LAM	Laminate
LVL	Laminated Veneer Lumber
LAV	Lavatory
LT	Light / Lighting
LTWT	Lightweight
MFGR	Manufacturer
M.O.	Masonry Opening
MATL	Material
MAX	Maximum
MECH	Mechanical
MTL	Metal
MIN	Minimum
MISC	Miscellaneous
MTD	Mounted
(N)	New
NOM	Nominal
N	North
N/A	Not Applicable
NIC	Not in Contract
NTS	Not To Scale
#	Number
O.C.	On Center
OPNG	Opening
OPP	Opposite
O.D.	Outside Diameter
O/	Over
O/	Over
OF	Overflow
OFCI	Owner Furnished Contractor Installed
OFOI	Owner Furnished Owner Installed
PR	Pair
PSL	Parallel Strand Lumber
PV	Photovoltaic
PLAM	Plastic Laminate
PL	Plate
PLYWD	Plywood
PSF	Pounds per Square Foot
PSI	Pounds per Square Inch
PT	Pressure Treated
PROP	Property
RAD	Radius
RWL	Rain Water Leader
REF	Reference
REFR	Refrigerator
REINF	Reinforcement/Reinforcing
REQD	Required
RD	Roof Drain
RM	Room
R.O.	Rough Opening
SCHED	Schedule
SHTG	Sheathing
SMS	Sheet Metal Screws
SHWR	Shower
SIM	Similar
SCWD	Solid Core Wood Door
S	South
SPEC	Specification
SAABM	Spray Applied Air Barrier Membrane
SF	Square Foot/Feet
SS	Stainless Steel
STD	Standard
STL	Steel
STOR	Storage
STRL	Structural
TEL	Telephone
TV	Television
TEMP	Temporary
TG	Thermal Glazing
TBD	To Be Determined
T&G	Tongue and Groove
T.O.	Top of
T	Tread
TS	Tube Steel
TYP	Typical
UC	Under Counter
UL	Underwriters Laboratory
UON	Unless Otherwise Noted
VIF	Verify in Field
VERT	Vertical
VEST	Vestibule
WC	Water Closet
WH	Water Heater
WRB	Water Resistant Barrier
WT	Weight
W	West
W.O.	Where Occurs
WDW	Window
W/	With
W/O	With Out

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DATE	04-18-2022
SCALE	1/8" = 1'-0"
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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G-000
COVER SHEET

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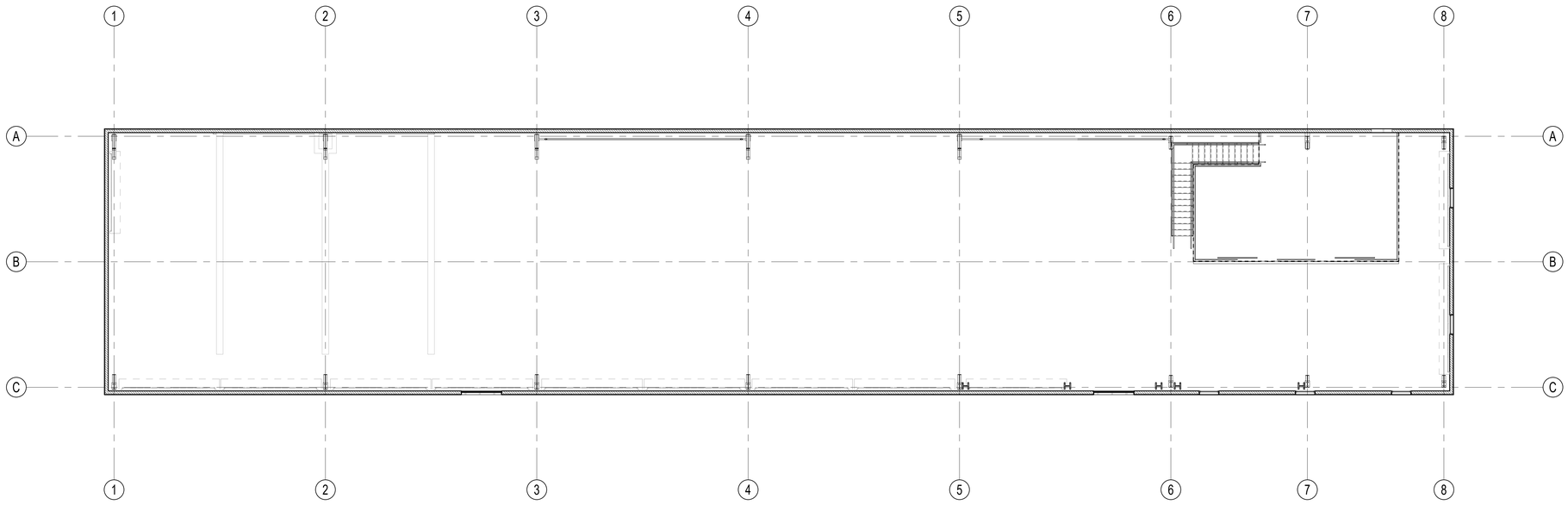
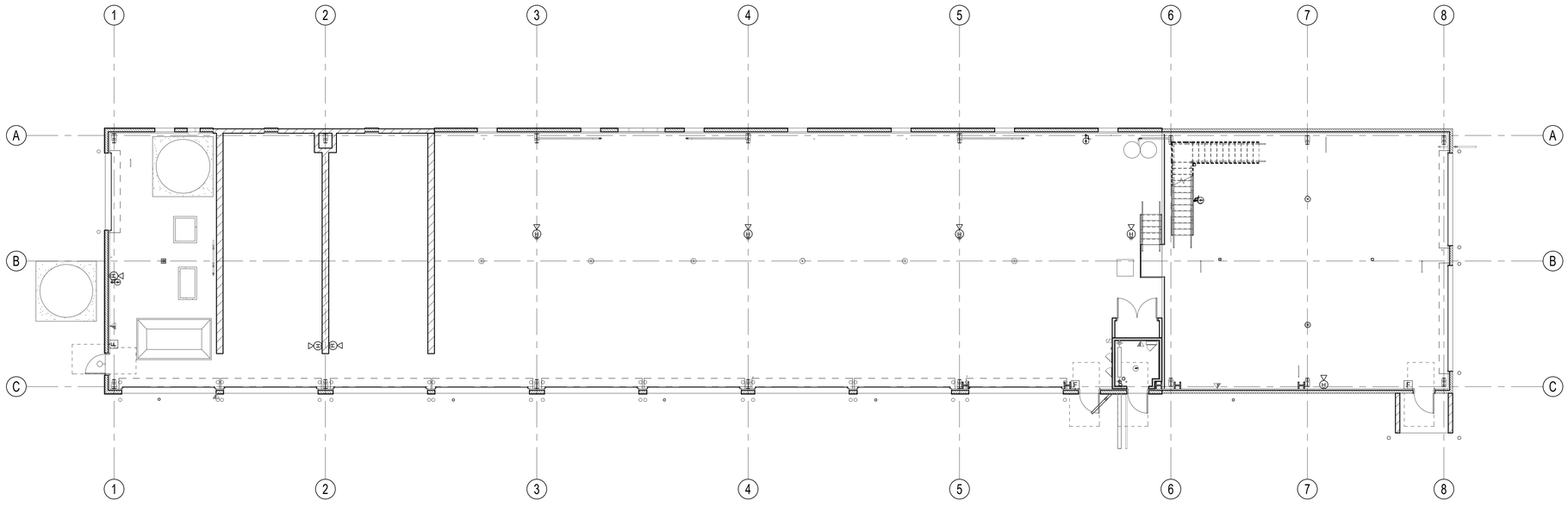


2 CODE ANALYSIS PLAN - MEZZANINE
1/8" = 1'-0"



1 CODE ANALYSIS PLAN - LOWER BAY
1/8" = 1'-0"

CODE ANALYSIS
THE FOLLOWING CODE ANALYSIS FOLLOWS THE FORMAT SUGGESTED IN THE 2019 CBC.

REGULATING AGENCIES:

AGENCY:	APPLICATION:
COUNTY OF EL DORADO	GENERAL CODE ENFORCEMENT - ACCESSIBILITY, FIRE/LIFE SAFETY,
COUNTY OF EL DORADO FIRE	STRUCTURAL LOCAL FIRE DEPARTMENT SIGN-OFF

APPLICABLE CODES AND STANDARDS:
REFER TO GENERAL NOTES: "COMPLIANCE WITH CODES AND AUTHORITIES" FOR A LIST OF APPLICABLE CODES AND STANDARDS ON SHEET G-002

NOTE: REFERENCED CODE SECTIONS AND TABLE IN THIS ANALYSIS ARE FROM THE 2019 CBC, UNLESS OTHERWISE NOTED.

GENERAL INFORMATION

PROJECT:	SHAKORI REPLACEMENT GARAGE
CONSTRUCTION TYPE:	TYPE V-B (CBC SECTION 602 AND TABLE 601), SPRINKLERED
NUMBER OF STORIES:	1, WITH MEZZANINE
FIRE SPRINKLERS:	YES (CBC SECTION 903.2.9)

BUILDING AREA

	OCCUPANCY CLASSIFICATION	CONSTRUCTION TYPE (PER SECTION 602.2)	ACTUAL AREA (SF)
1ST FLOOR	S-1 PER SECTION 311.2	TYPE V-B	8,160 SF
		TOTAL 1ST FLOOR AREA:	8,160 SF
MEZZANINE	S-1 PER SECTION 311.2	TYPE V-B	629 SF
		MEZZANINE FLOOR AREA:	629 SF
		TOTAL BUILDING AREA:	8,789 SF

CODE ANALYSIS FOR CONSTRUCTION TYPE V-B

BASIC ALLOWABLE HEIGHTS AND STORIES: SECTIONS 503 AND 504, TABLES 504.3 AND 504.4

ALLOWABLE HEIGHT: (CONSTRUCTION TYPE V-B, TABLES 504.3 AND 504.4)
GROUP S-1: 1 STORY, 60' - 0"

MAXIMUM ALLOWABLE HEIGHT: 1 STORY, 60 FEET
NUMBER OF STORIES: 1 STORY **OK**
HEIGHT MEASURED FROM GRADE: 33'-8" **OK**

BASIC ALLOWABLE BUILDING AREA: SECTIONS 506, TABLE 506.2

TABULAR AREA (AT) PER STORY: WITHOUT AREA INCREASE (PER TABLE 506.2)
GROUP S-1: 70,000 SF

ALLOWABLE AREA (CBC TABLE 506.2): TYPE V-B, SM
1ST FLOOR 8,789 SF < 9,000 SF (GROUP S-1) = **OK**

NO ALLOWABLE AREA INCREASES ARE REQUIRED AS THE AREA PER STORY IS LESS THAN THE TABULAR AREA OF THE MOST RESTRICTIVE (GROUP S-1).

SINGLE-OCCUPANCY, ONE-STORY BUILDING (CBC 506.2.1)
1 STORY ABOVE GRADE CONTAINING 'S' OCCUPANCIES

FIRE RESISTANCE RATING REQUIREMENTS AND MAXIMUM AREA OF EXTERIOR WALL OPENINGS

BUILDING ELEMENT	CODE REFERENCE	FIRE RESISTANCE RATING (HOURS) (TYPE V-B)
PRIMARY STRUCTURAL FRAME	TABLE 601	0 HR RATING (FOOTNOTE #3)
BEARING WALLS EXTERIOR INTERIOR	 TABLE 601 TABLE 601	 0 HR RATING 0 HR RATING (FOOTNOTE #1)
NONBEARING WALLS EXTERIOR INTERIOR	 TABLE 602 TABLE 601	 0 HR (5 < X ≤ 30), 0 HR (X ≥ 30) 0 HR RATING
FLOOR CONSTRUCTION & ASSOCIATED MEMBERS	TABLE 601	0 HR RATING (FOOTNOTE #2)
ROOF CONSTRUCTION & ASSOCIATED MEMBERS	TABLE 601	0 HR RATING
SHAFT ENCLOSURES	SECTION 713.4	1 HR RATING
CORRIDOR	TABLE 1020.1	1 HR RATING
EXTERIOR EXIT STAIRS	SECTION 1027	N/A (FOOTNOTE #4)

FOOTNOTES

1. SECTION 704.10 - LOAD BEARING STRUCTURAL MEMBERS LOCATED WITHIN THE EXTERIOR WALL OR ON THE OUTSIDE OF A BUILDING OR STRUCTURE SHALL BE PROVIDED WITH THE HIGHEST FIRE-RESISTANCE RATING AS DETERMINED IN ACCORDANGE WITH TABLE 601.
2. EXTERIOR EXIT STAIRWAYS AND RAMPS SERVING AS AN ELEMENT OF A REQUIRED MEANS OF EGRESS SHALL BE OPEN ON NOT LESS THAN ONE SIDE, EXCEPT FOR REQUIRED STRUCTURAL COLUMNS, BEAMS, HANDRAILS AND GUARDS. AN OPEN SIDE SHALL HAVE NOT LESS THAN 35 SQUARE FEET OF AGGREGATE OPEN AREA ADJACENT TO EACH FLOOR LEVEL AND THE LEVEL OF EACH INTERMEDIATE LANDING. THE REQUIRED OPEN AREA SHALL BE LOCATED NOT LESS THAN 42 INCHES ABOVE THE ADJACENT FLOOR OR LANDING LEVEL.

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G-001
CODE ANALYSIS

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G-001 CODE ANALYSIS
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BUILDING SECURITY STANDARDS

1. ALL WORK SHALL COMPLY WITH THE FOLLOWING BUILDING SECURITY STANDARDS:
   - A. GENERAL NOTES
     1. SECURITY AND LOCKING DEVICES SHALL NOTE CREATE HAZARDS TO LIFE BY OBSTRUCTING:
        - A. EXITWAYS OR MEANS OF EGRESS
        - B. EXIT DOORS EQUIPPED WITH PANIC HARDWARE.
2. ASSEMBLIES AND SECURITY HARDWARE INSTALLED SHALL BE LABELED AND CERTIFIED AS MEETING UL (UNDERWRITERS LABORATORY) STANDARDS, OR OTHER APPROVED PERFORMANCE TESTING CRITERIA AS APPROVED BY AGENCY HAVING JURISDICTION.
3. REQUIRED AREA LIGHTING AND ADDRESS IDENTIFICATION SHALL BE INSTALLED BEFORE FINAL INSPECTION IS CALLED FOR.
4. ILLUMINATION PER CODE REQUIREMENTS SHALL BE PROVIDED ADJACENT TO ALL EXTERIOR DOORS DURING ALL HOURS OF DARKNESS TO PROVIDE MINIMUM REQUIRED FOOT CANDLE LEVEL AT PAVING.
5. WINDOW PROVISIONS:
   - A. GLAZING IN EXTERIOR DOORS OR WITHIN A 23 INCH ARC OF EITHER VERTICAL EDGE OF DOOR IN THE CLOSED POSITION SHALL BE TEMPERED SAFETY GLAZING.
   - B. GLAZING AND GLAZED ASSEMBLIES FOR ACCESSIBLE OPENING SHALL BE CERTIFIED AS MEETING TEST PROVISIONS OF UL (UNDERWRITERS LABORATORY).
   - C. ALL GLAZING INSTALLED IN A HAZARDOUS LOCATION SHALL BE TEMPERED SAFETY GLASS.
   - D. GLAZING AND INSTALLATION SHALL BE IN COMPLIANCE WITH THE CALIFORNIA BUILDING CODE INCLUDING CHAPTER 24.
   - E. GLAZING SHALL BE TEMPERED SAFETY GLAZING WHERE INDICATED.

COMPLIANCE WITH CODES AND AUTHORITIES

1. ALL WORK SHALL COMPLY WITH THE 2019 CALIFORNIA CODE OF REGULATIONS, TITLE-24, CALIFORNIA BUILDING STANDARDS COMMISSION (CBSC) - PARTS 1 THRU PART 12.
   - A. PART 1 - CALIFORNIA ADMINISTRATIVE CODE
   - B. PART 2 - VOLUME 1 OF 2 - CALIFORNIA BUILDING CODE (CBC)
   - C. PART 2 - VOLUME 2 OF 2 - CALIFORNIA BUILDING CODE (CBC)
   - D. PART 3 - CALIFORNIA ELECTRICAL CODE (CEC)
   - E. PART 4 - CALIFORNIA MECHANICAL CODE (CMC)
   - F. PART 5 - CALIFORNIA PLUMBING CODE (CPC)
   - G. PART 6 - CALIFORNIA ENERGY CODE
   - H. PART 7 - CALIFORNIA ELEVATOR SAFETY CONSTRUCTION CODE
   - I. PART 8 - CALIFORNIA HISTORICAL BUILDING CODE
   - J. PART 9 - CALIFORNIA FIRE CODE
   - K. PART 10 - CALIFORNIA CODE FOR BUILDING CONSERVATION
   - L. PART 11 - CALIFORNIA GREEN BUILDING STANDARDS CODE
   - M. PART 12 - CALIFORNIA REFERENCED STANDARDS CODE (CALGreen)
2. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF THE CALIFORNIA CODE OF REGULATIONS (CCR). OFFICE OF ADMINISTRATION LAW.
   - A. TITLE 19 C.C.R., PUBLIC SAFETY
   - B. TITLE 24 C.C.R., BUILDING STANDARDS CODE
3. ALL WORK SHALL COMPLY WITH THE CURRENT FOLLOWING AUTHORITIES AND THEIR STANDARDS:
   - A. BUILDING & SAFETY DIVISION.
   - B. PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT.
   - C. PUBLIC WORKS DEPARTMENT
   - D. LAKE VALLEY FIRE DISTRICT MEYERS, CA.
   - E. AMERICANS WITH DISABILITIES ACT - ADA.

CONTRACTOR RESPONSIBILITIES

1. THE CONTRACTOR SHALL EXAMINE EXISTING CONDITIONS, THE DRAWINGS AND SPECIFICATIONS AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES FOUND PRIOR TO PROCEEDING WITH THE WORK IN UNCERTAINTY.
2. THE CONTRACTOR SHALL VERIFY CONDITIONS AT THE SITE AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK IN UNCERTAINTY.
3. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT PRIOR TO ANY EXCAVATING.
4. THE CONTRACTOR SHALL COORDINATE THE REMOVAL, ABANDONMENT AND/OR LOCATIONS OF EXISTING UTILITIES ABOVE OR BELOW GRADE WITH THE RESPECTIVE UTILITY COMPANIES.
5. THE CONTRACTOR SHALL PERFORM ALL WORK WITHIN STREET RIGHT-OF-WAYS ACCORDING TO APPROVED STANDARD PLANS AND SPECIFICATIONS OF THE AGENCY HAVING JURISDICTION.
6. THE CONTRACTOR PROVIDE TEMPORARY BRACES, SHORES, AND GUYS REQUIRED TO SUPPORT ALL LOADS TO WHICH THE BUILDING STRUCTURES AND COMPONENTS, ADJACENT STRUCTURES, UTILITIES AND RIGHT-OF-WAYS MAY BE SUBJECT DURING CONSTRUCTIONS.
7. FLOOR AND WALL OPENINGS, SLEEVES, VARIATIONS IN THE STRUCTURAL SLAB ELEVATIONS, DEPRESSED AREAS AND ALL OTHER ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND/OR CIVIL REQUIREMENTS MUST BE COORDINATED BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK.
8. THE CONTRACTOR SHALL INSPECT AND APPROVE ALL EXISTING WORK AS COMPLETE AND READY TO PROCEED WITH WORK UNDER THIS CONTRACT AND IN COMPLIANCE WITH DRAWINGS, SPECIFICATIONS AND DIVISION 1 REQUIREMENTS PRIOR TO COMMENCING.

TYPICAL NOTES

1. SIMILAR - MEANS COMPARABLE CHARACTERISTICS FOR THE CONDITIONS NOTES. VERIFY DIMENSIONS AND/OR ORIENTATIONS ON PLANS AND/OR ELEVATIONS.
2. DIMENSIONS ARE NOT ADJUSTABLE WITHOUT APPROVAL OF ARCHITECT IN WRITING.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ARCHITECT OF ANY CONFLICTS HEREIN, EITHER UNAPPARENT OR OBVIOUS, PRIOR TO START OF WORK ON THAT ITEM OR BEAR THE RESPONSIBILITY OF CORRECTING SUCH WORK AS DIRECTED BY THE ARCHITECT AND AT NO ADDITIONAL COST AND NO TIME EXTENSION OF THE PROJECT.
4. UNDERCUT ALL DOORS TO CLEAR TOP OF FLOOR FINISH AND/OR THRESHOLD .25 INCHES MAXIMUM. COORDINATE WITH AUTOMATIC DOOR BOTTOMS.
5. PREPARE DOORS FOR HARDWARE SPECIFIED. TEST AND ADJUST DOORS FOR SMOOTH, QUIET OPERATION BEFORE FINAL OBSERVATIONS TO CONFIRM MAXIMUM PRESSURE TO OPEN DOOR IS NOT EXCEEDED.
6. USE WATER RESISTANT / GLASS FIBER FACED GYPSUM WALLBOARD ON ALL WALL FACES WHICH ARE EXPOSED TO WATER OR MOISTURE AS WELL AS THOSE USED FOR JANITOR AND TOILET WALLS, COORDINATE AND COMPLY WITH SPECIFICATIONS, SECTION 09250.
7. ALL EXTERIOR WALLS SHALL BE INSULATED AND IN COMPLIANCE WITH SPECIFICATIONS AND PLAN DOCUMENTS AND SHALL NOT FALL BELOW MINIMUM TITLE 24 REQUIREMENTS WHERE NOT INDICATED, COORDINATE WITH WALL SCHEDULE.
8. PROVIDE ADEQUATE BLOCKING AND ANCHORAGE FOR CEILING AND WALL MOUNTED EQUIPMENT - I.E. FIRE EXTINGUISHER CABINETS, HANDRAILS AND GUARDRAILS, ETC.
9. ALL CEILING CONSTRUCTIONS SHALL COMPLY WITH CBC CHAPTER 25 (MAXIMUM 12" JOIST SPACING AT CEILINGS) AND AS INDICATED IN DRAWINGS.
10. ALL CEILING CONSTRUCTION SHALL COMPLY WITH CBC CHAPTER 25 (MAXIMUM 12" JOIST SPACING AT CEILINGS) AND AS INDICATED IN DRAWINGS.

MECHANICAL AND PLUMBING

1. MECHANICAL AND PLUMBING SHALL COMPLY WITH THE CURRENT ADOPTED EDITION ON THE CALIFORNIA MECHANICAL AND PLUMBING CODES AT TIME OF PERMIT ISSUANCE.
2. ACCESS PANELS SHALL BE PROVIDED WHERE REQUIRED FOR ACCESS TO ALL DUCTWORK, FIRE DAMPERS, ETC.; REFER ALSO TO SPECIFICATIONS. COORDINATE LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
3. LOCATION OF ALL MECHANICAL ROOF OPENINGS SHALL BE DETERMINED AND VERIFIED BY THE MECHANICAL AND GENERAL CONTRACTOR.
4. ELECTROLYSIS PROTECTION SHALL BE PROVIDED BETWEEN ALL DISSIMILAR METALS WHEREVER THE TWO ARE IN CONTACT.

COMPLIANCE WITH PLAN DOCUMENTS

1. DIMENSIONS:
   - A. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
   - B. ALL DIMENSIONS TO OPENINGS ARE TO THE ROUGH OPENING UNLESS NOTED OTHERWISE.
   - C. ALL DIMENSIONS TO STUD PARTITIONS ARE TO THE FACE OF FRAMING UNLESS NOTED OTHERWISE.
   - D. CEILING HEIGHT DIMENSIONS ARE FROM FINISH FLOOR TO FINISH FACE OF CEILING.
   - E. ALL DIMENSIONS SHALL BE VERIFIED IN THE FIELD BEFORE PROCEEDING WITH THE WORK.
   - F. ACCESSIBILITY DIMENSIONS SHALL BE MEASURED TO FACE OF WALL FINISH. CLEAR OPENING AND AS INDICATED ON ENLARGED PLAN, MOUNTING HEIGHTS SHEET, TOILET ROOM ELEVATIONS AND STANDARD DETAIL DRAWING SHEETS.
   - G. DIMENSIONING PROTOCOLS / HIERARCHY:
     1. "ENLARGED PLAN" INCLUDES ALL DIMENSIONING ASSOCIATED WITH THE GRAPHICS SHOWN.
     2. OVERALL PLANS SHOW DIMENSIONS NOT INDICATED ON THE "PARTIAL DIMENSIONING PLANS."
2. WHERE NO SPECIFIC DETAIL IS SHOWN, THE FRAMING OR CONSTRUCTION SHALL BE IDENTICAL OR SIMILAR TO THAT INDICATED FOR LIKE CASES OR CONSTRUCTIONS ON THE PROJECT AND IF NOT CLEAR A REQUEST FOR INFORMATION (RFI) SHALL BE ISSUED TO THE ARCHITECT FOR CLARIFICATION.
3. CONCRETE CONSTRUCTION SHALL COMPLY WITH THE CALIFORNIA BUILDING CODE INCLUDING BUT NOT LIMITED TO CHAPTERS 16, 17, 18 AND 19 AND SPECIFICATIONS.
4. STEEL CONSTRUCTION SHALL COMPLY WITH THE CALIFORNIA BUILDING CODE INCLUDING BUT NOT LIMITED TO CHAPTERS 16, 17 AND 22 AND SPECIFICATIONS.
5. ALL INTERIOR FINISH MATERIALS SHALL HAVE A FLAME SPREAD CLASSIFICATION RATING PER CALIFORNIA BUILDING CODE INCLUDING BUT NOT LIMITED TO CHAPTER 8.
6. ROOF COVERING AND ROOFING MATERIALS SHALL BE FIRE RETARDANT AND SHALL COMPLY WITH THE UNDERWRITERS LABORATORIES, INC. AND CLASSIFIED AS CLASS B U.L. FIRE HAZARD, MINIMUM UNLESS NOTED OTHERWISE ON DRAWINGS OR IN SPECIFICATIONS AND SHALL COMPLY WITH THE CALIFORNIA BUILDING CODE INCLUDING CHAPTER 15.
7. ALL REQUIRED EXITS SHALL BE OPERABLE FROM THE INSIDE AT ANY TIME BY TURNING OF THE LEVER OR DEPRESSING BAR OF PANIC EXIT DEVICE, WITHOUT THE USE OF A KEY OR ANY SPECIAL EFFORT OR KNOWLEDGE.
8. ILLUMINATED EXIT SIGNS SHALL BE INSTALLED WHERE INDICATED AND OTHER REQUIRED EXIT DOORWAYS IN ACCORDANCE WITH CALIFORNIA BUILDING CODE WHERE NECESSARY TO CLEARLY INDICATE THE DIRECTION OF EGRESS WHEN TWO OR MORE EXITS ARE REQUIRED AND AT ROOMS SERVING AN OCCUPANT LOAD OF MORE THAN 49.
9. DOOR OPENING SIZES INDICATED ON DOOR SCHEDULE ARE OPENING DIMENSIONS. ALLOWANCES FOR THRESHOLDS, FLOOR FINISHES, ETC. SHALL BE TAKEN OFF DOOR.
10. THE PRECISE DIMENSIONS AND LOCATIONS OF ALL DOORS, LOUVERS AND WINDOW OPENINGS SHALL BE DETERMINED BY ARCHITECTURAL PLANS AND DETAILS. OTHER WALL AND FLOOR OPENINGS AS REQUIRED BY MECHANICAL OR ELECTRICAL SHALL BE VERIFIED FROM SHOP DRAWINGS, EQUIPMENT DATA, ETC. AS REQUIRED, AND IF NOT CLEAR AN RFI SHALL BE ISSUED TO THE ARCHITECT FOR CLARIFICATION.
11. DOOR OPENINGS NOT LOCATED BY DIMENSIONS SHALL BE LOCATED 6 INCHES FROM FINISH WALL TO FINISH JAMB UNLESS OTHERWISE NOTED. IF DOOR CLEARANCE REQUIREMENTS AT PULL SIDE AND PUSH SIDE OF STRIKE ARE NOT ACHIEVABLE, THEN CONTRACTOR SHALL ISSUE A RFI FOR CLARIFICATION PRIOR TO PROCEEDING.
12. THERE SHALL BE A LEVEL FLOOR OR LEVEL LANDING ON EACH SIDE OF THE DOOR REGARDLESS OF THE OCCUPANT LOAD.
13. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONS LOCATING LIGHT FIXTURES, DIFFUSERS AND WALL MOUNTED FIXTURES. REFER TO ELECTRICAL DRAWINGS FOR ALL LIGHTING FIXTURE TYPES, WIRING, ETC.
14. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS FOR MOUNTING HEIGHTS. WALL FIXTURES OR ITEMS THAT PROTRUDE BEYOND 4 INCHES OF WALL SURFACE SHALL BE LOCATED WITH BOTTOM OF FIXTURE/ITEMS 80 INCHES CLEAR OF FINISH FLOOR.
15. CEILING SUSPENSION SYSTEM SHALL PROVIDE FOR CEILING SYSTEM ONLY. ADDITIONAL INDEPENDENT FRAMING FOR LIGHTING FIXTURES, EXIT SIGNS, GRILLES AND AIR CONDITIONING DIFFUSERS SHALL BE REQUIRED.
16. PROVIDE ADEQUATE ANCHORAGE, BLOCKING, BACKING AND FRAMING FOR FIRE SPRINKLERS, PIPING, LIGHTING FIXTURES, ELECTRICAL UNITS, HVAC EQUIPMENT AND CEILING TRACKS AS REQUIRED FOR A COMPLETE INSTALLATION.
17. GYPSUM BOARD ON METAL STUDS SHALL BE 5/8" THICK, TYPE 'X' UNLESS NOTED OTHERWISE AND IN COMPLIANCE WITH PLAN DOCUMENTS "WALL TYPES" REQUIREMENTS AND SPECIFICATIONS.

FIRE PROTECTION NOTES

1. THE BUILDING SHALL BE PROVIDED WITH AN AUTOMATIC FIRE EXTINGUISHING SYSTEM THROUGHOUT. SYSTEM TYPES SHALL BE DRY PIPE FIRE SPRINKLER SYSTEMS. SYSTEMS SHALL CONFORM TO THE CALIFORNIA BUILDING CODE (CBC), CALIFORNIA FIRE CODE (CFC), NFPA, UL AND CALIFORNIA STATE FIRE MARSHALL (CSFM).
2. ALL AUTOMATIC FIRE SPRINKLER SYSTEM WORK AND THE FIRE ALARM SYSTEM WORK ARE TO BE ENGINEERED, FURNISHED AND INSTALLED BY A LICENSE FIRE SPRINKLER CONTRACTOR.
3. FIRE SPRINKLER CONTRACTOR AND FIRE ALARM CONTRACTOR SHALL SUBMIT FIRE SPRINKLER AND FIRE ALARM DRAWINGS AND CALCULATIONS TO THE CSFM FOR APPROVAL AND PERMIT PRIOR TO COMMENCING THE WORK.
4. PORTABLE FIRE EXTINGUISHERS SHALL BE INSTALLED IN OCCUPANCIES AND LOCATIONS AS INDICATED ON DRAWINGS, AS HEREIN INDICATED AND SET FORTH IN THE CODE AND AS REQUIRED BY THE FIRE DEPARTMENT. THE MAXIMUM TRAVEL DISTANCE TO THE FIRE EXTINGUISHER SHALL NOT EXCEED 75 FEET ALONG AN UNOBSTRUCTED PATH OF TRAVEL, CFC TABLE 906.3(1). ALL PORTABLE FIRE EXTINGUISHERS SHALL HAVE A SERVICE TAG AFFIXED TO THEM SHOWING THAT THE EXTINGUISHER HAS BEEN SERVICED BY A CALIFORNIA STATE LICENSED FIRE EXTINGUISHER CONCERN. ALL FIRE EXTINGUISHERS SHALL BE ATTACHED TO A BRACKET OR WITHIN AN APPROVED CABINET, REFER TO DRAWINGS AND SPECIFICATIONS. MAXIMUM DISTANCE FROM THE FLOOR SHALL NOT EXCEED THE REQUIREMENTS OF CFC SECTION 906.9 AND ADA.

   - A. REFER TO DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION, LOCATION, TYPES, ETC.

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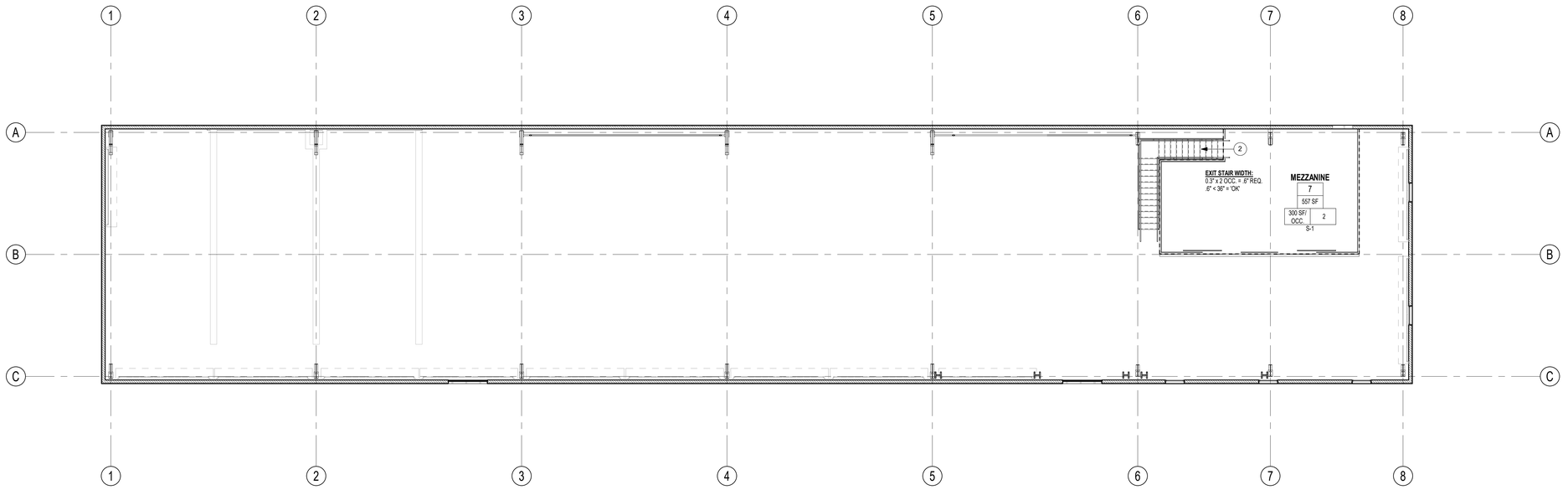
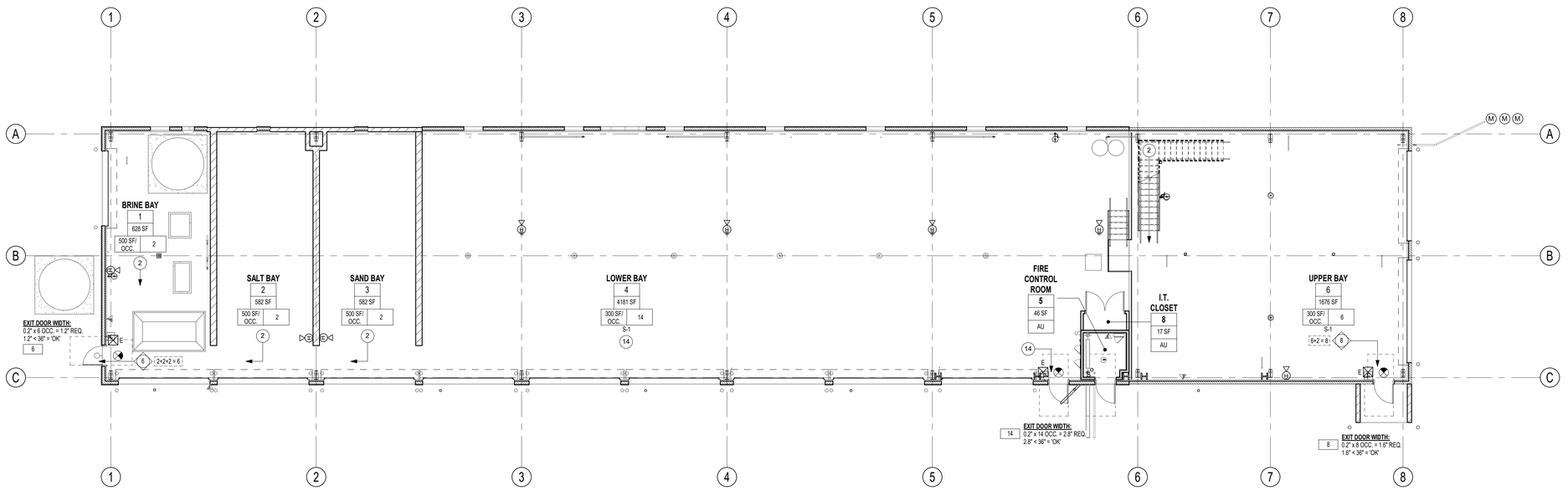


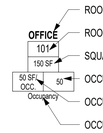
2 EXITING PLAN - MEZZANINE
1/8" = 1'-0"



1 EXITING PLAN
1/8" = 1'-0"

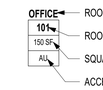
EXITING LEGEND

ROOM SYMBOLS



ROOM NAME
ROOM NUMBER
SQUARE FOOTAGE
OCCUPANCY LOAD
OCCUPANCY LOAD FACTOR
OCCUPANCY TYPE IF NOT "B"

ACCESSORY ROOM SYMBOLS



ROOM NAME
ROOM NUMBER
SQUARE FOOTAGE
ACCESSORY USE

EXITING ANALYSIS SYMBOLS

COMBINED OCCUPANT LOAD IN A MAIN AREA

OCCUPANT LOAD OF SPECIFIC ROOM

ESTIMATED OCCUPANT LOAD TO EXITING FROM MAIN AREA. TYPICAL 1/2" OR 1/3" THE MAIN AREA OCCUPANT LOAD

\# - OCCUPANT LOAD AT EXTERIOR DOOR USED FOR MINIMUM CLEAR DOOR WIDTH CALCULATIONS.
- OCCUPANT LOAD AT STAIR TO BE USED TO CALCULATE MINIMUM REQUIRED STAIR WIDTH.

HEAVY LINE REPRESENTS DIVISION BETWEEN MAIN AREA'S FOR CALCULATING OCCUPANT LOADS WITHIN THE SPECIFIC AREA EXTEND.

COMBINED OCCUPANT LOAD:
SPECIFIC AREA WHEN MULTIPLE LOADS DUMP INTO AN AREA.

HARDWARE

P — PANIC HARDWARE (EXIT DEVICE). TYPICAL NON LATCHING HARDWARE AT MAIN ENTRANCE DOORS.

SIGNAGE
REFER TO SIGNAGE LEGEND

OCC — MAXIMUM OCCUPANCY SIGN (REFER TO "SIGNAGE LEGEND")

[FILL IN] — SIGN, REFER TO SIGNAGE SCHEDULE

EXIT SIGNS (ILLUMINATED)

EXIT SIGN (ARROW INDICATES SPECIFIC PATH DIRECTION INTEGRAL TO SIGN) CENTER SIGN OVER DOOR OPENING

FIRE EXTINGUISHERS: (75' MAX. TRAVEL DISTANCE TO EXTINGUISHER, MIN. 1 PER 3,000S.F. CFC SECTION 906)

FE — FIRE EXTINGUISHER AND BRACKET: SURFACE MOUNTED WITH SIGNAGE.

FEF — FIRE EXTINGUISHER: FULLY RECESSED WITH SIGNAGE

FES — FIRE EXTINGUISHER: SEMI RECESSED WITH SIGNAGE

SHEET NOTES G-111

SIGNAGE SCHEDULE

SIGN MARK	DESCRIPTION	CODE REFERENCE	SIGN LOCATION	SPECIFICATION REFERENCE	DETAIL REFERENCE(S)
EXITING - TACTILE					
E	TACTILE EXIT SIGN: "EXIT" - EACH GRADE LEVEL EXTERIOR EXIT DOOR WHICH LEADS DIRECTLY TO EXTERIOR	2013 CBC 1011.4, 11B-703.1, 11-703.2, 11B-703.3, 11B-703.4, & 11B-703.5	BUILDING E	10 14 00.C	4 / A8.5

GENERAL NOTES

A. FOR SIGNAGE, REFER TO SPECIFICATION SECTION 10440, DETAILS AND THIS SHEET
B. COORDINATE THIS PLAN WITH DOCUMENTS INCLUDING BUT NOT LIMITED TO SITE PLANS, FLOOR PLANS, ELEVATIONS AND CEILING PLANS BY ALL DISCIPLINES.
C. INSTALL BLANK SIGN ON OPPOSITE SIDE OF SIGN WHEN INSTALLED ON GLASS.
D. MOUNT SIGNS BACK TO BACK AT GLAZING.

williams+paddon
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Sacramento, CA 95811
wp-architects.com
2237 Douglas Blvd., Ste. 160
Roseville, CA 95661
916.786.8178

LICENSED ARCHITECT
GREGORY M. TARCHIO
No. C18650
Ren. 2/28/23
STATE OF CALIFORNIA
AIA

SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	As indicated
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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G-111
EXITING PLAN & SIGNAGE

C:\Users\jason\Desktop\Temp Revit\Shakori Garage-Revit200035.00_Shakori-04-18-22-A_rvt 4/15/2022 10:04:48 AM

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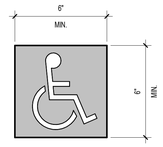
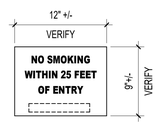


SIGNAGE FOR THE DISABLED NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH CALIFORNIA TITLE 24, C.B.C. ACCESSIBILITY REQUIREMENTS AND ADA REGULATIONS; MOST CURRENT AND MOST RESTRICTIVE SHALL APPLY.
2. SIGNAGE SHALL COMPLY WITH 2019 CBC 11B-703.7.2.1 AND SUBSECTIONS. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL BE EQUAL TO COLOR NO. 15090 IN FEDERAL STANDARD 595B.
3. AT GLAZING INSTALL A BLANK SIGN AT OPPOSITE SIDE WITH 2-SIDED 3M TAPE.
4. COORDINATE WITH SIGNAGE AT INTERIOR SIDE OF GLASS.

1 INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA)

3"=1'-0"
wp1.1



NOTES:

1. SIGNAGE SHALL COMPLY WITH 2019 CBC 11B-703.
2. SIGN SHALL BE MOUNTED ON GLASS AT EXTERIOR SIDE WITH SIGN BLANK ON INTERIOR SIDE OF SIGN.
3. COORDINATE WITH SIGNAGE AT INTERIOR OF GLASS. SIGN SHALL BE MOUNTED ABOVE FINISH FLOOR IN COMPLIANCE W/ 2019 CBC SECTION 11B-703.4.
4. CHARACTERS, SYMBOLS, AND THEIR BACKGROUND SHALL HAVE A NON-GLARE FINISH AND SHALL CONTRAST WITH THEIR BACKGROUND WITH EITHER A LIGHT SYMBOL ON A DARK BACKGROUND OR A DARK SYMBOL ON A LIGHT BACKGROUND IN COMPLIANCE WITH 2019 CBC 11B-703.5
5. FOR TYPICAL TACTILE SIGN MOUNTING HEIGHT AND NOTES, REFER TO:
6. FOR TYPICAL ALIGNMENT WITH OTHER SIGNS, REFER TO: 16/G-263

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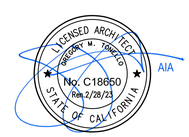

SHAKORI
GARAGE
REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
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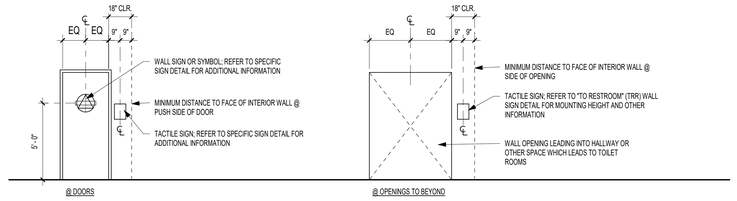
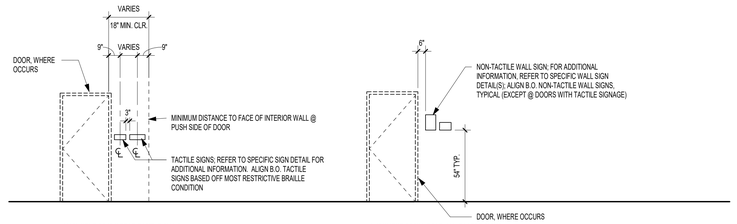
DEPARTMENT OF
TRANSPORTATION

REVISIONS

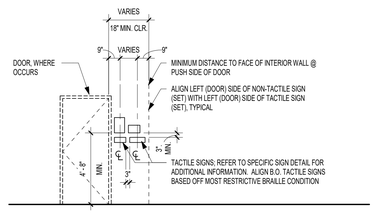


ALIGNMENT OF DOOR AND TACTILE WALL MOUNTED SIGNAGE



ALIGNMENT OF MULTIPLE TACTILE SIGNS

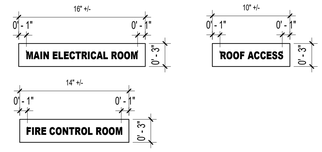
ALIGNMENT OF MULTIPLE NON-TACTILE SIGNS



ALIGNMENT OF TACTILE AND NON-TACTILE SIGNS

16 TYPICAL SIGN ALIGNMENT @ LOCATIONS WITH MULTIPLE SIGN

1/4" = 1'-0"
wp1.1

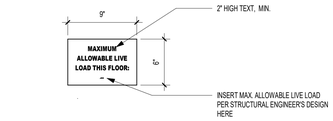


DOOR MOUNTED SIGNAGE NOTES:

1. THE TEXT SHALL BE 1" HIGH, MIN. AND CONTRAST WITH THE BACKGROUND PER 2019 CBC SECTION 11B-703.5 AND TABLE 11B-703.5.5.
2. VISUAL CHARACTER HEIGHT SHALL BE IN COMPLIANCE W/ 2019 CBC SECTION 11B-703.5.6 AND TABLE 11B-703.5.5.
3. SIGN SHALL BE MOUNTED ON DOOR AND CENTERED ON DOOR AT 60" UNLESS OTHERWISE REQUIRED BY 2019 CBC SECTION 11B-703.5.6 AND TABLE 11B-703.5.5. SIGNAGE SHALL BE IN COMPLIANCE WITH LOCAL FIRE DEPARTMENT STANDARDS.
4. CHARACTERS, SYMBOLS AND THEIR BACKGROUND SHALL HAVE A NON-GLARE FINISH AND SHALL CONTRAST WITH THEIR BACKGROUND WITH EITHER A LIGHT SYMBOL ON A DARK BACKGROUND OR A DARK SYMBOL ON A LIGHT BACKGROUND IN COMPLIANCE WITH 2019 CBC SECTION 11B-703.5.
5. FOR TYPICAL ALIGNMENT WITH OTHER SIGNS, REFER TO: 16/G-263

7 ELEC. & FIRE CONTROL ROOMS DOOR MOUNTED SIGNAGE (FRD, MED, RAD)

1-1/2"=1'-0"
wp1.1



MAXIMUM ALLOWABLE LIVE LOAD SIGNAGE NOTES:

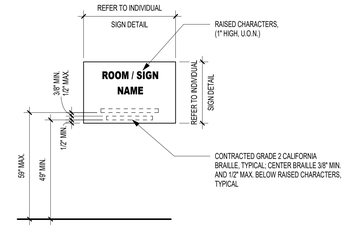
1. IN COMMERCIAL, INSTITUTIONAL OR INDUSTRIAL BUILDINGS, FOR EACH FLOOR OR PORTION THEREOF DESIGNED FOR LIVE LOADS EXCEEDING 50 PSF, SUCH DESIGN LIVE LOADS SHALL BE CONSPICUOUSLY POSTED BY THE OWNER IN THAT PART OF EACH STORY IN WHICH THEY APPLY, USING DURABLE SIGNS, IN COMPLIANCE WITH 2019 CBC SECTION 106.1.
2. NO PERSON SHALL DEFACE OR REMOVE SUCH SIGNS EXCEPT AS AUTHORIZED BY THE ENFORCING AGENCY.
3. VISUAL CHARACTERS SHALL COMPLY WITH WITH 2019 CBC SECTION 11B-703.5.
4. FOR TYPICAL ALIGNMENT WITH OTHER SIGNS, REFER TO:

8 MAXIMUM ALLOWABLE LIVE LOAD SIGNAGE (LL)

1-1/2"=1'-0"
wp1.1

2 NO SMOKING @ ENTRANCE TACTILE SIGN (NSE)

1-1/2"=1'-0"
wp1.1

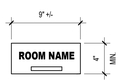


TACTILE SIGN MOUNTING HEIGHT NOTES:

1. SIGN SHALL BE MOUNTED ABOVE FINISH FLOOR IN COMPLIANCE WITH 2019 CBC 11B-703.4.

3 TACTILE SIGN TYPICAL MOUNTING HEIGHT AND NOTES

1-1/2" = 1'-0"
wp1.1



PERMANENT ROOM SIGNAGE NOTES:

1. RAISED CHARACTER AND BRAILLE PERMANENT ROOM SIGNS SHALL COMPLY WITH 2019 CBC 11B-703.1, 2019 CBC 11B-703.2, 2019 CBC 11B-703.3 AND 2019 CBC 11B-703.5.
2. SIGN SHALL BE MOUNTED ABOVE FINISH FLOOR IN COMPLIANCE WITH 2019 CBC 11B-703.4.
3. CHARACTERS, SYMBOLS, AND THEIR BACKGROUND SHALL HAVE A NON-GLARE FINISH AND SHALL CONTRAST WITH THEIR BACKGROUND WITH EITHER A LIGHT SYMBOL ON A DARK BACKGROUND OR A DARK SYMBOL ON A LIGHT BACKGROUND IN COMPLIANCE WITH 2019 CBC 11B-703.5.
4. FOR TYPICAL TACTILE SIGN MOUNTING HEIGHT AND NOTES, REFER TO: 3/G-263
5. FOR TYPICAL ALIGNMENT WITH OTHER SIGNS, REFER TO: 16/G-263

4 TACTILE & PERMANENT RM. TACTILE SIGN (PR, FRW, MEW, RAW, EM, SPR)

1-1/2" = 1'-0"
wp1.1

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	As indicated
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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G-263
BUILDING SIGNAGE

DIVISION 5.5 Environmental Quality	Mandatory	Carpet adhesives per Table 5.504.4.1	5.504.4.4.2		X					
	Mandatory	Composite wood products	5.504.4.5		X					
	Mandatory	Composite wood products: documentation	5.504.4.5.3		X					
	Mandatory	Resilient flooring systems	5.504.4.6		X					
	Mandatory	Resilient flooring: verification of compliance	5.504.4.6.1		X					
	Mandatory	Filters (with exceptions)	5.504.5.3	X			SPEC SECTION 233416			
	Mandatory	Filters: labeling	5.504.5.3.1	X			SPEC SECTION 233416			
	Mandatory	Environmental tobacco smoke (ETS) control	5.504.7		X					
	Mandatory	Indoor moisture control	5.505.1	X			SPEC SECTION 072100			
	Mandatory	Outside air delivery	5.506.41	X			DRAWING M3.1			
	Mandatory	Carbon dioxide (CO2) monitoring	5.506.2		X					
	Mandatory	Acoustical control (with exception)	5.507.4		X					
	Mandatory	Exterior noise transmission, prescriptive method (with exceptions)	5.507.4.1		X					
	Mandatory	Noise exposure where noise contours are not readily available	5.507.4.1.1		X					
	Mandatory	Performance method	5.507.4.2		X					
	Mandatory	Site features	5.507.4.2.1		X					
	Mandatory	Documentation of compliance	5.507.4.2.2		X					
	Mandatory	Interior sound transmission (with note)	5.507.4.3		X					
	Mandatory	Ozone depletion and greenhouse gas reductions	5.508.1		X					
	Mandatory	Chlorofluorocarbons (CFCs)	5.508.1.1		X					
	Mandatory	Halons	5.508.1.2		X					
	Mandatory	Supermarket refrigerant leak reduction for retail food stores 8,000 square feet or more Sections 5.508.2 through 5.508.2.6.3	5.508.2 through 5.508.2.6.3		X					

Documentation Author's / Responsible Designer's Declaration Statement			
	Mandatory: I attest that this mandatory provisions checklist is accurate and complete		
Signature:			
Company:	Williams + Planners Architects + Planners, Inc.	**Date:**	MARCH 7, 2022
Address:	2237 Douglas Blvd., Suite 160	**License:**	C-18650
City / State / Zip:	Roseville, CA 95661	**Phone:**	916-786-8178

A5.602.1 CAL Green Verification Guidelines Mandatory Measures Checklist									
Application: This Checklist shall be used for nonresidential projects that meet one of the following: new construction, building additions of 1,000 square feet or greater, or building alternations with a permit valuation of $200,000 or more pursuant to Section 301.3 AND do not trigger a Tier 1 or Tier 2 requirement									
Y = Yes (section has been selected and/or included)									
N/A = Not Applicable (code section does not apply to the project - mainly used for additions and alterations									
O = Other (provide explanation)									
[N] = New Construction pursuant to Section 301.3									
[A] = Additions and/or Alterations pursuant to Section 301.3									
Chapter 5 Divisions		**Section Title**	**Code Section**	**Y**	**N/A**	**O**	**Plan Sheet, Spec, or Attach Reference**		
DIVISION 5.1 Planning and Design	Mandatory	Storm water pollution prevention for projects that disturb less than 1 acre of land	5.106.1 through 5.106.2	X			C5.1, C5.2, C5.3, C8.3		
	Mandatory	Short-term bicycle parking (with exception)	5.106.4.1.1		X				
	Mandatory	Long-term bicycle parking	5.106.4.1.2 through 5.106.4.1.5		X				
	Mandatory	Designated parking for clean air vehicles	5.106.5.2		X				
	Mandatory	Parking stall marking	5.106.5.2.1		X				
	Mandatory	Single charging space requirements	5.16.5.3.1		X				
	Mandatory	Multiple charging space requirements [N]	5.106.5.3.2		X				
	Mandatory	EV charging space calculation [N] (with exception)	5.106.5.3.3		X				
	Mandatory	[N] Identification	5.106.5.3.4		X				
	Mandatory	[N] Future charging spaces	5.106.5.3.5		X				
	Mandatory	Light pollution reduction [N] (with exception and notes)	5.106.8	X			E2.0		
	Mandatory	Grading and paving (exception for additions and alterations not altering the drainage path)	5.106.10			X	(E) DRAINAGE PATH NOT BEING ALTERED		
DIVISION 5.2 Energy Efficiency	Mandatory	Meet the minimum energy efficiency standard	5.201.1	X					
DIVISION 5.3 Water Efficiency and Conservation	Mandatory	Separate meters (new buildings or additions > 50,000 sf that consume more than 100 gal/day)	5.303.1.1		X				
	Mandatory	Separate meters (for tenants in new buildings or additions that consume more than 1,000 gal/day)	5.303.1.2		X				
	Mandatory	Water Closets shall not exceed 1.28 gallons per flush (gpf)	5.303.3.1		X				
	Mandatory	Wall-mounted urinals shall not exceed 0.125 gpf	5.303.3.2.1		X				
	Mandatory	Floor mounted urinals shall not exceed 0.5 gpf	5.303.3.2.2		X				
	Mandatory	Single showerhead shall have maximum flow rate of 1.8 gpm (gallons per minute) at 80 psi	5.303.3.3.1		X				
	Mandatory	Multiple showerheads serving one shower shall have a combined flow rate of 1.8 gpm at 80 psi	5.303.3.3.2		X				
	Mandatory	Nonresidential lavatory faucets	5.303.3.4.1		X				
	Mandatory	Kitchen faucets	5.303.3.4.2		X				
	Mandatory	Wash fountains	5.303.3.4.3		X				
	Mandatory	Metering faucets	5.303.3.4.4		X				
	Mandatory	Metering faucets for wash fountains	5.303.3.4.5		X				
	Mandatory	Food waste disposers	5.303.4.1		X				
	Mandatory	Areas of additions or alterations	5.303.5		X				
	Mandatory	Standards for plumbing fixutres and fittings	5.303.6		X				
	Mandatory	Outdoor potable water use in landscape areas (wioth notes)	5.304.1		X				
	Mandatory	Outdoor water supply systems (with Exceptions 1-4)	5.305.1.1		X				
	Mandatory	Technical requirements for outdoor recycled water supply systems	5.305.1.2		X				
DIVISION 5.4 Material Conservation and Resource Efficiency	Mandatory	Weather protection	5.407.1		X				
	Mandatory	Moisture control: sprinklers	5.407.2.1		X				
	Mandatory	Moisture control: exterior door protection	5.407.2.2.1		X				
	Mandatory	Moisture control: flashing	5.470.2.2.2		X				
	Mandatory	Construction waste management - comply with either Sections 5.408.1.1, 5.408.1.2, and 5.408.1.3 or more stringent local ordinance	5.408.1.1, 5.408.1.2, 5.408.1.3	X			SPEC SECTION 017419		
	Mandatory	Construction waste management: documentation	5.408.1.4	X			SPEC SECTION 017419		
	Mandatory	Universal waste [A]	5.408.2		X				
	Mandatory	Excavated soil and land clearning debris (100% reuse or recycle)	5.408.3		X				
	Mandatory	Recycling by occupants (with exception)	5.410.1	X					
	Mandatory	Recycling by occupants: additions (with exception)	5.410.1.1		X				
	Mandatory	Recycling by occupants: sample ordinance	5.410.1.2		X				
	Mandatory	Commissioning new buildings (≥ 10,000 sf) [N]	5.410.2		X				
	Mandatory	Owner's or owner representative's Project Requirements (OPR) [N]	5.410.2.1		X				
	Mandatory	Basis of Design (BOD) [N]	5.410.2.2		X				
	Mandatory	Commissioning plan [N]	5.410.2.3		X				
	Mandatory	Functional performance testing [N]	5.410.2.4		X				
	Mandatory	Documentation and training [N]	5.410.42.5		X				
	Mandatory	Systems manual [N]	5.410.2.5.1		X				
	Mandatory	Systems operation training [N]	5.410.2.5.2		X				
	Mandatory	Commissioning report [N]	5.410.2.6		X				
	Mandatory	Testing and adjusting for new buildings < 10,000 sf or new systems that serve additions or alterations [A]	5.410.4		X				
	Mandatory	System testing plan for renewable energy, landsacpe irrigation and water reuse [A]	5.410.4.2		X				
	Mandatory	Procedures for testing and adjusting	5.410.4.3		X				
	Mandatory	Procedures for HVAC balancing	5.410.4.3.1		X				
	Mandatory	Reporting for testing and adjusting	5.410.4.4		X				
	Mandatory	Operation and maintenant (O&M) manual	5.410.4.5		X				
	Mandatory	Inspection and reports	5.410.4.5.1		X				
DIVISION 5.5 Environmental Quality	Mandatory	Fireplaces	5.503.1		X				
	Mandatory	Woodstoves	5.503.1.1		X				
	Mandatory	Temporary ventilation	5.504.1		X				
	Mandatory	Covering of ducts openings and protection of mechanical equipment during construction	5.504.3	X			SPEC SECTION 017419		
	Mandatory	Adhesives, sealants, and caulks	5.504.4.1	X			SPEC SECTION 079200		
	Mandatory	Paints and coatings	5.504.4.3	X			SPEC SECTION 099000		
	Mandatory	Aerosol paints and coatings	5.504.4.3.1	X			SPEC SECTION 099000		
	Mandatory	Aerosol paints and coatings: verification	5.504.4.3.2	X			SPEC SECTION 099000		
	Mandatory	Carpet systems	5.504.4.4		X				
	Mandatory	Carpet cushion	5.504.4.4.1		X				

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LICENSED ARCHITECT
GREGORY M. TORRICO
No. C18650
Ren. 2/28/23
STATE OF CALIFORNIA
AIA

SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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G-711

CAL GREEN - COMM. MANDATORY

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G-711 CAL GREEN - COMM. MANDATORY 5/9/2022 1:48:17 PM C:\Users\jason\Desktop\Temp Revit\Shakori Garage--Rev#200035.00_Shakori-05-09-22_d_rvt

DIVISION 5.5 Environmental Quality	Mandatory	Fireplaces	5.503.1		X			
	Mandatory	Woodstoves	5.503.1.1		X			
	Mandatory	Temporary ventilation	5.504.1		X			
	Mandatory	Covering of ducts openings and protection of mechanical equipment during construction	5.504.3	X				
	Mandatory	Adhesives, sealants, and caulks	5.504.4.1	X				
	Mandatory	Paints and coatings	5.504.4.3	X				
	Mandatory	Aerosol paints and coatings	5.504.4.3.1	X				
	Mandatory	Aerosol paints and coatings: verification	5.504.4.3.2	X				
	Mandatory	Carpet systems	5.504.4.4		X			
	Mandatory	Carpet cushion	5.504.4.4.1		X			
	Mandatory	Carpet adhesives per Table 5.504.4.1	5.504.4.4.2		X			
	Mandatory	Composite wood products	5.504.4.5		X			
	Mandatory	Composite wood products: documentation	5.504.4.5.3		X			
	Mandatory	Resilient flooring systems	5.504.4.6		X			
	Mandatory	Resilient flooring: verification of compliance	5.504.4.6.1		X			
	Tier 1 Prerequisite	*Resilient flooring systems, Tier 1 (with verification of compliance)*	*A5.504.4.7, A5.504.4.7.2*		X			
	Tier 1 Prerequisite	*Thermal insulation, Tier 1 (with verification of compliance)*	*A5.504.4.8, A5.504.4.8.2*		X			
	Mandatory	Filters (with exceptions)	5.504.5.3	X				SPEC SECTION 233416
	Mandatory	Filters: labeling	5.504.5.3.1	X				SPEC SECTION 233416
	Mandatory	Environmental tobacco smoke (ETS) control	5.504.7		X			
	Mandatory	Indoor moisture control	5.505.1	X				SPEC SECTION 072100
	Mandatory	Outside air delivery	5.506.41	X				DRAWING M3.1
	Mandatory	Carbon dioxide (CO2) monitoring	5.506.2		X			
	Mandatory	Acoustical control (with exception)	5.507.4		X			
	Mandatory	Exterior noise transmission, prescriptive method (with exceptions)	5.507.4.1		X			
	Mandatory	Noise exposure where noise contours are not readily available	5.507.4.1.1		X			
	Mandatory	Performance method	5.507.4.2		X			
	Mandatory	Site features	5.507.4.2.1		X			
	Mandatory	Documentation of compliance	5.507.4.2.2		X			
	Mandatory	Interior sound transmission (with note)	5.507.4.3		X			
	Mandatory	Ozone depletion and greenhouse gas reductions	5.508.1		X			
	Mandatory	Chlorofluorocarbons (CFCs)	5.508.1.1		X			
	Mandatory	Halons	5.508.1.2		X			
	Mandatory	Supermarket refrigerant leak reduction for retail food stores 8,000 square feet or more Sections 5.508.2 through 5.508.2.6.3	5.508.2 through 5.508.2.6.3		X			
	Tier 1 Elective	*Indoor air quality (IAQ) during construction*	*A5.504.1, A5.504.1.1, A5.504.1.2*		X			
	Tier 1 Elective	*IAQ postconstruction*	*A5.504.2*		X			
	Tier 1 Elective	*IAQ testing*	*A5.504.2.1, A5.504.2.1.1, A5.504.2.1.2, A5.504.2.1.3*		X			
	Tier 1 Elective	*No added formaldehyde Tier 1 (with notes)*	*A5.504.4.5.1*		X			
	Tier 1 Elective	*Acoustical ceilings and wall panels (with verification of compliance)*	*A5.504.4.9, A5.504.4.9.1*		X			
	Tier 1 Elective	*Hazardous particulates and chemical pollutants*	*A5.504.5*		X			
	Tier 1 Elective	*Entryway systems*	*A5.504.5.1*		X			
	Tier 1 Elective	*Isolation of pollutant sources*	*A5.504.5.2*		X			
	Tier 1 Elective	*Lighting and thermal comfort controls*	*A5.507.1, A5.507.1.1 through A5.507.1.2*		X			
	Tier 1 Elective	*Daylight*	*A5.507.2*		X			
	Tier 1 Elective	*Views*	*A5.507.3*		X			
	Tier 1 Elective	*Interior office spaces*	*A5.507.3.1*		X			
	Tier 1 Elective	*Multi-occupant spaces (with exceptions)*	*A5.507.3.2*		X			
	Tier 1 Elective	*Hydrochlorofluorocarbons (HCFCs)*	*A5.508.1.3*		X			
	Tier 1 Elective	*Hydrofluorocarbons (HFCs)*	*A5.508.1.4*		X			
Additional Measures		*Select one (1) additional measure from any division*	*Add Section #*		X			

Total number of Measures required	15
Total number of Measures selected	20

Documentation Author's / Responsible Designer's Declaration Statement
Check the appropriate box(es) for the list below.

	Mandatory: I attest that this mandatory provisions checklist is accurate and complete
	Tier 1 compliant: I attest that the total number of voluntary measures selected meet or exceed the total number required to achieve Tier 1 compliance
	Partial Tier 1 compliant: I attest that the total number of voluntary measures selected do not meet the total number required to achieve Tier 1 compliance: however, partial Tier 1 compliance has been achieved
Signature:	

Company:	Williams + Planners Architects + Planners, Inc.	**Date:**	MARCH 7, 2022
Address:	2237 Douglas Blvd., Suite 160	**License:**	C-18650
City / State / Zip:	Roseville, CA 95661	**Phone:**	916-786-8178

DIVISION 5.3 Water Efficiency and Conservation	Mandatory	Nonresidential lavatory faucets	5.303.3.4.1					
	Mandatory	Kitchen faucets	5.303.3.4.2		X			
	Mandatory	Wash fountains	5.303.3.4.3		X			
	Mandatory	Metering faucets	5.303.3.4.4		X			
	Mandatory	Metering faucets for wash fountains	5.303.3.4.5		X			
	Mandatory	Food waste disposers	5.303.4.1		X			
	Mandatory	Areas of additions or alterations	5.303.5		X			
	Mandatory	Standards for plumbing fixutres and fittings	5.303.6		X			
	Mandatory	Outdoor potable water use in landscape areas (wioth notes)	5.304.1		X			
	Mandatory	Outdoor water supply systems (with Exceptions 1-4)	5.305.1.1		X			
	Mandatory	Technical requirements for outdoor recycled water supply systems	5.305.1.2		X			
	SELECT ONE (1) ELECTIVE	*Tier 1 Elective*	*Nonpotable water systems for indoor use*	*A5.303.2.3.4*		X		
		Tier 1 Elective	*Appliances and fixtures for commercial application*	*A5.303.3*		X		
		Tier 1 Elective	*Nonwater supplied urinals*	*A5.303.4.1*		X		
		Tier 1 Elective	*Dual plumbing*	*A5.303.5*		X		
		Tier 1 Elective	*Outdoor potable water use in landscape areas (wioth...*	*A5.304.2*		X		
		Tier 1 Elective	*Restoration of areas disturbed by construction*	*A5.304.6*		X		
		Tier 1 Elective	*Previously developed sites (with exceptions)*	*A5.304.7*		X		
		Tier 1 Elective	*Graywater irrigation system*	*A5.304.8*		X		
		Tier 1 Elective	*Nonpotable water systems for indoor use*	*A5.305.1*		X		
		Tier 1 Elective	*Irrigation systems*	*A5.305.2*		X		
DIVISION 5.4 Material Conservation and Resource Efficiency	*Tier 1 Prerequisite*	*Recycled content for 10% of total material cost*	*A5.405.4, A5.405.4.1 through A5.405.4.4.5*			X		
	Mandatory	Weather protection	5.407.1	X				
	Mandatory	Moisture control: sprinklers	5.407.2.1	X				
	Mandatory	Moisture control: exterior door protection	5.407.2.2.1	X				
	Mandatory	Moisture control: flashing	5.470.2.2.2	X				
	Mandatory	Construction waste management - comply with either Sections 5.408.1.1, 5.408.1.2, and 5.408.1.3 or more stringent local ordinance	5.408.1.1, 5.408.1.2, 5.408.1.3	X				
	Mandatory	Construction waste management: documentation	5.408.1.4	X				
	Mandatory	Universal waste [A]	5.408.2			X		
	Mandatory	Excavated soil and land clearning debris (100% reuse or recycle)	5.408.3			X		
	Tier 1 Prerequisite	*Enhanced construction waste reduction (65% - Tier 1 with verification)*	*A5.408.3.1, A5.408.3.1.2*			X		
	Mandatory	Recycling by occupants (with exception)	5.410.1			X		
	Mandatory	Recycling by occupants: additions (with exception)	5.410.1.1	X				
	Mandatory	Recycling by occupants: sample ordinance	5.410.1.2			X		
	Mandatory	Commissioning new buildings (≥ 10,000 sf) [N]	5.410.2			X		
	Mandatory	Owner's or owner representative's Project Requirements (OPR) [N]	5.410.2.1			X		
	Mandatory	Basis of Design (BOD) [N]	5.410.2.2			X		
	Mandatory	Commissioning plan [N]	5.410.2.3			X		
	Mandatory	Functional performance testing [N]	5.410.2.4			X		
	Mandatory	Documentation and training [N]	5.410.42.5			X		
	Mandatory	Systems manual [N]	5.410.2.5.1			X		
	Mandatory	Systems operation training [N]	5.410.2.5.2			X		
	Mandatory	Commissioning report [N]	5.410.2.6			X		
	Mandatory	Testing and adjusting for new buildings < 10,000 sf or new systems that serve additions or alterations [A]	5.410.4			X		
	Mandatory	System testing plan for renewable energy, landsacpe irrigation and water reuse [A]	5.410.4.2			X		
	Mandatory	Procedures for testing and adjusting	5.410.4.3			X		
	Mandatory	Procedures for HVAC balancing	5.410.4.3.1			X		
	Mandatory	Reporting for testing and adjusting	5.410.4.4			X		
	Mandatory	Operation and maintenant (O&M) manual	5.410.4.5			X		
	Mandatory	Inspection and reports	5.410.4.5.1			X		
	SELECT ONE (1) ELECTIVE	*Tier 1 Elective*	*Wood framing or OVE w/ note*	*A5.404.1,...*			X	
		Tier 1 Elective	*Regional materials*	*A5.405.1*			X	
		Tier 1 Elective	*Bio-based materials*	*A5.405.2*			X	
		Tier 1 Elective	*Rapidly renewable materials*	*A5.405.2.2*			X	
		Tier 1 Elective	*Reused materials w/ note*	*A5.405.3*			X	
		Tier 1 Elective	*Cement and concrete: cement*	*A5.405.5.1*			X	
		Tier 1 Elective	*Cement and concrete: concrete with SCM & Mix design equation*	*A5.405.5.2, A5.405.5.2.1, A5.405.5.2.1.1*			X	
		Tier 1 Elective	*Cement and concrete: additional means of compliance*	*A5.405.5.3, A5.405.5.3.1, A5.405.5.3.1.1, A5.405.5.3.1.2, A5.405.5.3.2,...*			X	
		Tier 1 Elective	*Choice of materials*	*A5.406.1, A5.406.1.1, A5.406.1.2, A5.406.1.3*			X	
		Tier 1 Elective	*Life cycle assessment: general*	*A5.409.1*			X	
		Tier 1 Elective	*Whole building life cycle assessment*	*A5.409.2, A5.409.2.1, A5.409.2.2*			X	
		Tier 1 Elective	*Materials and system assemblies*	*A5.409.3*			X	
		Tier 1 Elective	*Substitution for prescriptive standards*	*A5.409.4*			X	
		Tier 1 Elective	*Verification of compliance*	*A5.409.5*			X	

A5.602
CAL Green Verification Guidelines
Mandatory Measures Checklist

Application: This Checklist shall be used for nonresidential projects that meet one of the following: new construction, building additions of 1,000 square feet or greater, or building alternations with a permit valuation of $200,000 or more pursuant to Section 301.3 AND do not trigger a Tier 1 or Tier 2 requirement

Y = Yes (section has been selected and/or included)

N/A = Not Applicable (code section does not apply to the project - mainly used for additions and alterations

O = Other (provide explanation)

[N] = New Construction pursuant to Section 301.3

[A] = Additions and/or Alterations pursuant to Section 301.3

Chapter 5 Divisions			Section Title	Code Section	Y	N/A	O	Plan Sheet, Spec, or Attach Reference
DIVISION 5.1 Planning and Design	Mandatory		Storm water pollution prevention for projects that disturb less than 1 acre of land	5.106.1 through 5.106.2	X			C5.1, C5.2, C5.3, C8.3
	Mandatory		Short-term bicycle parking (with exception)	5.106.4.1.1		X		
	Mandatory		Long-term bicycle parking	5.106.4.1.2 through 5.106.4.1.5		X		
	Mandatory		Designated parking for clean air vehicles	5.106.5.2		X		
	Tier 1 Prerequisite		*Designated parking - 10% of parking capacity w/ parking stall markings and stall identification*	*A5.106.5.1, A5.106.5.1.1, A5.106.5.1.3, A5.106.5.1.4*		X		
	Mandatory		Parking stall marking	5.106.5.2.1		X		
	Mandatory		Single charging space requirements	5.16.5.3.1		X		
	Mandatory		Multiple charging space requirements [N]	5.106.5.3.2		X		
	Tier 1 Prerequisite		*Electric vehicle (EV) charging [N] w/ associated electrical panel identification and designated parking allowance*	*A5.106.5.3, A5.106.5.3.1, A5.106.5.3.3, A5.106.5.3.4*		X		
	Mandatory		EV charging space calculation [N] (with exception)	5.106.5.3.3		X		
	Mandatory		[N] Identification	5.106.5.3.4		X		
	Mandatory		[N] Future charging spaces	5.106.5.3.5		X		
	Mandatory		Light pollution reduction [N] (with exception and notes)	5.106.8	X			E2.0
	Mandatory		Grading and paving (exception for additions and alterations not altering the drainage path)	5.106.10		X		(E) DRAINAGE PATH NOT BEING ALTERED
	Tier 1 Prerequisite		*Cool roof (A5.106.11.2.2): SRI 75 when ≤ 2:12, SRI 16 when > 2:12*	*A5.106.11.2*		X		
	SELECT ONE (1) ELECTIVE	*Tier 1 Elective*	*Community connectivity*	*A5.103.1*		X		
		Tier 1 Elective	*Brownfield or greyfield site redecelopment or infill area development*	*A5.103.2, A5.103.2.1*	X			
		Tier 1 Elective	*Reduce development footprint and optimize open space*	*A5.104.1, A5.104.1.1, A5.104.1.2, A5.104.1.3*		X		
		Tier 1 Elective	*Disassemble and reuse existing buidling structure (75%) with exceptions*	*A5.105.1.1*		X		
		Tier 1 Elective	*Disassemble and reuse existing nonstructural elements (50%) with exceptions*	*A5.105.1.2*		X		
		Tier 1 Elective	*Salvage*	*A5.105.1.3*		X		
		Tier 1 Elective	*Storm water design*	*A5.106.2, A5.106.2.1, A5.106.2.2*		X		
		Tier 1 Elective	*Low Impact Development (LID)*	*A5.106.3, A5.106.3.1, A5.106.3.2*		X		
		Tier 1 Elective	*Changing room w/ note*	*A5.106.4.3*		X		
		Tier 1 Elective	*Parking capacity w/ reduced parkinhg capacity options*	*A5.106.6, A5.106.6.1*		X		
		Tier 1 Elective	*Exterior wall shading w/ fenestration and/or opaque wall area option*	*A5.106.7, A5.106.7.1, A5.106.7.2*		X		
		Tier 1 Elective	*Heat island effect*	*A5.106.11*		X		
DIVISION 5.2 Energy Efficiency	Mandatory		Meet the minimum energy efficiency standard	5.201.1	X			
	Tier 1 Prerequisite		*Energy Performance - outdoor lighting power 90% of Part 6*	*A5.203.1.1.1*		X		
	Tier 1 Prerequisite		*If applicable, service for water heating in restaurants of 8,000 sf or greater*	*A5.203.1.1.2*		X		
	Tier 1 Prerequisite		*Energy budget 95% or 90% or Part 6 calculated value of allowance*	*A5.203.1.2.1*		X		
	SELECT ONE (1) ELECTIVE	*Tier 1 Elective*	*On-site renewable energy (with documentation)*	*A5.211.1, A5.211.1.1*		X		
		Tier 1 Elective	*Green power*	*A5.211.3*		X		
		Tier 1 Elective	*Elevators with car lights and fan*	*A5.212.1.1, A5.212.1.1.1*		X		
		Tier 1 Elective	*Escalators*	*A5.212.1.2*		X		
		Tier 1 Elective	*Controls that reduce energy*	*A5.212.1.4*		X		
		Tier 1 Elective	*Steel framing*	*A5.213.1*		X		
DIVISION 5.3 Water Efficiency and Conservation	Mandatory		Separate meters (new buildings or additions > 50,000 sf that consume more than 100 gal/day)	5.303.1.1		X		
	Mandatory		Separate meters (for tenants in new buildings or additions that consume more than 1,000 gal/day)	5.303.1.2		X		
	Tier 1 Prerequisite		*Water reduction Tier 1 - 12% savings over the "water use basline" in Table A5.303.2.2 or meet Talbe A5.303.2.3.1*	*A5.3.3.2.3.1*		X		
	Mandatory		Water Closets shall not exceed 1.28 gallons per flush (gpf)	5.303.3.1		X		
	Mandatory		Wall-mounted urinals shall not exceed 0.125 gpf	5.303.3.2.1		X		
	Mandatory		Floor mounted urinals shall not exceed 0.5 gpf	5.303.3.2.2		X		
	Mandatory		Single showerhead shall have maximum flow rate of 1.8 gpm (gallons per minute) at 80 psi	5.303.3.3.1		X		
	Mandatory		Multiple showerheads serving one shower shall have a combined flow rate of 1.8 gpm at 80 psi	5.303.3.3.2		X		

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LICENCED ARCHITECT GREGORY M. TIMOKO No. C18650 Exp. 2/28/23 STATE OF CALIFORNIA AIA

SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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G-712

CAL GREEN - COMM. TIER 1

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ABBREVIATIONS

NOTE: NOT ALL ABBREVIATIONS MAY BE USED ON THESE PLANS.

AB	AGGREGATE BASE
AC	ASPHALTIC CONCRETE
AD	AREA DRAIN
APN	ASSESSOR'S PARCEL NUMBER
ARV	AIR RELEASE VALVE
ASB	AGGREGATE SUB-BASE
BO	BLOW-OFF VALVE
BV	BUTTERFLY VALVE
BW	BACK OF WALK
C/L	CENTERLINE
CB	CATCH BASIN
CL	CLASS
CMP	CORRUGATED METAL PIPE
CATV	CABLE TELEVISION
CO	CLEANOUT
COMM	COMMUNICATION
CONC.	CONCRETE
CONST.	CONSTRUCT
CR	CURB RETURN
CS	CONCRETE SURFACE
DC	DOUBLE CHECK VALVE
DDC	DOUBLE DETECTOR CHECK VALVE
DG	DECOMPOSED GRANITE
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DWG	DRAWING
DS	DOWNSPOUT
E	ELECTRIC
EP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX	EXISTING
FS	FIRE SERVICE LINE
FDC	FIRE DEPARTMENT CONNECTION
FL	FLOWLINE
FM	SANITARY SEWER FORCE MAIN
FF	FINISHED FLOOR ELEVATION
FH	FIRE HYDRANT
G	GAS
GR	GRATE ELEVATION
GRD	GRADE ELEVATION
GV	GATE VALVE
HB	HOSE BIBB
HBD	HEADER BOARD
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HP	HIGH POINT
INV	PIPE INVERT ELEVATION
JP	JOINT UTILITY POLE
LF	LINEAL FEET
LIP	LIP OF GUTTER
LT	LEFT
MS	MOWSTRIP
NTS	NOT TO SCALE
OH	OVERHEAD
PCC	PORTLAND CEMENT CONCRETE
PD	PLANTER DRAIN
PIV	POST INDICATOR VALVE
P/L	PROPERTY LINE
PP	POWER POLE
PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
R	RADIUS
RIM	MANHOLE RIM ELEVATION (SOLID COVER)
RP	REDUCED PRESSURE BACKFLOW PREVENTER
RW	RIGHT OF WAY
SCH	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SG	SUBGRADE ELEVATION
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STD	STANDARD
S/W	SIDEWALK
T	TELEPHONE
TC	TOP OF CURB
TD	TRENCH DRAIN
TDCB	TRENCH DRAIN CATCH BASIN
TP	TELEPHONE POLE
TRC	TOP OF RETAINING CRUB
TRW	TOP OF RETAINING WALL
TSW	TOP OF SEAT WALL
TW	TOP OF WALK ELEVATION
U	UTILITY
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
VCP	VITRIFIED CLAY PIPE
W	WATER
W/	WITH
W/O	WITHOUT
WV	WATER VALVE

LEGEND

NOTE: NOT ALL SYMBOLS MAY BE USED ON THESE PLANS.

PROPOSED GRADING & DRAINAGE SYMBOLS:

- 8" SD — STORM DRAIN LINE (SIZE AND FLOW SHOWN)
- STORM DRAIN MANHOLE (SDMH)
- CATCH BASIN (CB)
- DROP INLET (DI)
- AREA DRAIN (AD)
- PLANTER DRAIN (PD) OR FLOOR DRAIN (FD)
- CO — STORM DRAIN CLEANOUT
- 99.99 — ELEVATION
- FF=100.00 — FINISHED FLOOR ELEVATION
- PAD=99.33 — BUILDING PAD ELEVATION
- CONCRETE SIDEWALK
- GRADED DIRECTION FOR DRAINAGE FLOW
- SWALE
- SLOPE
- TREE TO BE REMOVED
- RETAINING WALL

PROPOSED SANITARY SEWER SYMBOLS:

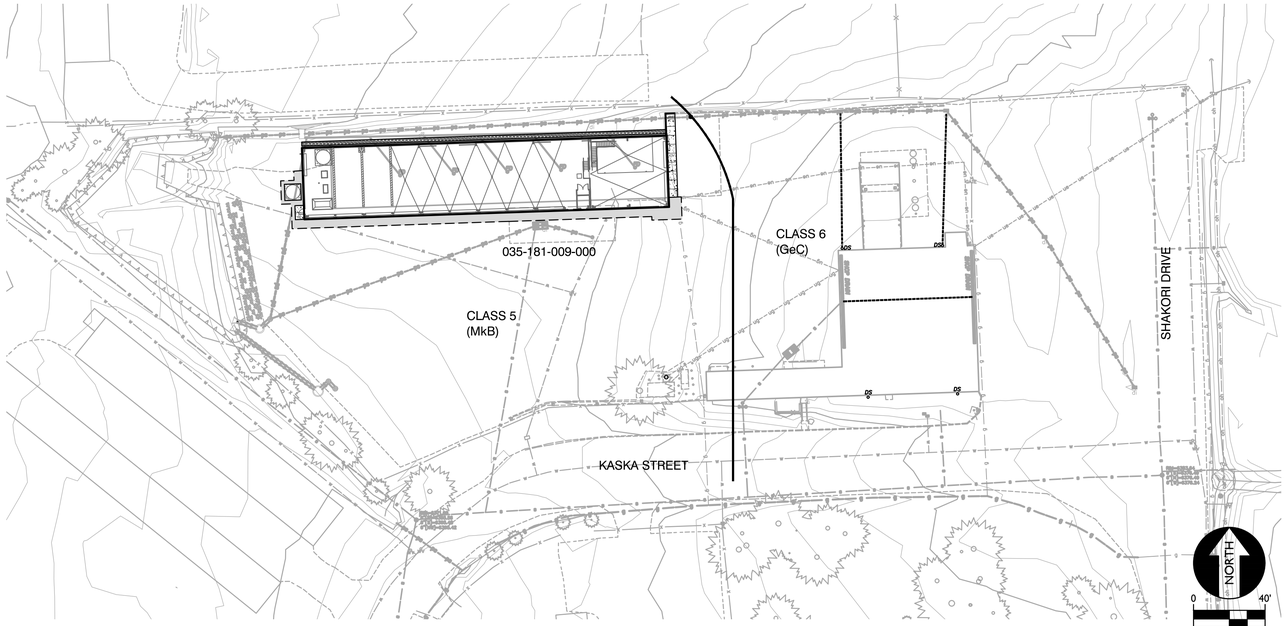
- 6" SS — SANITARY SEWER LINE (SIZE AND FLOW SHOWN)
- SANITARY SEWER MANHOLE (SSMH)
- CO — SEWER CLEANOUT FLUSHER BRANCH

PROPOSED WATER SYMBOLS:

- 8" W — WATER LINE & SIZE
- 8" FS — FIRE LINE & SIZE
- GATE VALVE
- M — WATER METER
- FH — FIRE HYDRANT ASSEMBLY
- FDC — FIRE DEPARTMENT CONNECTION
- DC — DETECTOR CHECK VALVE
- DDC — DOUBLE DETECTOR CHECK VALVE
- RP — REDUCED PRESSURE BACKFLOW PREVENTER
- BUTTERFLY VALVE
- 1" — AIR RELEASE VALVE + SIZE
- 1" — BLOW-OFF VALVE + SIZE
- PIV — POST INDICATOR VALVE

IMPROVEMENT PLANS FOR

EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150



SITE

AREA OF PARCEL(S)	2.85 ACRES
AREA OF DISTURBANCE	0.27 ACRES
W.D.I.D.#	N/A
A.P.N.	035-181-009-000

EARTHWORK QUANTITIES IN CUBIC YARDS		
CUT (CY)	FILL (CY)	NET (CY)
2000	2000	0

A SEPARATE GRADING PERMIT WILL BE REQUIRED IF IMPORT SOIL IS TAKEN FROM LOCATIONS WITHIN EL DORADO COUNTY.

SHEET INDEX

SHT. NO.	DESCRIPTION
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C0.2	GENERAL NOTES
C1.1	DEMOLITION PLAN
C1.2	ENGINEERED FILL PLAN
C2.1	GRADING PLAN
C3.1	UTILITY PLAN
C4.1	PAVING PLAN
C5.1	EROSION CONTROL GENERAL NOTES
C5.2	EROSION CONTROL PLAN
C5.3	EROSION CONTROL DETAILS
C6.1	DETAILS AND SECTIONS
C6.2	DETAILS AND SECTIONS
C8.1	LAND COVERAGE-DEMOLITION
C8.2	LAND COVERAGE-PROPOSED
C8.3	BMP PLAN

EL DORADO COUNTY BUILDING DEPARTMENT

APPROVED BY _____ DATE: _____

SOUTH TAHOE PUBLIC UTILITY DISTRICT

APPROVED BY _____ DATE _____

A.P.N. 035-181-009-000 BENCHMARK _____ ELEV. _____

EXHIBIT TITLE: COVER SHEET

PROJECT: EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHAKORI YARD 1121 SHAKORI DRIVE SOUTH LAKE TAHOE, CA 96150

WCE
WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

REGISTERED PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C 75185 CIVIL STATE OF CALIFORNIA

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C0.1

FILENAME: I:\21-037\CIVIL\DWG\21-037-C01.DWG

STANDARD GENERAL NOTES – ROADWORK, GRADING AND DRAINAGE

1. MATERIALS, CONSTRUCTION QUALITY, AND METHODS FOR THIS PROJECT ARE SUBJECT TO THE COUNTY OF EL DORADO DESIGN AND IMPROVEMENT STANDARDS MANUAL STANDARD PLANS, AND THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD PLANS AND STANDARD SPECIFICATIONS.

2. ALL REFERENCE TO TD SHALL MEAN THE CDA–TRANSPORTATION DIVISION DIRECTOR, OF EL DORADO COUNTY OR AUTHORIZED REPRESENTATIVE. ALL REFERENCE TO BD SHALL MEAN THE CDA–BUILDING DIVISION DIRECTOR, OF EL DORADO COUNTY OR AUTHORIZED REPRESENTATIVE.

3. ALL WORK SHALL BE ACCOMPLISHED TO THE SATISFACTION OF THE TD/BD OR AN AUTHORIZED REPRESENTATIVE.

4. ALL REFERENCE TO THE STANDARD SPECIFICATIONS SHALL MEAN THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS DATED 2015.

5. THE CONTRACTOR SHALL HAVE A RESPONSIBLE PARTY, WHO SHALL HAVE FULL AUTHORITY TO REPRESENT AND ACT FOR THE CONTRACTOR ON SITE AT ALL TIMES DURING WORKING HOURS.

6. THE CONTRACTOR SHALL NOTIFY TD/BD 48 HOURS IN ADVANCE OF COMMENCING WORK TO SCHEDULE A PRE–CONSTRUCTION CONFERENCE AND INSPECTION WITH THE ENGINEER AND TD/BD. NO WORK SHALL BEGIN UNTIL AFTER THE PRE–CONSTRUCTION CONFERENCE AND INSPECTION HAVE BEEN COMPLETED.

7. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7, "LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC" OF THE STANDARD SPECIFICATIONS.

8. RIGHTS TO ENTER AND CONSTRUCT SHALL BE OBTAINED PRIOR TO CONSTRUCTING ANY OFF–SITE WORK SHOWN IN THESE PLANS. COPIES OF SUCH DOCUMENTS SHALL BE KEPT ON–SITE AT ALL TIMES DURING THE PERFORMANCE OF OFF–SITE WORK.

9. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT (USA) 811 OR 1–800–227–2600 PRIOR TO PERFORMING ANY EXCAVATION ON THE PROJECT SITE. THE OWNER(S) OF IDENTIFIED EXISTING UNDERGROUND FACILITIES SHALL ALSO BE CONTACTED PRIOR TO CONSTRUCTION.

10. THE CONTRACTOR SHALL NOT CONSTRUCT ANY WORK WITHOUT ADEQUATE CONSTRUCTION STAKING. AS A MINIMUM, THE FOLLOWING STAKING SHALL BE REQUIRED: 1) CLEARING LIMITS, 2) SLOPE STAKES, 3) WATER LINE STAKES, 4) SEWER LINE STAKES, 5) STORM DRAIN STAKES, AND 6) FINISHED GRADE STAKES. ADDITIONAL STAKING MAY BE REQUIRED BY TD/BD DUE TO THE NATURE AND/OR COMPLEXITY OF THE WORK. LOST OR DAMAGED STAKES SHALL BE REPLACED TO THE SATISFACTION OF TD/BD WHETHER RESULTING FROM CONSTRUCTION PROCEDURES, VANDALISM, OR ANY OTHER CAUSE. SURVEY CUT SHEETS SHALL BE PROVIDED TO THE CONTRACTOR WITHIN ONE BUSINESS DAY OF COMPLETION OF THE SURVEY REQUEST. CONTRACTOR SHALL PROVIDE ALL CUT SHEETS TO THE TD/BD INSPECTOR THE SAME DAY THEY ARE RECEIVED.

11. THE CONTRACTOR'S ATTENTION IS DIRECTED TO COUNTY OF EL DORADO RESOLUTION NO. 199–91 WHICH CONTAINS SPECIFIC REQUIREMENTS FOR THE PROTECTION AND PRESERVATION OF OAK TREES AND WETLANDS. THE CONTRACTOR SHALL REMOVE ONLY THOSE TREES SHOWN ON THE PLANS TO BE REMOVED. THE CONTRACTOR SHALL INSTALL PROTECTIVE FENCING AT THE DRIP LINE OF ALL REMAINING TREES WITHIN 50 FEET OF ANY GRADING, AND OTHERWISE COMPLY WITH THE PROVISIONS OF SAID ORDINANCE.

12. CONSTRUCTION HOURS SHALL BE LIMITED FROM 7:00 A.M. TO 7:00 P.M. (OR SUNSET), MONDAY THROUGH FRIDAY, AND 8:00 AM TO 5:00 PM WEEKENDS AND FEDERALLY RECOGNIZED HOLIDAYS, UNLESS OTHERWISE SPECIFIED BY SEPARATE AGREEMENT (SUBDIVISION GRADING AGREEMENT, SUBDIVISION IMPROVEMENT AGREEMENT, ROAD IMPROVEMENT AGREEMENT, ETC.). ALL HEAVY EQUIPMENT AND ANY INTERNAL COMBUSTION ENGINES SHALL BE FITTED WITH ADEQUATE MUFFLERS.

13. THE CONTRACTOR SHALL PROVIDE, PLACE AND MAINTAIN ALL LIGHTS, SIGNS, DELINEATORS, BARRICADES, TEMPORARY TRAFFIC STRIPING, FLAGMEN, DETOURS OR OTHER DEVICES NECESSARY TO PROVIDE FOR THE SAFE AND CONVENIENT PASSAGE OF PUBLIC VEHICLE AND PEDESTRIAN TRAFFIC THROUGH THE CONSTRUCTION SITE.

14. THE CONTRACTOR SHALL OBTAIN THE EXPRESS WRITTEN CONSENT OF EDC TRANSPORTATION DEPARTMENT PRIOR TO IMPLEMENTING ANY LANE CLOSURE OR DETOUR ON A COUNTY MAINTAINED STREET OR HIGHWAY. ALL LANE CLOSURES OR DETOURS SHALL CONFORM TO CHAPTER 5, "TRAFFIC CONTROL DEVICES FOR LOW VOLUME ROADS" OF THE CALIFORNIA MUTCD.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL DURING CONSTRUCTION. AT LEAST ONE WATER TRUCK SHALL BE ON SITE AT ALL TIMES. ADDITIONAL EQUIPMENT MAY BE REQUIRED AS DETERMINED BY TD/BD.

16. THE CONTRACTOR SHALL OBTAIN AN APPROVED FUGITIVE DUST CONTROL PLAN, INCLUDING PROVISIONS FOR ASBESTOS HAZARD MITIGATION, IF REQUIRED, FROM THE COUNTY OF EL DORADO ENVIRONMENTAL MANAGEMENT DIVISION/AQMD PRIOR TO BEGINNING OF WORK.

17. IF UNUSUAL AMOUNTS OF STONE, BONE, OR ARTIFACTS ARE UNCOVERED DURING CONSTRUCTION, ALL WORK SHALL BE STOPPED WITHIN ONE HUNDRED FEET (100') OF THE FIND, AND A QUALIFIED ARCHAEOLOGIST CONSULTED FOR AN ON–SITE EVALUATION.

18. IF THE PRESENCE OF SERPENTINE ROCK (SAF) IS DISCOVERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, BD AND THE COUNTY OF EL DORADO ENVIRONMENTAL MANAGEMENT DIVISION/AQMD THAT SERPENTINE ROCK IS PRESENT ON THE SITE. ADDITIONALLY, THE CONTRACTOR SHALL IMPLEMENT THE ASBESTOS HAZARD MITIGATION PROVISIONS OF THE FUGITIVE DUST PLAN PRIOR TO CONTINUATION OF EARTHWORK IN AREAS WHERE SERPENTINE ROCK IS PRESENT.

19. UPON JOB COMPLETION, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE INFORMATION TO _____(ENGINEER), REGARDING ANY MATERIAL CHANGES MADE DURING CONSTRUCTION AS WELL AS ANY OTHER INFORMATION REQUIRED TO BE SHOWN ON THE RECORD DRAWINGS BY TD/BD, THE OTHER UTILITY COMPANIES, OR OTHER RESPONSIBLE AGENCIES.

20. CLEARING AND GRUBBING SHALL CONFORM TO THE PROVISIONS OF SECTION 16, "CLEARING AND GRUBBING" OF THE STANDARD SPECIFICATIONS. ROOTS, STUMPS, TREES, ROCKS OR OTHER DELETERIOUS SUBSTANCES SHALL BE DISPOSED OF OFF–SITE AND IN A LAWFUL MANNER.

21. EARTHWORK SHALL CONFORM TO THE PROVISIONS OF SECTION 19, "EARTHWORK" OF THE STANDARD SPECIFICATIONS. WIDENING OF EMBANKMENTS AND FLATTENING OF SLOPES, WHICH RESULT IN AN INCREASED AREA OF GRADING, WILL NOT BE PERMITTED WITHOUT EXPRESS WRITTEN APPROVAL FROM TD/BD.

22. AGGREGATE BASE SHALL CONFORM TO THE PROVISIONS OF SECTION 26, "AGGREGATE BASES" OF THE STANDARD SPECIFICATIONS FOR CLASS 2 AGGREGATE BASE, 3/4 INCH MAXIMUM GRADATION. AGGREGATE BASE SHALL NOT BE PLACED UNTIL THE PRIOR GRADING PLANE HAS BEEN APPROVED BY TD/BD.

23. ASPHALT CONCRETE SHALL CONFORM TO THE PROVISIONS OF SECTION 39, "ASPHALT CONCRETE" OF THE STANDARD SPECIFICATIONS. ASPHALT BINDER(S) SHALL BE PERFORMANCE GRADE 64–16. ASPHALT CONCRETE SHALL NOT BE PLACED UNTIL THE PRIOR GRADING PLANE HAS BEEN APPROVED BY THE GEOTECHNICAL ENGINEER, AND ALL UTILITIES WITHIN THE PAVED AREA HAVE BEEN PLACED, TESTED, AND APPROVED.

24. ALL ASPHALT CONCRETE GRIND(S) SHALL BE A MINIMUM OF 3 INCHES AND REPLACED IN KIND WITH ASPHALT CONCRETE AS DEFINED IN SECTION 39, OF THE STANDARD SPECIFICATIONS. IF AGGREGATE BASE IS NOT PRESENT IT SHALL BE REPLACED WITH A MINIMUM OF 8 INCHES OF CLASS 2 AGGREGATE BASE AND CONFORM TO THE PROVISIONS OF SECTION 26 OF THE STANDARD SPECIFICATIONS FOR CLASS 2 AGGREGATE BASE. ANY EXCEPTION TO THE 8 INCH MINIMUM OF CLASS 2 AGGREGATE BASE REPLACEMENT MUST BE PROVIDED BY A LICENSED GEOTECHNICAL ENGINEER.

25. AFTER ACCEPTANCE OF THE FINAL LIFT OF ASPHALT CONCRETE, AND PRIOR TO THE END OF THE WARRANTY PERIOD, ALL ROADWAYS SHALL BE FOG SEALED IN ACCORDANCE WITH SECTION 37–2, "SEAL COATS" OF THE STANDARD SPECIFICATIONS. ASPHALTIC EMULSION SHALL BE SLOW–SETTING ANIONIC ASPHALTIC EMULSION TYPE, GRADE SS1, CONFORMING TO THE REQUIREMENTS OF SECTION 94, "ASPHALTIC EMULSIONS" OF THE STANDARD SPECIFICATIONS. ALL PROJECTS THAT HAVE RE–STRIPING DUE TO TRAFFIC STAGING OR NEW LANE LINES SHALL BE SEALED WITH A SLURRY SEAL CONFORMING TO THE REQUIREMENTS OF SECTION 37–3 "SLURRY SEAL AND MICRO–SURFACING" OF THE STANDARD SPECIFICATIONS AFTER THE EXISTING STRIPING IS REMOVED BY GRINDING, SANDBLASTING OR PAVEMENT OVERLAY.

26. SUBGRADE – WHEN ASPHALT CONCRETE OR ASPHALT CONCRETE BASE IS TO BE PLACED ON THE GRADING PLANE, THE GRADING PLANE AT ANY POINT SHALL NOT VARY MORE THAN 0.05 FOOT ABOVE OR BELOW THE GRADE ESTABLISHED BY THE ENGINEER. WHEN SUB–BASE OR BASE MATERIAL (OTHER THAN ASPHALT CONCRETE BASE) IS TO BE PLACED ON THE GRADING PLANE, THE GRADING PLANE AT ANY POINT SHALL NOT VARY MORE THAN 0.05 FOOT ABOVE THE GRADE ESTABLISHED BY THE ENGINEER.

27. CONCRETE STRUCTURES SHALL CONFORM TO SECTION 90–2 "MINOR CONCRETE" OF THE STANDARD SPECIFICATIONS.

28. PRECAST CONCRETE STRUCTURES SHALL CONFORM TO SECTION 70–4 "PRECAST CONCRETE PIPE DRAINAGE FACILITIES" OF THE STANDARD SPECIFICATIONS.

29. WHERE TYPE B DROP INLETS EXCEED 5 FEET IN HEIGHT, REINFORCING STEEL SHALL BE INSTALLED AS SHOWN ON THE PLAN DETAIL. REINFORCING STEEL SHALL BE # 4 BARS, INSTALLED IN THE VERTICAL WALLS AT 12 INCH O.C. (BOTH DIRECTIONS). A 3 INCH CLEARANCE SHALL BE MAINTAINED FROM THE OUTSIDE FACE OF THE WALLS. UNDER NO CIRCUMSTANCES WILL TYPE B DROP INLETS BE ALLOWED IN EXCESS OF 8 FEET IN HEIGHT.

30. WHERE ANY PORTION OF THE STRUCTURE EXCAVATION FOR VERTICAL CONCRETE STRUCTURES (MANHOLES, INLETS, VAULTS, ETC.) IS WITHIN THE STREET, MATERIAL USED TO BACKFILL SUCH STRUCTURES SHALL CONFORM TO SECTION 19–3.02B, "STRUCTURE BACKFILL" OF THE STANDARD SPECIFICATIONS. COMPACTION TESTS WILL BE TAKEN EVERY 2–3 FEET VERTICALLY. WHERE CAST–IN–PLACE STRUCTURES ARE PLACED AGAINST UNDISTURBED NATIVE MATERIAL, THIS REQUIREMENT SHALL NOT APPLY.

31. TRAFFIC STRIPING AND PAVEMENT MARKINGS SHALL BE THERMOPLASTIC, CONFORMING TO SECTION 84–2 "TRAFFIC STRIPES AND PAVEMENT MARKINGS" OF THE STANDARD SPECIFICATIONS.

32. A GEOTECHNICAL ENGINEER AND A STRUCTURAL ENGINEER SHALL CERTIFY, RESPECTIVELY, THE GEOTECHNICAL AND STRUCTURAL ITEMS ON THE PLAN(S) WERE BUILT IN CONFORMANCE WITH THE RESPECTIVE GEOTECHNICAL AND STRUCTURAL RECOMMENDATIONS FOR THE PROJECT BEFORE FINALIZATION OF THE PROJECT.

33. IF BLASTING ACTIVITIES ARE TO OCCUR IN CONJUNCTION WITH DEVELOPMENT, THE DEVELOPER SHALL ENSURE THAT SUCH BLASTING ACTIVITIES ARE CONDUCTED IN COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.

34. IF BURNING ACTIVITIES ARE TO OCCUR DURING CONSTRUCTION, THE DEVELOPER SHALL OBTAIN THE NECESSARY BURNING PERMITS AND AIR POLLUTION PERMITS FROM THE CALIFORNIA DEPARTMENT OF FORESTRY (CDF) AND FROM THE AIR QUALITY MANAGEMENT DISTRICT (AQMD) PRIOR TO SAID BURNING ACTIVITIES.

35. STORM DRAINS SHALL BE TELEVISED WHEN BACKFILL REACHES THE POINT OF 2 FOOT OF COMPACTED TRENCH FILL OVER THE PIPE. A COPY OF THE VIDEOTAPE WILL BE PROVIDED TO THE TD/BD INSPECTOR, AND NO PAVING OVER THE PIPE WILL BE DONE WITHOUT THE INSPECTOR'S AUTHORIZATION. COST OF TELEVISING WILL BE INCLUDED IN THE UNIT COST OF CONSTRUCTION.

36. STORM DRAINS IN PUBLIC RIGHT–OF–WAY, IN IRREVOCABLE OFFERS OF DEDICATIONS, OR THAT ARE TO BE MAINTAINED BY A ZONE OF BENEFIT (ZOB), SERVICE DISTRICT (CSD), SERVICE AREA (CSA), OR ANY OTHER PUBLICLY ADMINISTERED AGENCY WILL BE OF THE FOLLOWING MATERIALS:
A. REINFORCED CONCRETE PIPE (RCP)
B. HIGH DENSITY POLYETHYLENE PIPE (HDPE), 48 INCH MAXIMUM
C. CORRUGATED STEEL PIPE, BUT ONLY UNDER THE FOLLOWING CIRCUMSTANCES
(1) 48 INCH MAXIMUM
(2) NON–EROSIVE FLOW VELOCITIES
(3) ALUMINIZED
(4) NOMINAL THICKNESS FOR 50 YEAR LIFE (AASHTO DESIGNATION M196)
(5) 4 INCH REINFORCED CONCRETE PAD IN BOTTOM THIRD
(6) IN NON–CORROSIVE SOILS (INCLUDING BACKFILL)
D. STEEL PLATE OR STEEL ARCH WITH CONCRETE OR "SOFT" BOTTOM

37. STREET NAME SIGNS SHALL BE INSTALLED AT EVERY INTERSECTION IN ACCORDANCE WITH LATEST APPROVED CALIFORNIA MUTCD.

38. THE CONTRACTOR SHALL FURNISH AND INSTALL TYPE F–2 MARKERS AT BOTH ENDS OF CULVERTS. THE CULVERT MARKERS SHALL HAVE A TWO INCH WIDE BLACK STRIP AT THE TOP OF THE MARKER. ABOVE ELEVATIONS 3,000 FEET, THE CONTRACTOR SHALL FURNISH AND INSTALL TYPE F MARKERS WITH SNOW POLE BRACKETS ON ALL DIKES AT 100 FOOT INTERVALS AND AT BOTH ENDS OF CULVERTS. ABOVE ELEVATION 3,000 FEET, THE CONTRACTOR SHALL INSTALL METAL MARKER POSTS WITH SNOW POLE BRACKETS NEAR EACH FIRE HYDRANT.

39. CONTRACTOR SHALL NOT START ANY UTILITY WORK UNTIL A JOINT TRENCH COMPOSITE PLAN HAS BEEN APPROVED BY THE TD/BD (WATER AND SEWER EXCEPTED). ALL UTILITY WORK PERFORMED IN THE COUNTY RIGHT OF WAY SHALL REQUIRE AN ENCROACHMENT PERMIT.

40. WATER AND SEWER LINES SHALL BE TESTED AND APPROVED BY TD/BD PRIOR TO PLACING PAVEMENT ON THE STREET.

41. OMISSIONS AND ERRORS ON PLANS SHALL NOT BE VALID, AND ALL CODES AND LAWS MUST BE COMPLIED WITH BY THE OWNER, ENGINEER AND CONTRACTOR.

42. ALL NEW OR RECONSTRUCTED DRAINAGE INLETS SHALL HAVE A STORM WATER QUALITY MESSAGE STAMPED INTO THE CONCRETE. ALL STAMPS SHALL BE APPROVED BY THE TD/BD INSPECTOR PRIOR TO BEING USED.

43. IMPORT OR EXPORT OVER 250 CUBIC YARDS TO ANY OFF–SITE BORROW OR DISPOSAL SITE WILL REQUIRE A SEPARATE APPROVED GRADING PERMIT FOR THE OFF–SITE LOCATION PRIOR TO TD/BD SIGNATURE APPROVAL OF PLANS.

44. IN THE EVENT OF THE DISCOVERY OF HUMAN REMAINS, ALL WORK IS TO STOP AND THE COUNTY CORONER SHALL BE IMMEDIATELY NOTIFIED PURSUANT TO SECTION 7050.5 OF THE HEALTH AND SAFETY CODE AND SECTION 5097.98 OF THE PUBLIC RESOURCES CODE. IF THE REMAINS ARE DETERMINED TO BE NATIVE AMERICAN, THE CORONER MUST CONTACT THE NATIVE AMERICAN HERITAGE COMMISSION WITHIN 24 HOURS. THE TREATMENT AND DISPOSITION OF HUMAN REMAINS SHALL BE COMPLETED CONSISTENT WITH GUIDELINES OF THE NATIVE AMERICAN HERITAGE COMMISSION.

South Tahoe Public Utility District
General Manager
John A. Thiel
Directors
Chris Cefalu
Shane Tomsos
David Peterson
Kelly Sheehan
Nick Exline
1275 Meadow Crest Drive • South Lake Tahoe • CA 96150-7401
Phone 530 544-6474 • Fax 530 541-0614 • www.stpud.us

Date: July 2, 2021
To: Bob Christenson
Re: 1121 Shakori Drive, South Lake Tahoe, CA 96150

Pursuant to your request, the South Tahoe Public Utility District ("District") has prepared the following information for use in your sprinkler design calculations. You will need to consider all other components downstream of the water main connection including, but not limited to, the extended water service lateral, meters and meter assemblies, check valves, backflow assemblies, entrance/exit, pipe and fitting losses, etc. Should you need the length of the service lateral from the main to the meter, we recommend using the width of the Right-of-Way due to the unknown location of any future main replacements. The flows and pressures shown on the attachment are an indication of the existing system conditions at the water main during maximum day demand and do not include any additional demands from your project.

The estimated static water pressure at your likely point of connection is 80 psi (assuming an elevation of 6390' MSL at the meter location based on Google Earth). This static pressure is based on the low end of a range of pressures calculated by a 72 hour maximum day demand extended period simulation performed using the District's hydraulic model.

Water flow estimates are provided from the closest existing fire hydrant location as shown in Figure 1 on the attachment (Fire Hydrant #0019). The flow estimates and associated pressures are calculated using the District's steady-state fire-flow model which has set parameters for various pumps being on/off and may differ from the boundary conditions associated with the Extend Period Simulation used to calculate the static pressure provided above. The model calculates the flow estimates at a point on the pipe in the street at the approximate location of the fire hydrant lateral and does not take into account any other downstream losses in the lateral, in the hydrant, etc.

The water model is an approximate computer representation of the actual distribution system and should be field verified. Pressure and flow testing at existing hydrants and other locations in your neighborhood is recommended to verify your system calculations. The District does not provide fire protection engineering services and does not guarantee flow or pressure. You will need to engage a fire protection engineer for your system design and have that person evaluate the model data provided along with pertinent field data to properly design your fire protection system.

The above estimated information regarding water line sizes and water pressure ("Information") is based on the District's currently available water system model, is provided solely in response to your request for such information, and provided solely to assist you in planning for fire protection purposes in connection with the development of your property. The water pressure and flows can vary significantly depending on the time of day, customer utilization, water supply interruption, and water system operational problems. The Information is provided "as is" without warranty of any kind, and the District expressly disclaims all express and implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, and that the Information is accurate. The District does not warrant, guarantee, or make any representations regarding the use of, or inability to use, the Information in terms of correctness, accuracy, reliability, timeliness, completeness, or otherwise. The entire risk as to the use of the Information is entirely assumed by you. Any person who uses the information disclaims all liability for damages, costs and expenses and agrees that there are no remedies against the District and its employees or agents for negligence, or for personal injury, breach of warranty or contract, including but not limited to indirect, consequential, punitive or incidental damages.

The District will be reviewing parts of your project submittal as part of the City's review process. Please contact our direct email at fireflow@stpud.dst.ca.us if you need additional information regarding pressure or flows for your project. Review process, meters, connection details, inspection, fees, and all other questions at the District should be directed to our Customer Service Department which handles the permitting and inspection process. They can be reached at 530-544-6474.

Sincerely,

Adrian Combes, P.E.
Senior Engineer
South Tahoe Public Utility District

WATER SYSTEM MODELING BASED ON EXISTING MAX DAY 2014 WATER MODEL

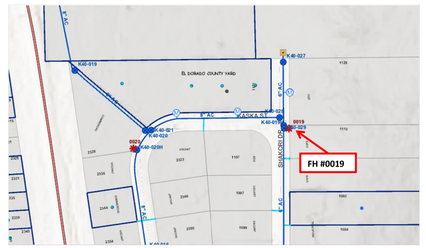


Figure 1 –Schematic map of property location, closest fire hydrants and pipes nearest to service lateral

Table 1 - Steady State Design Fire Flow and Pressure

Fire Hydrant #	Approximate Elevation Above Sea Level (feet)	Static Pressure[1] (psi)	Available Flow at Hydrant Connection to Main (gpm) at 20 psi Residual Pressure in System	Residual Pressure (psi) at Hydrant Connection to Main at 1,000 gpm Demand
FH #0019	6388'	89	1933[2]	51

[1]Static pressure provided at the hydrant is based on a steady state model of fire flow demands. This is not calculated using the same operating conditions as the static pressure provided by the EPS model.
[2]Residual Pressure at FH #0019 is 31 psi

A.P.N. 035-181-009-000
BENCHMARK ELEV.

EXHIBIT TITLE: GENERAL NOTES
PROJECT: EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WCE
WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C 75185 REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

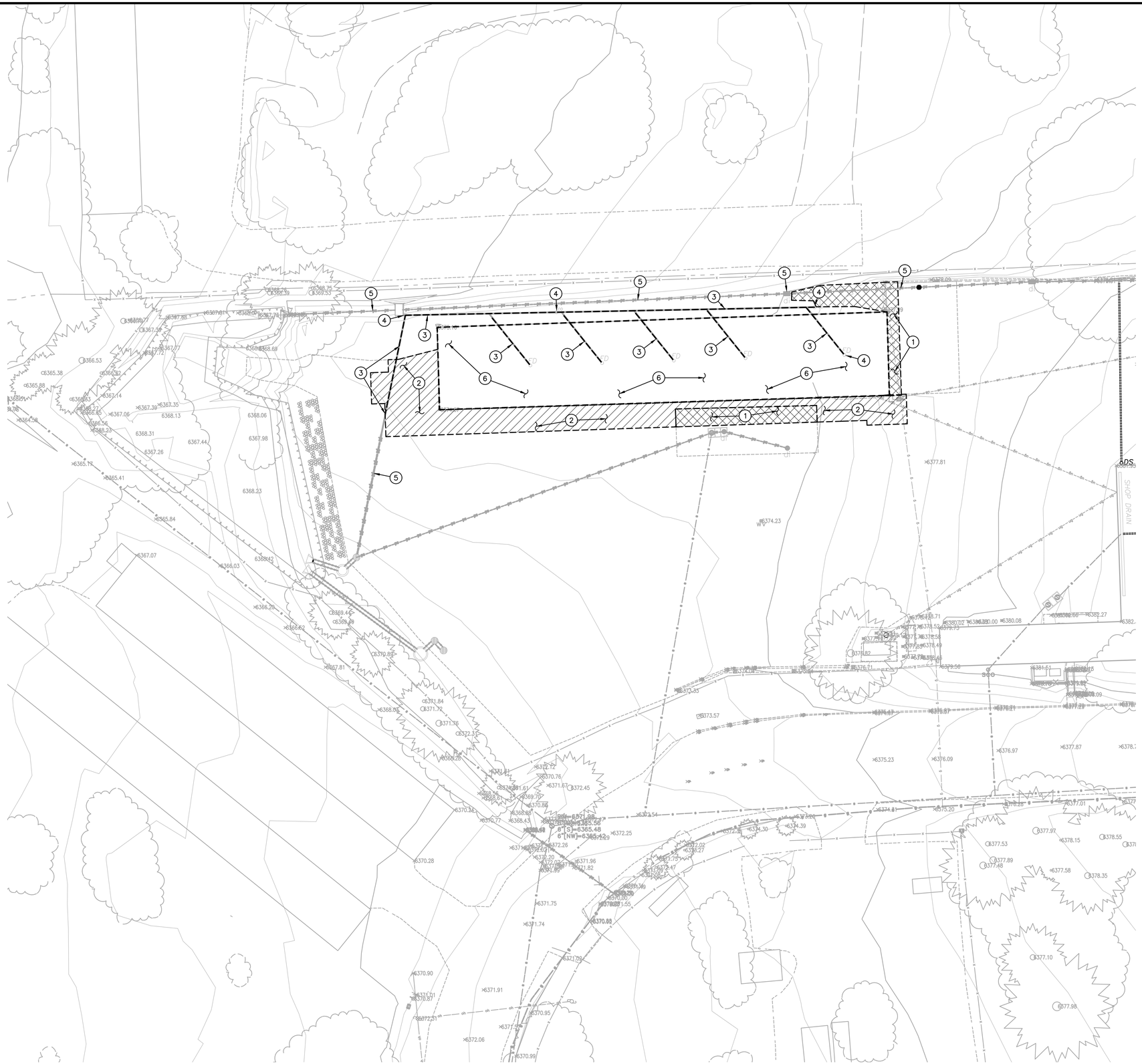
HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21–037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04–18–22

SHEET NO. C0.2

FILENAME: I:\21–037\CIVIL\DWG\21–037–C02.DWG



DEMOLITION NOTES

1. REMOVE EXISTING CONCRETE PAVING AND AGGREGATE BASE. WHERE SAWCUTS ARE NECESSARY, THEY SHALL BE A NEAT STRAIGHT LINE. CUT SHALL BE MADE AT NEAREST EXISTING JOINT TO LOCATION SHOWN.
2. REMOVE EXISTING ASPHALT PAVING AND AGGREGATE BASE. WHERE SAWCUT EDGES ARE SHOWN, THEY SHALL BE A NEAT STRAIGHT LINE. MAINTAIN CLEAN STRAIGHT CUT EDGE UNTIL NEW PAVING PLACED.
3. REMOVE AND DISPOSE OF EXISTING STORM DRAIN PIPE TO EXTENT SHOWN.
4. REMOVE AND DISPOSE OF EXISTING STORM DRAIN STRUCTURE.
5. EXISTING STORM DRAIN TO REMAIN.
6. REMOVE AND DISPOSE OF EXISTING BUILDING, SLAB AND ASSOCIATED FOUNDATIONS.

GRAPHIC SCALE

20' 0 10' 20' 40'

(IN FEET) 1 inch = 20 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000

BENCHMARK ELEV.

EXHIBIT TITLE: DEMOLITION PLAN

PROJECT: EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

REGISTERED PROFESSIONAL ENGINEER
ANTHONY J. TASSANO
C 17898
STATE OF CALIFORNIA

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C1.1

FILENAME: I:\21-037\CIVIL\DWG\21-037-C11.DWG

SUBGRADE PREPARATION

BUILDING PAD PREPARATION

1. FOLLOWING SITE DEMOLITION ACTIVITIES, THE EXPOSED SURFACE SOILS SHALL BE OVER-EXCAVATED TO A DEPTH OF AT LEAST THREE (3) FEET BELOW THE BOTTOM OF PROPOSED LOWEST FOUNDATION FOOTINGS. THE SUB-EXCAVATION SHALL EXTEND AT LEAST 5 FEET BEYOND THE PROPOSED EXTERIOR EDGE OF PERIMETER FOUNDATIONS AND SHALL INCLUDED ANY EXTERIOR COLUMNS.

   FOLLOWING OVER-EXCAVATION, THE EXPOSED SOILS SHALL BE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, THOROUGHLY MOISTURE CONDITIONED AND UNIFORMLY COMPACTED TO AT LEAST 90 PERCENT OF THE ASTM D1557 MAXIMUM DRY DENSITY.

   PLACE BACK NATIVE SOILS IN HORIZONTAL LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS. EACH LIFT SHALL BE MOISTURE CONDITIONED TO WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT AND UNIFORMLY COMPACTED TO AT LEAST 90 PERCENT OF THE ASTM D1557 MAXIMUM DRY DENSITY. PLACE FILL MATERIAL AS REQUIRED TO PROPOSED SUBGRADE ELEVATIONS.

GENERAL NOTES

1. IN THE EVENT THAT ANY UNUSUAL CONDITIONS NOT COVERED BY THE GEOTECHNICAL INVESTIGATION REPORT OR ARE ENCOUNTERED DURING GRADING OPERATIONS THE GEOTECHNICAL ENGINEER AND THE ARCHITECT SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTIONS.

2. NO BURNING SHALL BE PERMITTED.

3. THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLAN WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS, AND DEPTHS OF SUCH UNDERGROUND UTILITIES. A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES. HOWEVER, WARREN CONSULTING ENGINEERS CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF SUCH UNDERGROUND UTILITIES, NOR FOR THE EXISTENCE OF OTHER BURIED OBJECTS OR UTILITIES WHICH MAY BE ENCOUNTERED BUT WHICH ARE NOT SHOWN ON THESE DRAWINGS.

GRAPHIC SCALE

20' 0 10' 20' 40'

(IN FEET) 1 inch = 20 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000

BENCHMARK ELEV.

EXHIBIT TITLE: ENGINEERED FILL PLAN

PROJECT: EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
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PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C 75181 REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

HORIZONTAL SCALE:	VERTICAL SCALE:	JOB NO:
AS NOTED	NA	21-037

NO.	REVISIONS

DESIGNED:	DRAWN:	CHECKED:	DATE:
AT	AT	AT	04-18-22

SHEET NO. C1.2

FILENAME: I:\21-037\CIVIL\DWG\21-037-C12.DWG

CONSTRUCTION NOTES

1. MATCH EXISTING GRADE/ELEVATION.
2. CONSTRUCT CONCRETE SIDEWALK PER (1 / C6.1)
3. CONSTRUCT CONCRETE CURB PER (2 / C6.1)
4. CONSTRUCT DRIPLINE TRENCH PER (3 / C6.1)
5. PROPOSED SIDEWALK ELEVATION SHALL MEET FLUSH WITH FINISH FLOOR ELEVATION.

GRAPHIC SCALE

20' 0 10' 20' 40'

(IN FEET) 1 inch = 20 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000

BENCHMARK ELEV.

EXHIBIT TITLE: GRADING PLAN

PROJECT: EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
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PROFESSIONAL ENGINEER — ANTHONY J. TASSANO — No. C79881 — REGISTERED — CIVIL — STATE OF CALIFORNIA

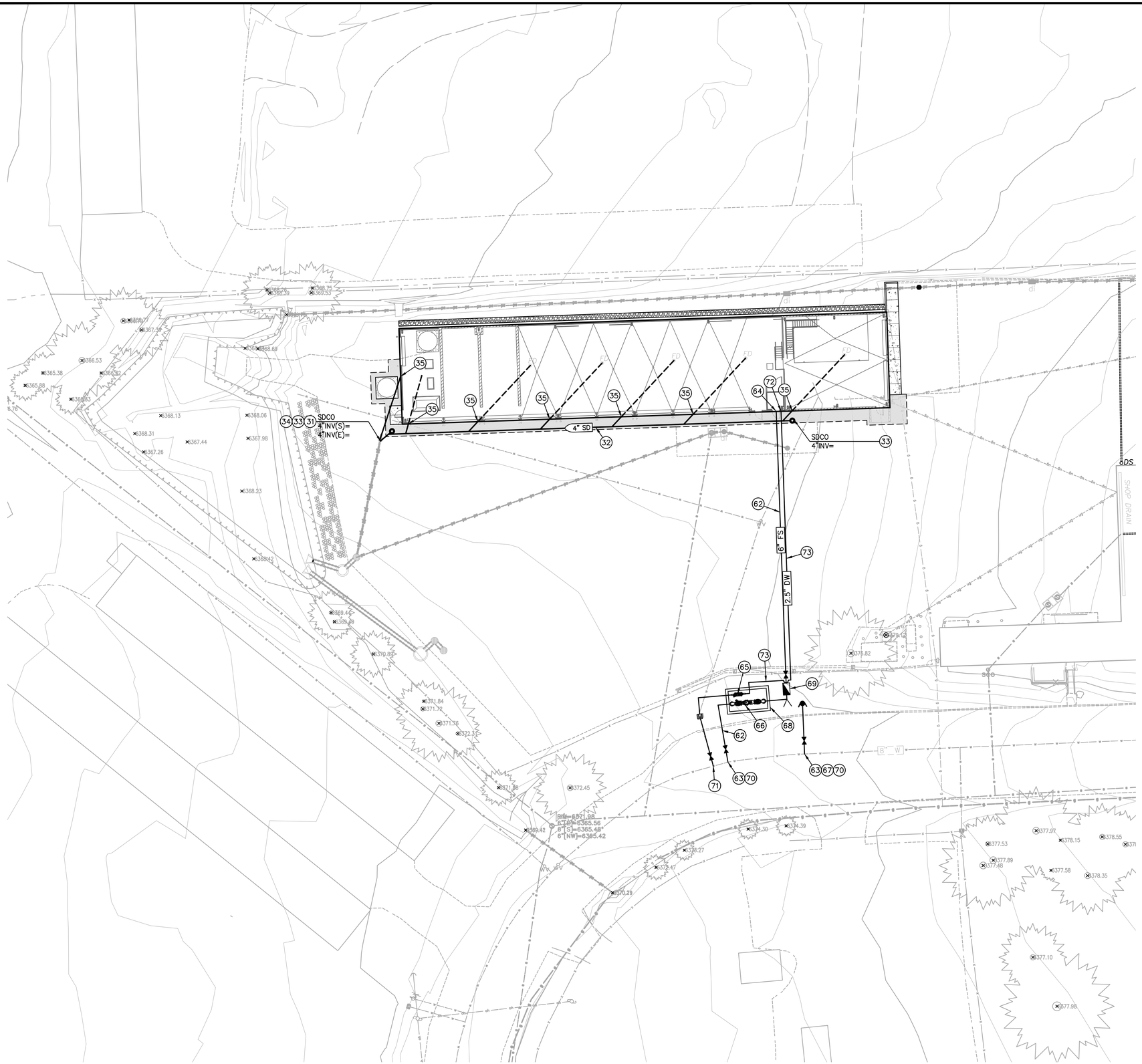
HORIZONTAL SCALE:	AS NOTED
VERTICAL SCALE:	NA
JOB NO.:	21-037

NO.	REVISIONS

DESIGNED:	AT
DRAWN:	AT
CHECKED:	AT
DATE:	04-18-22

SHEET NO. C2.1

FILENAME: I:\21-037\CIVIL\DWG\21-037-C21.DWG



DRAINAGE NOTES

31. CONNECT TO EXISTING STORM DRAIN PIPE. PROVIDE ALL FITTINGS NECESSARY TO MAKE CONNECTION.
32. PLACE 4" STORM DRAIN PER (4 / C6.1)
33. CONSTRUCT STORM DRAIN CLEANOUT PER (5 / C6.1)
34. SAWCUT, REMOVE AND DISPOSE OF EXISTING ASPHALT PAVING AS REQUIRED FOR STORM DRAIN INSTALLATION. PLACE 3" AC OVER 24" AB.
35. CONNECT TO FLOOR DRAIN PIPING. REFER TO PLUMBING PLANS FOR EXACT DEPTH AND LOCATION PRIOR TO TRENCHING. PROVIDE ALL FITTINGS NECESSARY TO MAKE CONNECTION.

BACKFLOW PREVENTION GENERAL NOTES

1. CLEARANCE FROM BOTTOM OF BACKFLOW PREVENTION DEVICE TO TOP OF CONCRETE SLAB SHALL BE BETWEEN 12" TO 36".
2. TEST COCKS SHALL BE FACING THE OPENING OF THE HEATED ENCLOSURE. SEE NOTE #79, THIS SHEET.

GENERAL THRUST BLOCK NOTE

1. ALL JUNCTION AND BENDS ON WATER MAIN PIPES 4" OR LARGER IN DIAMETER, VERTICAL AND HORIZONTAL SHALL BE PROTECTED WITH THRUST BLOCKS OR RESTRAINED JOINT FITTINGS PER DETAILS (3 / C6.2)

WATER NOTES

61. PLACE 2" WATER, SCH 80 PVC PER (6 / C6.1)
62. PLACE 6" WATER, C900 DR14 PER
63. CONNECT TO EXISTING 8" WATER MAIN WITH NEW 6" SERVICE TAP PER SOUTH LAKE TAHOE PUD STANDARDS AND SPECIFICATIONS. (1 / C6.2)
64. CONNECT TO BUILDING FIRE SPRINKLER SERVICE. REFER TO FIRE PROTECTION PLANS FOR EXACT DEPTH AND LOCATION, PROVIDE ALL FITTINGS NECESSARY TO MAKE CONNECTION.
65. PLACE 3" WILKINS 975XL2 REDUCED PRESSURE DOMESTIC BACKFLOW ASSEMBLY. (2 / C6.2)
66. PLACE 6" WILKINS 375A REDUCED PRESSURE BACKFLOW ASSEMBLY. (4 / C6.2)
67. PLACE FIRE HYDRANT PER SOUTH TAHOE PUBLIC UTILITY DISTRICT STANDARDS AND SPECIFICATION.
68. PLACE ALL RP ASSEMBLIES IN HEATED HOT BOX HUBBELL ENCLOSURE HB8FN-D ON A 60"W X 105"L X 6" THICK CONCRETE SLAB, OR APPROVED EQUAL.
69. PLACE FIRE DEPARTMENT CONNECTION, POST INDICATOR VALVE WITH TAMPER SWITCH AND CHECK VALVE. COORDINATE TAMPER SWITCH CONNECTED TO FIRE ALARM WITH ELECTRICAL PLANS (7 / C6.1)
70. PROVIDE GATE VALVE AND VALVE BOX PER STPUD STANDARDS.
71. REMOVE EXISTING 2" DOMESTIC WATER SERVICE AND PROVIDE NEW 3" SERVICE PER SOUTH TAHOE PUBLIC UTILITY DISTRICT DWG. S2-D3. (5 / C6.2)
72. CONNECT TO BUILDING DOMESTIC WATER SERVICE. PROVIDE ALL FITTINGS NECESSARY TO MAKE CONNECTION.
73. PLACE 3" WATER, SCH 80 PVC PER (6 / C6.1)

GRAPHIC SCALE

20' 0 10' 20' 40'

(IN FEET) 1 inch = 20 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000 BENCHMARK ELEV.

EXHIBIT TITLE: UTILITY PLAN

PROJECT: EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHAKORI YARD 1121 SHAKORI DRIVE SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

REGISTERED PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C79981 CIVIL STATE OF CALIFORNIA

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C3.1

FILENAME: I:\21-037\CIVIL\DWG\21-037-C31.DWG

PAVING GENERAL NOTES:

1. ASPHALT MIX SHALL MEET CALTRANS SPECIFICATIONS FOR TYPE B ASPHALTIC CONCRETE. REFERENCE CALTRANS SPECIFICATION SECTION 39, AND PROJECT SPECIFICATIONS
2. AGGREGATE BASE SHALL MEET CALTRANS SPECIFICATIONS FOR CLASS II AGGREGATE BASE. REFERENCE CALTRANS SPECIFICATION SECTION 26 AND PROJECT SPECIFICATIONS
3. ALL AGGREGATE BASE SHALL BE MOISTURE CONDITIONED TO, OR SLIGHTLY ABOVE, OPTIMUM MOISTURE CONTENT AND COMPACTED TO 95% RELATIVE COMPACTION.
4. RECYCLED ASPHALT MAY BE USED AS CONCRETE AND ASPHALT BASE MATERIAL PROVIDED IT MEETS CALTRANS SPECIFICATIONS FOR CLASS II AB, REFERENCE CALTRANS SPECIFICATION SECTION 26-1.02A.
5. PAVEMENT SUBGRADE PREPARATION, I.E. SCARIFICATION, MOISTURE CONDITIONING, AND COMPACTION SHALL BE PERFORMED AFTER;
   A. POT HOLING ALL EXISTING UTILITIES.
   B. THE INSTALLATION OF UNDERGROUND UTILITIES AND TRENCHES BACKFILLED IN ACCORDANCE WITH THESE PLANS.
6. ALL AREAS DISTURBED BY GRADING, DEMOLITION, OR CONSTRUCTION ACCESS, WHICH ARE NOT SHOWN TO BE LANDSCAPED SHALL BE REVEGITATED WITH NATIVE SEEDING AND WOOD CHIP COVER.
7. REFER TO GRADING PLANS FOR CURBS, CURB GUTTERS, VALLEY GUTTERS, AND OTHER CONCRETE STRUCTURES AND PAVING FEATURES NOT SPECIFICALLY NOTED ON THIS PLAN.
8. ADJUST TO FINISH GRADE ALL BOXES, FRAMES, COVERS SLEEVES, POST HOLES, GRATES, ETC. FOUND IN NEW ASPHALT OR CONCRETE PAVING AREAS, WHICH ARE NOT NOTED FOR REMOVAL. CLEAN/OR REPLACE AS NECESSARY TO ENSURE PROPER SEATING.

PAVING LEGEND

(1) TYPE 1 PAVING
PLACE 3.5" AC OVER 4" COMPACTED CLASS II AB ON SUBGRADE COMPACTED PER PLANS AND SPECIFICATIONS.

(2) TYPE 2 PAVING
PLACE 6" PCC WITH #4 REBAR AT 18"O.C.E.W. OVER 6" AB ON SUBGRADE COMPACTED PER PLANS AND SPECIFICATIONS. SNOW MELT WITH FOAM PAD AND WIRE MESH WHERE OCCURS PER DETAIL

1 / C6.1

GRAPHIC SCALE
20' 0 10' 20' 40'
(IN FEET) 1 inch = 20 feet
NORTH
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A.P.N. 035-181-009-000
BENCHMARK ELEV.

EXHIBIT TITLE: PAVING PLAN

PROJECT:
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
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PROFESSIONAL ENGINEER REGISTERED
ANTHONY J. TASSANO
No. C 75181
CIVIL
STATE OF CALIFORNIA

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
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CHECKED: AT
DATE: 04-18-22

SHEET NO. C4.1

FILENAME: I:\21-037\CIVIL\DWG\21-037-C41.DWG

COMBINED
EL DORADO COUNTY RESOURCE CONSERVATION DISTRICT
AND
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION
EROSION CONTROL REQUIREMENTS AND SPECIFICATIONS
July 2006

I. MINIMUM CONSTRUCTION SITE STORM WATER MANAGEMENT PRACTICES

The storm water management practices described below are the minimum, required water quality protection measures applicable to all construction sites, within Western El Dorado County. This listing does not include the various inspection, record keeping, training and reporting requirements. Additionally, there will be instances where project and site conditions require supplementing or deviating from these minimum protection requirements. The contractor is expected to deploy measures sufficient to achieve compliance with the County's Grading Ordinance; and, as applicable (projects which involve one acre or more of disturbed soil or are part of a larger common plan of development that encompasses one acre or more of disturbed soil), with the State Water Resources Control Board's (SWRCB) NPDES General Permit for Storm Water Discharges Associated with Construction Activity.

A. SCHEDULING

Construction shall be scheduled to minimize construction activities in "high-risk areas" and the amount of active disturbed soil areas, during the rainy season (Oct. 15th to May 1st). "High-risk areas" include those areas within 50 feet of USGS watercourses, 100-year flood plains, regulated wetlands, and where slopes exceed 16%.

Unless specifically authorized by the County's on-site representative, during the rainy season the contractor shall not schedule construction activities in "high risk areas" or schedule to have more than 5 acres of active disturbed soil area.

Where permanent storm water treatment devices are to be constructed, these devices should, whenever feasible, be constructed as an early work item.

B. PRESERVATION OF NATURAL FEATURES

Prior to the commencement of soil-disturbing activities, areas of existing vegetation that are to remain and environmentally sensitive areas (i.e. wetlands, protected habitats, etc) shall be fenced for protection. In general, site designs shall preserve existing vegetation to the maximum extent possible; and during construction, existing vegetation shall be preserved (and protected by fencing) for as long as possible to minimize erosion.

C. STORM WATER RUN-ON AND CONCENTRATED FLOWS

Existing watercourses shall be protected; and if diverted, handled in a non-eroding fashion. To the extent feasible, all concentrated water flows shall be channeled away from disturbed soil areas / stockpiles. Concentrated water flows shall be conveyed in a non-eroding fashion.

D. STOCKPILE MANAGEMENT

Stockpiles shall be managed as follows:

1. Soil stockpiles

Rainy season:
- Covered, or protected with soil stabilization measures & perimeter sediment barriers

Non-rainy season:
- Covered or protected with perimeter sediment barriers

2. Concrete/asphalt rubble, rock and aggregate base/sub-base
   - Covered or protected with perimeter sediment barriers
3. "Cold mix" asphalt
   - Covered

E. SEDIMENT TRACKING CONTROL

Appropriate measures shall be deployed to minimize any tracking of sediment off-site by vehicles and/or equipment. These measures include stabilized construction entrances/exits & roadways, and tire washing. Where tracking occurs, streets shall be swept using a pickup sweeper with water supply.

F. NON-STORM WATER MANAGEMENT

Non-storm water discharges shall be minimized to the extent feasible. Sediment-laden non-storm water is required to be filtered (or equivalent treatment) prior to discharging. Measures required to manage non-storm water discharges include: water conservation practices, dust control, material storage practices, vehicle/equipment operation and maintenance requirements, waste management practices, and spill prevention/control measures.

G. DISTURBED SOIL AREA MANAGEMENT

Disturbed soil areas (DSA) shall be protected with an "effective combination" of measures including soil stabilization, sediment barriers and basins / traps. There may be situations where "Sediment Basins" or "Treatment" are able to substitute as alternative control measures to the normally required "effective combination" of soil stabilization, sediment barriers and basins / traps. However, when substituting these measures, the contractor must be prepared to demonstrate that the sediment load within storm water discharges from the construction site does not exceed natural or pre-construction levels.

1. Soil stabilization measures include:
   - Hydraulic mulch (ref. CASQA BMP # EC-3)
   - Hydroseeding (ref. CASQA BMP # EC-4)
   - Suitably stabilized, non-polluting straw / wood / organic mulch (ref. CASQA BMP #'s EC-6 & EC-8)
   - Geotextiles, mats, plastic covers and erosion control blankets (ref. CASQA BMP # EC-7)
   - Stabilized construction roadways (ref. CASQA BMP # TC-2)
2. Sediment barriers include:
   - Silt fences (ref. CASQA BMP # SE-1)
   - Sand/gravel bag barriers (ref. CASQA BMP #'s SE-6 & SE-8)
   - Straw bale barriers (ref. CASQA BMP # SE-9)
   - Fiber rolls (ref. CASQA BMP # SE-5)
3. Basin / traps include:

   - Desilting basins (ref. Caltrans BMPs)
   - Sediment traps (ref. Caltrans BMPs)
4. On DSAs with slope lengths greater than 10 feet, the following measures shall be deployed:

a. Rainy season (Oct. 15th to May 1st):

Non-active areas (no soil disturbing activities for 21 or more days)
- On slopes equal to or flatter than 1:20 (V/H), soil stabilization
- On slopes steeper than 1:20 (V/H), soil stabilization and sediment barriers

Active areas
- On slopes steeper than 1:20 (V/H), sediment barriers
- On slopes steeper than 1:2 (V/H) with slope lengths greater than 50 feet: soil stabilization; sediment barriers; and where feasible, basins / traps

b. Non-rainy season:

Non-active areas (no soil disturbing activities for 21 or more days)
- On slopes steeper than 1:2 (V/H), sediment barriers

5. General:

- Protection shall be deployed on non-active DSAs within 14 days from the cessation of soil-disturbing activities or one day prior to the predicted (40% or more chance) onset of significant precipitation, whichever occurs first. Protection shall be deployed on active DSAs prior to the predicted (40% or more chance) onset of significant precipitation.
- "Terraces." For cut slopes up to 60 feet in height, terraces at least 8 feet (2.4 meters) in width shall be established at not more than 30-foot (9.1 meters) vertical intervals on all cut slopes to control surface drainage and debris except that where only one terrace is required, it shall be at midheight. For cut slopes greater than 60 feet (18 meters) and up to 120 feet (37 meters) in vertical height, one additional terrace at approximately midheight shall be 12 feet (3.6 meters) in width. Terraces shall slope a minimum of 5 percent gradient toward the hillside. Terrace widths and spacing for cut slopes greater than 120 feet (36 meters) in height shall be designed by the Civil Engineer and approved by the Director. Suitable access shall be provided to permit proper cleaning and maintenance.
- "Sediment Basin:" A basin with a capacity equivalent to at least 3600 cubic feet of storage (as measured from the bottom of the basin to the principal outlet) per acre draining into the basin. The length of the basin shall be more than twice the basin's width (length is determined by measuring the distance between the inlet and the outlet). The depth of the basin must not be less than three feet nor greater than five feet.
- "Treatment": A combination of basin and treatment engineered to capture and treat (to remove 0.01 mm sized particles and larger) the 10-year, 6-hour

rain event using Q=C×I×A where C=0.5 and I ranges from 0.286 (El Dorado Hills) to 0.500 (Sly Park).

General reference:

1. **El Dorado County "Storm Water Management Plan", October 2004. Available online at: http://www.co.el-dorado.ca.us//emd/solidwaste/storm.html**

Detailed references:

1. **California Storm water Quality Association (CASQA) "Construction Handbook," January 2003, Errata September 2004. Available online at: http://www.cabmphandbooks.com/**
2. **Caltrans "Statewide Storm Water Quality Practice Guidelines," April 2003. Available online at: http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/index.htm**
3. **High Sierra Resource Conservation and Development Council "Vegetation Establishment Guidelines for the Sierra Nevada Foothills and Mountains," 2005. Available online at: http://www.co.el-dorado.ca.us/emd/solidwaste/StormWater/HSRCD%20Vegetation%20Guidelines%20Final%202005.pdf**

II. CRITICAL AREA PLANTING SPECIFICATIONS (January 2006)

A. SCOPE – Establishing vegetation on severely eroding areas or areas with an erosion potential. Its purpose is to stabilized the soil, minimize or prevent damage from sediment and runoff to downstream areas, protect wildlife habitat, and maintain aesthetic qualities.

B. AREAS TO BE SEEDED, TIMING OF SEEDING – Complete revegetation and stabilization of all disturbed soils, both within and outside county rights-of-way, will be accomplished with specified amounts and types of vegetative species, mulch and fertilizer material. See Major Land Resource Area exhibits MLRA 18 OR 22.

All erosion and sediment control practices performed after October 15, shall follow "Rainy Season" specification contained in the Storm Water Management Practices.

C. MATERIAL

1. Seed – All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code and shall be acceptable to the County Agricultural Commissioner.

   Seed shall be of a quality which has a minimum pure live seed content of 80% (% purity × % germination) and weed seed shall not exceed 0.5% of the aggregate of pure live seed and other materials. Legume seed shall be inoculated with inoculate specific to its needs within two hours prior to seeding. Inoculants shall not be used later than the date indicated on the

container or as otherwise specified. All inoculated seed shall be labeled to show weight of seed, date of inoculation, and the weight and source of inoculant materials.

2. Fertilizer – A commercial fertilizer shall be Ammonium Phosphate and contain a minimum of 16% nitrogen, 20% phosphorus and 0% potash, uniform in composition, dry and free flowing, pelleted or granular.

   All fertilizer shall be delivered in unbroken or unopened containers, labeled in accordance with applicable state regulations and bearing the warranty of the producer for the grade furnished.
3. Mulch – Mulch shall be one of the following materials as approved by the government representative.

3A. Straw – Straw shall be new straw derived from rice, wheat, oats, or barley and be free of mold and noxious weed seed. Straw shall be furnished in air dry bales. Evidence shall be furnished that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw obtained from outside the county in which it is to be used is delivered to the site of the work.

3B. Wood Fiber Mulch – Wood fiber mulch is a wood cellulose fiber that contains no germinating or growth inhibiting factors. It is colored with a non-toxic, water soluble, green dye to provide a proper gauge for metering over ground surfaces. It has the property to be evenly dispersed and suspended when agitated in water.

D. SEEDING REQUIREMENTS

1. General – All seeding, fertilizer and mulching operations shall begin when approval is given by the appropriate County Engineer or Conservation District representative.
2. Seedbed Preparation – The entire area to be seeded shall be reasonably smooth and conform to the desired shape before actual seedbed preparation is begun. Any debris which would interfere with seeding operations, growth or maintenance of the vegetative cover will be removed. The area to be seeded shall have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of two to four inches (2" – 4"). No implement shall be used that will create an excessive amount of downward movement of soil or clods of sloping areas. Seedbed may be prepared at time of completion of earth-moving work.
3. Fertilizing – Fertilizer shall be distributed uniformly over the seedbed at the rate of 300 pounds per acre, and shall be in such physical condition to insure uniform application over the area to be fertilized. Fertilizer may be applied in any way that will result in uniform distribution. The fertilizer shall be incorporated into the soil.
4. Seeding – Seed shall be broadcast by hand, mechanical hand seeder, power operated seeder, hydroseeder or other approved equipment. 'Seed shall have a soil cover of not more than one-half inch. Seeding will be carried out using either of the following methods:

Method 1 The seed may be drilled, not to exceed one-half (1/2) inch deep and cultipacked or rolled once over with a corrugated roller on all areas where equipment can be operated safely. Seed operations will be across the slope.

Method 2 The seed may be applied in a slurry mix of wood cellulose fiber distributed uniformly at the prescribed rate (see Item E.2, Wood Cellulose Fiber -Hydro-mulching, below). The application unit used for "Hydro Mulch" shall be equipped with an agitator to maintain the seed and mulch in suspension within the unit's tank prior to and during application.

Method 3 Where emergency treatment of exposed soils extends beyond October 15, emergency mulching without seed will be prescribed in accordance with "Soil stabilization measures" described previously.

Special Note: A minimum 70% seed germination with at least 1" growth must be obtained by December 1st, or area must be covered with straw mulch. (Section E-1)

A.P.N. 035-181-009-000
BENCHMARK _____ ELEV. _____

EXHIBIT TITLE: EROSION CONTROL NOTES

PROJECT:
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
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PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C 75685 CIVIL STATE OF CALIFORNIA

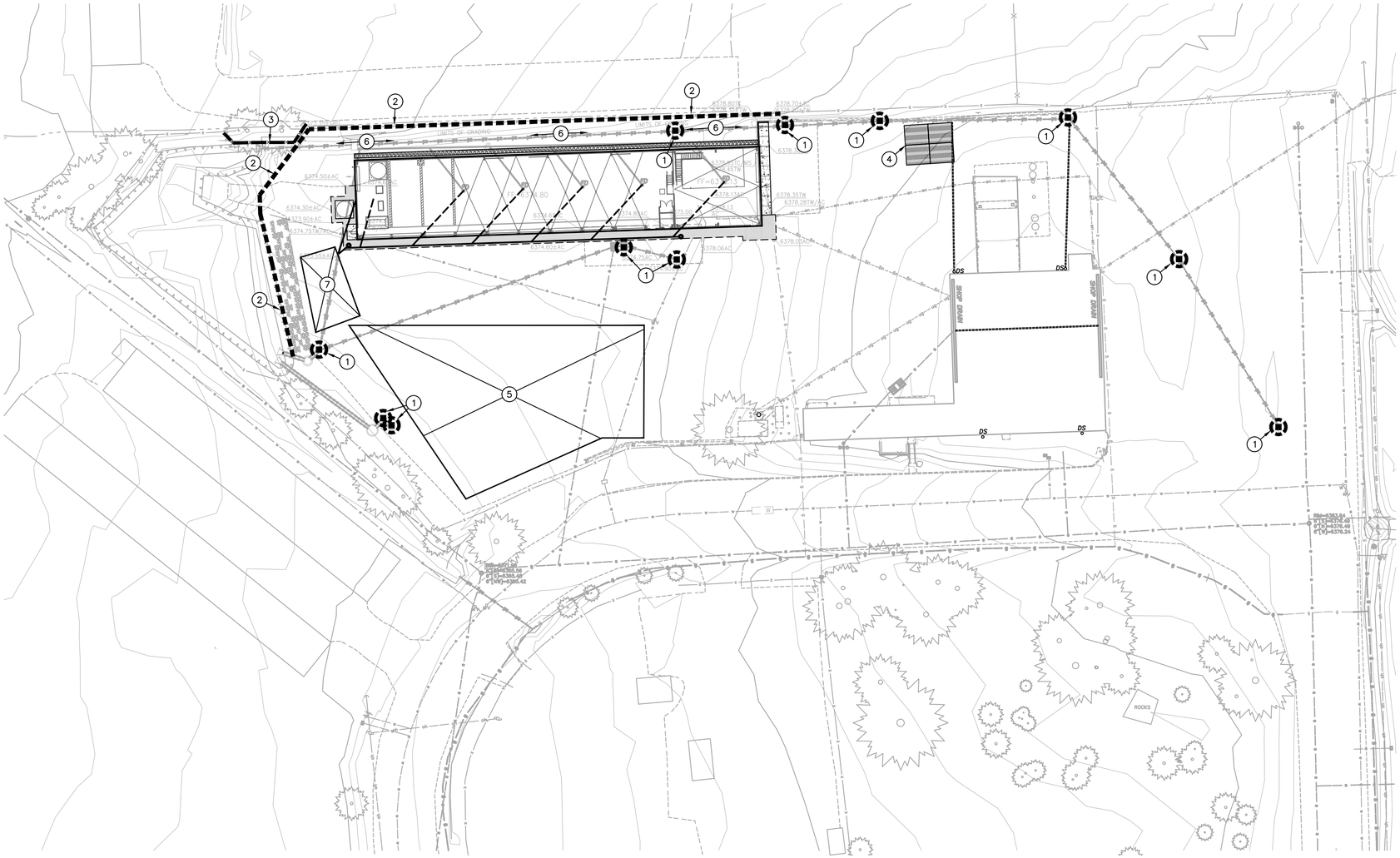
HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C5.1

FILENAME: I:\21-037\CIVIL\DWG\21-037-C51-C53.DWG



EROSION CONTROL NOTES

1. INLET PROTECTION AT DROP INLET. (4/C5.3)
2. COIR LOGS (2/C5.3)
3. PLACE VEGETATION PROTECTION FENCING. (1/C5.3)
4. CONTRACTOR SHALL RUMBLE STRIPS AT ENTRY/EXIT POINTS. CONTRACTOR SHALL PROTECT EXISTING PAVEMENT/CONCRETE FROM DAMAGE.
5. TEMPORARY MATERIAL STORAGE AND STAGING AREA; OVER EXISTING PAVEMENT. PROVIDE COIR LOGS AT PERIMETER OF ANY STOCKPILED SOIL, GRAVEL, LANDSCAPE MATERIALS, SPOILS STORAGE MAY REQUIRE WEIGHTED COVERS.
6. PROVIDE UPLAND REVEG MIX 1 IN ALL AREAS DISTURBED BY GRADING THAT ARE NOT PROPOSED TO BE LANDSCAPED.
7. TEMPORARY SNOW REMOVAL STORAGE AREA; OVER EXISTING PAVEMENT.

GENERAL BMP NOTES:

A. DUST CONTROL MEASURES SHALL BE IN PLACE DURING CONSTRUCTION. BROADCAST MULCH SHALL NOT BE PERMITTED AS A DUST CONTROL MEASURE WITHIN 35 FEET OF STRUCTURES.

B. STRAW BALES ARE NO LONGER ACCEPTABLE FOR TEMPORARY EROSION CONTROL OR MULCH MATERIAL IN THE LAKE TAHOE BASIN. THE USE OF STRAW HAS CONTRIBUTED TO THE SPREAD OF NOXIOUS WEEDS THROUGHOUT THE BASIN. THE USE OF ALTERNATIVES TO STRAW BALES, SUCH AS PINE NEEDLE BALES, FILTER FABRIC, COIR LOGS AND PINE NEEDLE OR WOOD MULCHES FOR EROSION CONTROL PURPOSES IS REQUIRED.

C. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE REVEGETATED IN ACCORDANCE WITH THE TRPA HANDBOOK OF BEST MANAGEMENT PRACTICES AND LIVING WITH FIRE, LAKE TAHOE BASIN SECOND ADDITION.

D. VEGETATION PROTECTIVE FENCING AROUND THE ENTIRE CONSTRUCTION SITE. THE FENCING SHALL BE NO MORE THAN 12 FEET FORM ANY FOOTPRINT, DRIVEWAY, OR AREA OF APPROVED DISTURBANCE. TREE LOCATED WITHIN THE CONSTRUCTION AREA THAT AREA TO BE RETAINED SHALL BE INDIVIDUALLY PROTECTED BY FENCING OR OTHER MEANS NECESSARY.

E. CONSTRUCTION STAGING AND SPOILS STORAGE SHALL BE LOCATED ON EXISTING PAVED AREAS OR PREVIOUSLY DISTURBED AREAS, AND SHALL INCLUDE TEMPORARY EROSION CONTROL. SPOILS STORAGE LOCATIONS MAY REQUIRE WEIGHED COVERS.

EROSION CONTROL NOTES

1. CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR COMPLIANCE WITH STATE WATER RESOURCES CONTROL BOARD REQUIREMENTS.
2. CONTRACTOR SHALL PROVIDE COIR LOG BARRIER AT ALL INLETS (NEW AND/OR EXIST.) IN AREAS OF WORK.
3. CONTRACTOR SHALL PROVIDE COIR LOGS AT PERIMETER OF SITE.
4. CONTRACTOR SHALL MAINTAIN ALL COIR LOGS AND OTHER STORM WATER POLLUTION PREVENTION DEVICES THROUGHOUT CONSTRUCTION. REMOVE ALL POLLUTION PREVENTION DEVICES AT THE END OF CONSTRUCTION AS REQUIRED.
5. PRIOR TO PLACEMENT OF LANDSCAPING AND/OR FINISHED GROUND SEEDING, REMOVE TEMPORARY EROSION CONTROL MEASURES.
6. CONTRACTOR SHALL PROVIDE AND MAINTAIN FILTER BAGS AT INLETS LOCATED IN THE EXISTING ROADWAY.
7. CONTRACTOR SHALL REVEGETATE AND STABILIZE ALL AREAS DISTURBED BY GRADING.

A. VEGETATION PROTECTION IS ONLY REQUIRED AROUND AREAS OF ACTIVE GRADING, SPECIFIC VEGETATION TO BE RETAINED AND IN NEED OF PROTECTION FROM ACTIVE CONSTRUCTION, STAGING/STOCKPILE AREAS AND INGRESS/EGRESS AREAS AS APPROPRIATE. VEGETATION PROTECTION FENCING IS NOT REQUIRED AROUND THE ENTIRE PROPERTY.

B. INSTALL COIR LOG AND/OR SEDIMENT FENCE DOWNSLOPE OF THOSE AREAS OF ACTIVE CONSTRUCTION AND GRADING.

C. SEE TAHOE REGIONAL PLANNING AGENCY (TRPA) ATTACHMENT Q, STANDARD CONDITIONS OF APPROVAL FOR GRADING PROJECTS FOR ADDITIONAL REQUIREMENTS.

SEED MIX 1: UPLAND REVEG MIX

Species (Common name)	Species (*Botanical name*)	PLS lbs per acre
Squirreltail (high–elevation collection)	*Elymus elymoides (Sierra)*	50
Mokelumne or El Dorado Brome (high–elevation Tahoe collection	*Bromus carinatus (Mokelumne)*	20
Blue Wildrye (Stanislaus 5000)	*Elymus glaucus*	17
Antelope Bitterbrush (+5500 ft. Sierra collection)	*Purshia tridentata*	5
Sulfur–flower Buckwheat	*Eriogonum umbellatum*	3
Currant, Wax or Sierra	*Ribes spp. (cereum or nevadense)*	3
Penstemon spp.	*Penstemon Speciosus, rydbergyii, or newberryii*	2
	TOTAL PLS POUNDS PER ACRE RATE	100

GRAPHIC SCALE

30' 0 15' 30' 60'

(IN FEET) 1 inch = 30 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

FILENAME: I:\21–037\CIVIL\DWG\21–037–C51–C53.DWG

A.P.N. 035-181-009-000 BENCHMARK ELEV.

EXHIBIT TITLE: EROSION CONTROL PLAN

PROJECT: EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHAKORI YARD 1121 SHAKORI DRIVE SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

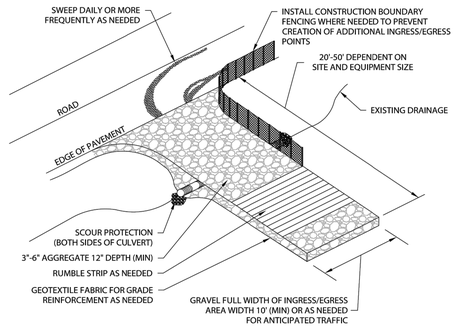
REGISTERED PROFESSIONAL ENGINEER ANTHONY J. TASSANO C 74818 CIVIL STATE OF CALIFORNIA

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: N/A
JOB NO.: 21–037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04–18–22

SHEET NO. C5.2



NOTES:
1. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE USED AT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS.
2. THE AGGREGATE SHALL BE 3" - 6" CRUSHED ROCK.
3. THE ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.
4. THE ENTRANCE SHALL BE CONSTRUCTED ON LEVEL GROUND, WHERE FEASIBLE, AND LOCATED WHERE PERMANENT DRIVEWAY OR PARKING AREAS ARE PLANNED.
5. ADDITIONAL STONE SHALL BE PROVIDED WHEN SURFACE VOIDS ARE NO LONGER VISIBLE OR WHEN THERE IS FREQUENT OFF-SITE TRACKING. FREQUENT OFF-SITE TRACKING MAY INDICATE THE NEED FOR GRAVEL REPLACEMENT.
6. CONTRACTOR TO MAINTAIN CONSTRUCTION ENTRANCE AT ALL TIMES.
7. ALL SEDIMENT DEPOSITS ON PAVED ROADWAYS SHALL BE SWEPT AND REMOVED DAILY OR MORE FREQUENTLY AS NEEDED.
8. LIMIT CONSTRUCTION TRAFFIC DURING WET WEATHER OR WHEN THE SITE IS SATURATED, MUDDY OR COVERED IN SNOW.
9. LIMIT SPEEDS OF INGRESS/EGRESS VEHICLES TO 5 M.P.H. OR LESS.

Vehicle Tracking Control

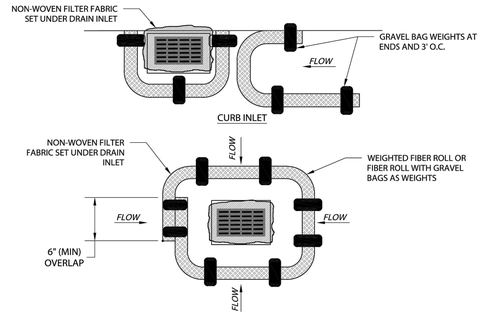
TAHOE REGIONAL PLANNING AGENCY

BMP-508
December 2012

THE TAHOE REGIONAL PLANNING AGENCY (TRPA) SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS DETAIL.

3 / C5.3 STABILIZED CONSTRUCTION SITE ACCESS

NO SCALE



NOTES:
1. FIBER ROLL DRAIN INLET PROTECTION SHALL USE A MIN. 12" DIAMETER ROLL AND BE INSTALLED BEFORE CONSTRUCTION BEGINS.
2. GRAVEL BAGS SHALL BE FILLED WITH GRAVEL. SAND BAGS ARE NOT AN ACCEPTABLE SUBSTITUTE.
3. INSPECT AND REPAIR FIBER ROLLS EACH DAY AND AFTER EACH STORM EVENT. REMOVE SEDIMENT WHEN ONE THIRD OF THE FILTER DEPTH HAS BEEN FILLED. REMOVED SEDIMENT SHALL BE DISPOSED OF PROPERLY.
4. SEDIMENT AND GRAVEL DEPOSITED ON ROADWAYS SHALL BE IMMEDIATELY REMOVED.
5. IN HIGH TRAFFIC AREAS, MARK DRAIN INLET PROTECTION WITH VISIBLE BARRIERS SUCH AS SAFETY CONES.
6. REMOVE DRAIN INLET PROTECTION AFTER THE SURROUNDING AREA HAS BEEN STABILIZED.

Drain Inlet Protection

TAHOE REGIONAL PLANNING AGENCY

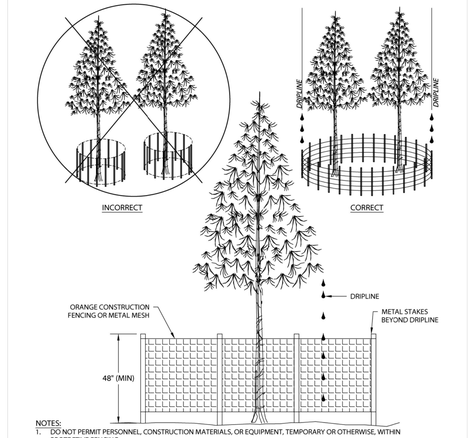
BMP-511
November 2012

THE TAHOE REGIONAL PLANNING AGENCY (TRPA) SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS DETAIL.

4 / C5.3 INLET PROTECTION

NO SCALE

Vegetation Protection Figure



NOTES:
1. DO NOT PERMIT PERSONNEL, CONSTRUCTION MATERIALS, OR EQUIPMENT, TEMPORARY OR OTHERWISE, WITHIN PROTECTIVE FENCING.
2. VEGETATION PROTECTION IS REQUIRED FOR ALL PROJECTS AS A CONDITION OF PROJECT APPROVAL.
3. METAL OR WIRE MESH FENCING MAY BE REQUIRED.
4. CALCULATE THE PROTECTIVE PERIMETER FOR SHIELDING LARGER SPECIMEN TREES MEASURING OVER 30" DBH AS FOLLOWS: COMPUTE THE PROTECTIVE RADIUS BY ADDING ONE FOOT, AS MEASURED OUT FROM THE TREE BOLE, FOR EVERY INCH IN DBH. (E.G. A TREE WITH A 30" DBH WOULD RECEIVE A 30' PROTECTIVE PERIMETER)

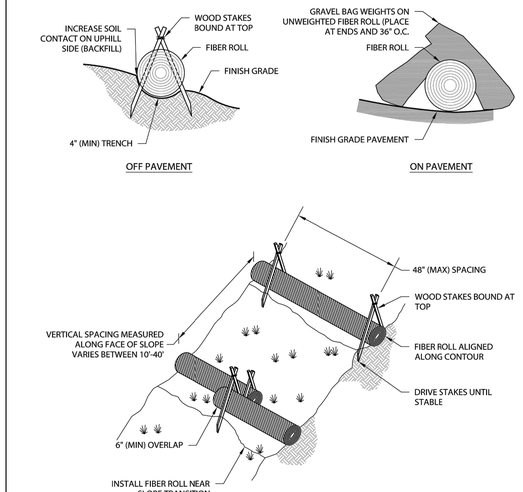
THE TAHOE REGIONAL PLANNING AGENCY (TRPA) SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS DETAIL.

TRPA BMP Handbook
May 2014

Chapter 4: BMP Toolkit
4.5-e Vegetation Protection
Page 31

1 / C5.3 VEGETATION PROTECTION FENCING

NO SCALE



Fiber Rolls

TAHOE REGIONAL PLANNING AGENCY

BMP-512
December 2012

THE TAHOE REGIONAL PLANNING AGENCY (TRPA) SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS DETAIL.

2 / C5.3 FIBER ROLLS

NO SCALE

A.P.N. 035-181-009-000
BENCHMARK ELEV.

EXHIBIT TITLE: EROSION CONTROL NOTES

PROJECT:
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C 58181 REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

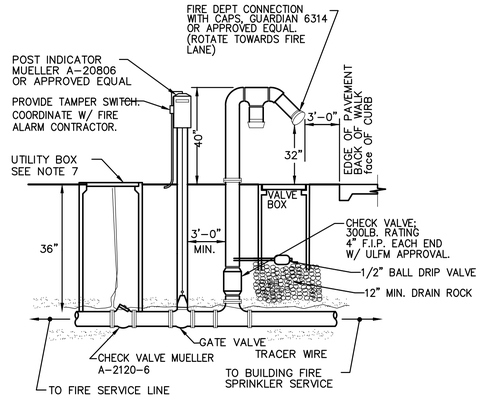
HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C5.3

FILENAME: I:\21-037\CIVIL\DWG\21-037-C51-C53.DWG

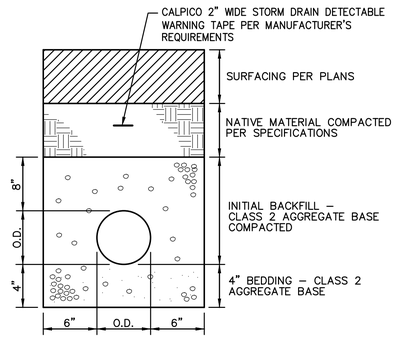


FIRE DEPARTMENT NOTES

1. THE INSTALLATION OF ALL ON-SITE FIRE PROTECTION SYSTEMS SHALL BE IN ACCORDANCE WITH N.F.P.A. 24 AND FIRE DEPARTMENT STANDARDS.
2. ALL ON-SITE FIRE PROTECTION SYSTEMS SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF N.F.P.A. 24 AND SHALL BE WITNESSED BY THE PRIVATE INSPECTOR. UNDERGROUND PIPING SHALL BE FLUSHED PER NFPA13 AND RISER STUB-UP IMMEDIATELY CAPPED.
3. THE INSTALLING CONTRACTOR, OR SUBCONTRACTOR, FOR ALL ON-SITE FIRE PROTECTION SYSTEMS SHALL NOTIFY THE PRIVATE INSPECTOR AT LEAST 24 HOURS IN ADVANCE OF REQUESTING A DATE AND TIME FOR INSPECTIONS.
4. IF PLASTIC PIPE IS INSTALLED FOR FIRE PROTECTION SYSTEMS, THE PIPE SHALL BE C-900 CLASS 200.
5. AFTER INSTALLATION, RODS, NUTS, BOLTS, WASHERS, CLAMPS, AND OTHER RESTRAINING DEVICES, EXCEPT THRUST BLOCKS, USED ON ON-SITE FIRE PROTECTION SYSTEMS SHALL BE CLEANED AND THOROUGHLY COATED WITH A BITUMINOUS OR OTHER ACCEPTABLE CORROSION-RETARDING MATERIAL.
6. ALL PIPES AND FITTINGS SHALL BE WRAPPED PER N.F.P.A. 24 AND BEDDED IN SAND.
7. PROVIDE UTILITY BOX. FOR 4" - 6" VALVE CHRISTY N48, FOR 8"+ CHRISTY N52 OR APPROVED EQUAL. PROVIDE 12" MIN CHAIN WELDED TO LIDS AND BOLTED TO INSIDE OF BOX. LID SHALL BE TRAFFIC RATED IF WITHIN A TRAFFIC AREA.

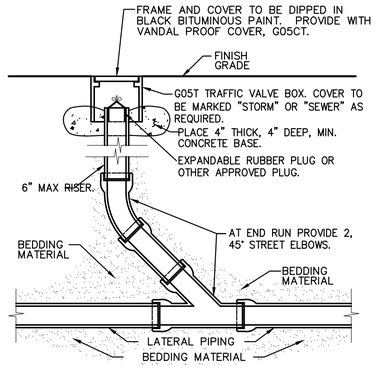
7 / C6.1 FIRE DEPARTMENT CONNECTION ASSEMBLY

NO SCALE



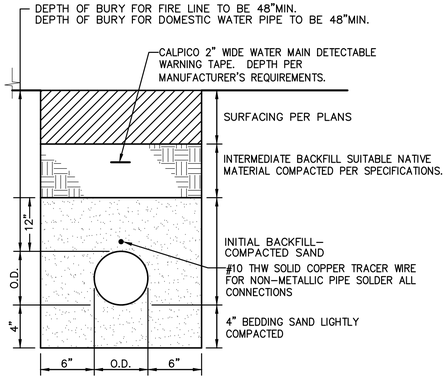
4 / C6.1 STORM DRAIN TRENCH

NO SCALE

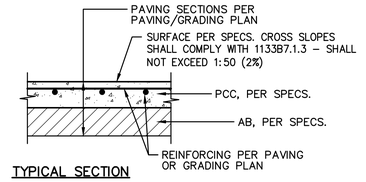


5 / C6.1 CLEANOUT

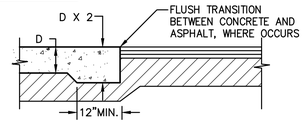
NO SCALE



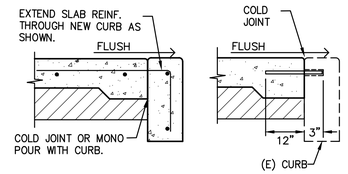
6 / C6.1 WATER TRENCH



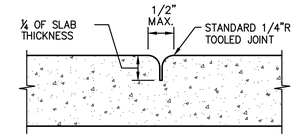
TYPICAL SECTION



TYPICAL THICKENED EDGE



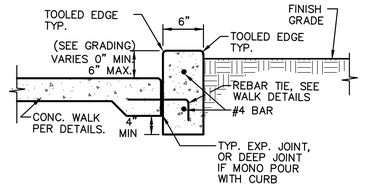
TYPICAL JOINT AT CURB



TYPICAL CONTROL JOINT

1 / C6.1 CONCRETE SIDEWALK

NO SCALE

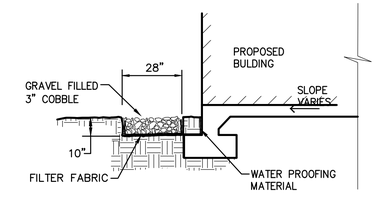


NOTES:

1. PROVIDE FELT EXPANSION JOINTS (E.J.) AT 20 FEET O.C. PROVIDE CONTROL JOINTS AT 10 FEET O.C., EXCEPT WHEN PLACING ADJACENT TO CONCRETE WALKS THE EXPANSION JOINTS SHALL ALIGN WITH THE EXPANSION JOINTS SHOWN FOR THE CONCRETE WALKS. SEAL E.J. WITH APPROVED JOINT SEALANT.
2. AT E.J. USE 1/2"X24" SMOOTH DOWELS, ALIGN WITH REBAR,GREASE 1/2 THE LENGTH BEFORE CONCRETE PLACEMENT.

2 / C6.1 CONCRETE CURB

NO SCALE



3 / C6.1 DRIPLINE TRENCH

NO SCALE

EXHIBIT TITLE: DETAILS AND SECTIONS

PROJECT: EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHAKORI YARD 1121 SHAKORI DRIVE SOUTH LAKE TAHOE, CA 96150

A.P.N. 035-181-009-000 BENCHMARK ELEV.

WARREN CONSULTING ENGINEERS, INC. 1117 WINDFIELD WAY, SUITE 110 EL DORADO HILLS, CA 95762 | (916) 985-1970

PROFESSIONAL ENGINEER ANTHONY J. TASSANO 27498 REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

HORIZONTAL SCALE:	VERTICAL SCALE:	JOB NO.:
AS NOTED	NA	21-037

NO.	REVISIONS

DESIGNED:	DRAWN:	CHECKED:	DATE:
AT	AT	AT	04-18-22

SHEET NO. C6.1

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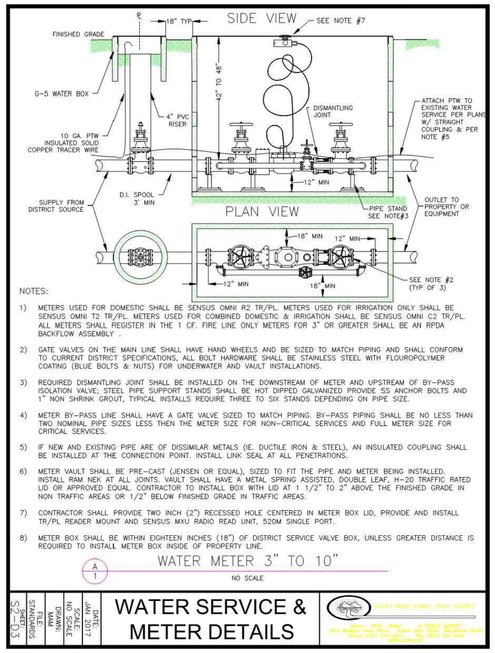


NOTES:

1) METERS USED FOR DOMESTIC SHALL BE SENSUS OMNI R2 TR/PL. METERS USED FOR IRRIGATION ONLY SHALL BE SENSUS OMNI T2 TR/PL. METERS USED FOR COMBINED DOMESTIC & IRRIGATION SHALL BE SENSUS OMNI C2 TR/PL. ALL METERS SHALL REGISTER IN THE 1 CF. FIRE LINE ONLY METERS FOR 3" OR GREATER SHALL BE AN RPDA BACKFLOW ASSEMBLY .
2) GATE VALVES ON THE MAIN LINE SHALL HAVE HAND WHEELS AND BE SIZED TO MATCH PIPING AND SHALL CONFORM TO CURRENT DISTRICT SPECIFICATIONS, ALL BOLT HARDWARE SHALL BE STAINLESS STEEL WITH FLOUROPOLYMER COATING (BLUE BOLTS & NUTS) FOR UNDERWATER AND VAULT INSTALLATIONS.
3) REQUIRED DISMANTLING JOINT SHALL BE INSTALLED ON THE DOWNSTREAM OF METER AND UPSTREAM OF BY-PASS ISOLATION VALVE; STEEL PIPE SUPPORT STANDS SHALL BE HOT DIPPED GALVANIZED PROVIDE SS ANCHOR BOLTS AND 1" NON SHRINK GROUT, TYPICAL INSTALLS REQUIRE THREE TO SIX STANDS DEPENDING ON PIPE SIZE.
4) METER BY-PASS LINE SHALL HAVE A GATE VALVE SIZED TO MATCH PIPING. BY-PASS PIPING SHALL BE NO LESS THAN TWO NOMINAL PIPE SIZES LESS THEN THE METER SIZE FOR NON-CRITICAL SERVICES AND FULL METER SIZE FOR CRITICAL SERVICES.
5) IF NEW AND EXISTING PIPE ARE OF DISSIMILAR METALS (IE. DUCTILE IRON & STEEL), AN INSULATED COUPLING SHALL BE INSTALLED AT THE CONNECTION POINT. INSTALL LINK SEAL AT ALL PENETRATIONS.
6) METER VAULT SHALL BE PRE-CAST (JENSEN OR EQUAL), SIZED TO FIT THE PIPE AND METER BEING INSTALLED. INSTALL RAM NEK AT ALL JOINTS. VAULT SHALL HAVE A METAL SPRING ASSISTED, DOUBLE LEAF, H-20 TRAFFIC RATED LID OR APPROVED EQUAL. CONTRACTOR TO INSTALL BOX WITH LID AT 1 1/2" TO 2" ABOVE THE FINISHED GRADE IN NON TRAFFIC AREAS OR 1/2" BELOW FINISHED GRADE IN TRAFFIC AREAS.
7) CONTRACTOR SHALL PROVIDE TWO INCH (2") RECESSED HOLE CENTERED IN METER BOX LID, PROVIDE AND INSTALL TR/PL READER MOUNT AND SENSUS MXU RADIO READ UNIT, 520M SINGLE PORT.
8) METER BOX SHALL BE WITHIN EIGHTEEN INCHES (18") OF DISTRICT SERVICE VALVE BOX, UNLESS GREATER DISTANCE IS REQUIRED TO INSTALL METER BOX INSIDE OF PROPERTY LINE.

A/1 WATER METER 3" TO 10"
NO SCALE

WATER SERVICE & METER DETAILS

SHEET NO. ST-05 | STANDARDS FILE | DRAWN WAM | SCALE NO SCALE | DATE JUL 2017

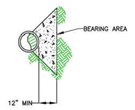
SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US

5 C6.2 3" METER SERVICE

THRUST BLOCK AREA REQUIRED – SQUARE FEET

TYPE OF FITTING		90° ELBOW	45° ELBOW	22.5° ELBOW	11.25° ELBOW	TEE BRANCH	TEE W/ PLUG	CROSS W/ PLUG	CROSS W/ PLUGS
TYPICAL INSTALLATION									
SIZE OF PIPE	6"	4	4	2	2	4	4	4	4
	8"	10	6	3	3	10	10	10	10
	10"	12	8	4	4	15	15	15	15
	12"	16	10	6	6	20	20	20	20
	14"	21	12	6	6	22	21	22	21
	16"	27	15	8	8	22	27	27	27
	18"	45	25	13	13	32	45	45	45
	24"	65	35	18	18	45	65	65	65

SECTION



NOTES:

1) JOINTS, FLANGE BOLTS AND FACE OF PLUGS TO BE KEPT CLEAR OF CONCRETE.
2) BLOCKS MUST BE POURED AGAINST UNDISTURBED SOIL.
3) THRUST BLOCKS TO BE CONSTRUCTED OF CLASS 423-C-2500 OR BETTER P.C.C.
4) THRUST BLOCKS AREA IS BASED ON TEST PRESSURE OF 150 PSI AND A HORIZONTAL SOIL BEARING STRENGTH OF 1500 PSI.
5) NUTS AND BOLTS ON ALL MJ FITTINGS SHALL BE PAINTED WITH TWO COATS OF KOPPERS 505, TNEMEC 46-450', AMERON OR EQUAL, 15 MILS EACH COAT.

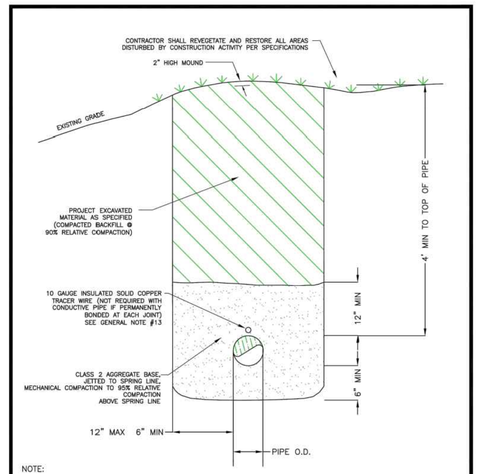
A/1 TYPICAL THRUST BLOCK
NO SCALE

WATERLINE DETAILS

ST-06 | STANDARDS FILE | DRAWN WAM | SCALE NO SCALE | DATE JUL 2016

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US

3 C6.2 THRUST BLOCK DETAILS



NOTE:

1) NO RECYCLED MATERIAL TO BE USED IN PIPE ZONE.

A/1 TRENCH DETAIL– OUTSIDE PAVED AREAS
NO SCALE

TRENCH AND PAVEMENT DETAILS

SS-02 | STANDARDS SHEET | FILE | DRAWN WAM | SCALE NO SCALE | DATE JUL 2016

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US

1 C6.2 TRENCH DETAIL

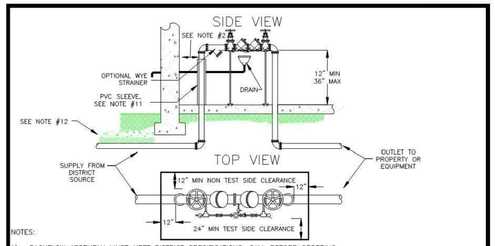
REQUIREMENTS FOR WATER SERVICE HOOKUP: (PAGE 1)

1) Obtain a permit from the South Tahoe Public Utility District (District) for each connection to the system. No work is to be performed until a permit has been obtained. It is your responsibility to contact USA North (1-800-227-2600) to mark utilities prior to digging. You must Call the CUSTOMER SERVICE OFFICE to schedule an inspection – PLEASE HAVE YOUR APN AND\OR SEWER PERMIT NUMBER WHEN CALLING. NO INSPECTION WILL BE SCHEDULED WITHOUT THIS INFORMATION.
2) Type K rigid copper pipe or Polyethylene Class 200 PSI, shall be installed from the District valve to the meter box with any existing nipple being removed from the District valve. An insulated coupling shall be located immediately downstream of the water meter unless the new water service line is non-metallic pipe.
3) A water service line one and half inch (1.5") or larger, must use a factory made resetter with a high by-pass.
4) The water service line downstream of the meter box shall be constructed of Copper Type L, Copper Type K, Polyethylene Class 200 PSI, or other suitable material approved by the District. For piping requirements at the meter, see Water Meter Installation Detail. For tracing purposes #10 insulated solid copper wire shall be installed the entire length of all plastic services and attached to the pipe.
5) The size of the water service line shall be subject to the approval of the District, it shall not be smaller than three-quarter inch (3/4") per single family dwelling.
6) Water service lines shall not run or be in the same trench with the building sewer or other drainage piping unless the building sewer drainage piping is of materials approved for use within the building.
7) When the building sewer or drainage piping is of materials not approved for use inside a building, the water service line, at all points, shall have a minimum of twenty four inches (24") of separation from the sewer or drainage piping. If separation can not be maintained the owner shall contact the District for a field meet with a District Inspector to approve installation options.
8) All water service lines shall be a minimum of forty two inches (42") below grade. Water service lines shall be bedded with clean material.
9) An individual shut-off valve must be installed outside the building foundation in a permanently accessible location. For easy access in the winter, it is recommended that the valve standpipe be left at least six inches (6") above final grade and capped. The valve must be constructed of brass with non-corrosive working parts. The valve must have a one-quarter (1/4") turn on/off capability with non-metallic seating properties.
10) If an auxiliary water source currently exists on the property, a connection can only be made to the District's water system if the auxiliary water source is properly destroyed or proper back flow protection is installed and maintained per District standards.
11) Abandoned auxiliary sources of water must first be verified and approved by the District prior to connection to the District system. If a private well exists, contact the El Dorado County Environmental Management office at: (530) 573-3450. This contact MUST be made immediately and prior to water service installation.

GS-01 | STANDARDS SHEET | FILE | DRAWN | SCALE NO SCALE | DATE JUL 2016

GENERAL NOTES

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US



NOTES:

1) BACKFLOW ASSEMBLY MUST MEET DISTRICT SPECIFICATIONS, CALL BEFORE ORDERING.
2) ASSEMBLIES MUST BE INSTALLED ABOVE GRADE IN A HORIZONTAL POSITION. ASSEMBLIES PLACED OUTSIDE OF THE STRUCTURE SHALL BE INSTALLED BETWEEN THE WATER METER AND THE FOUNDATION OF THE STRUCTURE. ASSEMBLIES PLACED INSIDE THE STRUCTURE SHALL BE INSTALLED WITHIN TWENTY FOUR INCHES (24") OF WHERE THE SERVICE ENTERS THE STRUCTURE.
3) ENCLOSURE FOR OUTDOOR OR INDOOR PROTECTION OF THE ASSEMBLY IS ALLOWED, BUT MUST PROVIDE IMMEDIATE TOP ACCESS OF TWELVE INCHES (12") FOR TESTING AND MAINTENANCE
4) TEST COCKS ARE REQUIRED TO FACE AWAY FROM WALLS AND NEAREST STATIONARY OBJECT AND AT NO TIME BE LESS THAN TWENTY FOUR INCHES (24") CLEARANCE.
5) BYPASS METER SHALL BE 5/8" SENSUS IPERL TR/PL, REGISTERING IN 1 CF.
6) CONTRACTOR SHALL PROVIDE TWO INCH (2") HOLE CENTERED IN HOT BOX LID, PROVIDE AND INSTALL TR/PL READER MOUNT AND SENSUS MXU RADIO READ UNIT, 520M SINGLE PORT.
7) NO BRANCH PIPING SHALL BE CONNECTED TO THE SUPPLY PIPE BETWEEN THE DISTRICTS SUPPLY AND THE ASSEMBLY.
8) ALL MEASUREMENTS ARE FROM THE LOWEST OR WIDEST PART OF THE ASSEMBLY.
9) ALL ASSEMBLIES ARE SUSCEPTIBLE TO FREEZING AND SHALL BE ADEQUATELY FREEZE PROTECTED.
10) ADEQUATE DRAINAGE FROM THE ASSEMBLY MUST BE PROVIDED.
11) BACK FLOW ASSEMBLY MUST BE TESTED UPON INSTALLATION BY A DISTRICT APPROVED CERTIFIED TESTER.
12) WHEN INSTALLED INSIDE A STRUCTURE, THE WATER SERVICE SHALL BE PROTECTED WITH A SCH 40 PVC PIPE SLEEVE (TYPICALLY ONE SIZE LARGER THAN THE WATER SERVICE).
13) COMMERCIAL CONSTRUCTION ONLY. CONTRACTOR SHALL INSTALL SLURRY CAP OVER SERVICE LINE FROM POINT OF CONNECTION (START 24" AWAY FROM ANY PIPING) TO FOOTING OF BUILDING. SLURRY CAP SHALL BE A MINIMUM 4" THICK BY 18" WIDE THE ENTIRE LENGTH OF SERVICE LINE. CONTRACTOR SHALL PLACE A MINIMUM 6" OF CLEAN FILL OR SAND BETWEEN SERVICE LINE AND SLURRY.

NOT APPLICABLE

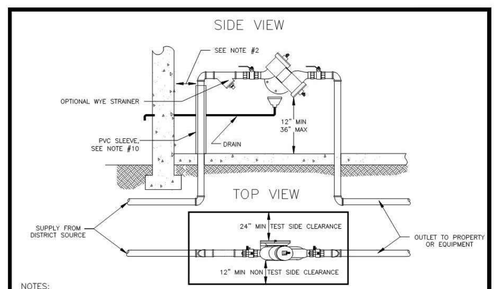
A/1 REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY 2 1/2" TO 10"
NO SCALE

BACK FLOW PREVENTER DETAILS

SHEET NO. ST-07 | STANDARDS SHEET | FILE | DRAWN WAM | SCALE NO SCALE | DATE JAN 2017

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US

4 C6.2 6" RP ASSEMBLY



NOTES:

1) BACKFLOW ASSEMBLY MUST MEET DISTRICT SPECIFICATIONS, CALL BEFORE ORDERING.
2) ASSEMBLIES MUST BE INSTALLED ABOVE GRADE IN A HORIZONTAL POSITION. ASSEMBLIES PLACED OUTSIDE OF THE STRUCTURE SHALL BE INSTALLED BETWEEN THE WATER METER AND THE FOUNDATION OF THE STRUCTURE. ASSEMBLIES PLACED INSIDE THE STRUCTURE SHALL BE INSTALLED WITHIN TWENTY FOUR INCHES (24") OF WHERE THE SERVICE ENTERS THE STRUCTURE.
3) ENCLOSURE FOR OUTDOOR OR INDOOR PROTECTION OF THE ASSEMBLY IS ALLOWED, BUT MUST PROVIDE IMMEDIATE TOP ACCESS OF TWELVE INCHES (12") FOR TESTING AND MAINTENANCE.
4) TEST COCKS ARE REQUIRED TO FACE AWAY FROM WALLS AND NEAREST STATIONARY OBJECT AND AT NO TIME BE LESS THAN TWENTY FOUR (24") CLEARANCE.
5) THERE MUST BE NO BRANCH PIPING CONNECTED TO THE SUPPLY PIPE BETWEEN THE DISTRICTS SUPPLY AND THE ASSEMBLY.
6) ALL MEASUREMENTS ARE FROM THE LOWEST OR WIDEST PART OF THE ASSEMBLY.
7) ALL ASSEMBLIES ARE SUSCEPTIBLE TO FREEZING AND SHALL BE ADEQUATELY FREEZE PROTECTED.
8) ADEQUATE DRAINAGE FROM THE ASSEMBLY MUST BE PROVIDED.
9) BACK FLOW ASSEMBLY MUST BE TESTED UPON INSTALLATION BY A DISTRICT APPROVED CERTIFIED TESTER.
10) WHEN INSTALLED INSIDE A STRUCTURE, THE WATER SERVICE SHALL BE PROTECTED WITH A SCH 40 PVC PIPE SLEEVE (TYPICALLY ONE SIZE LARGER THAN THE WATER SERVICE).

A/1 REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY 3/4" TO 2"
NO SCALE

BACK FLOW PREVENTER DETAILS

SHEET NO. ST-08 | STANDARDS SHEET | FILE | DRAWN WAM | SCALE NO SCALE | DATE JUL 2016

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US

2 C6.2 2" RP ASSEMBLY

REQUIREMENTS FOR WATER SERVICE HOOKUP: (PAGE 2)

12) If potential for contamination to the District's potable water supply exists (i.e. Auxiliary Water Supply, Hydronic Heating, Boilers, Swimming Pools, Solar Heating Systems, Fire Sprinkler Systems, etc.) An approved Backflow Assembly will be required. Backflow Assembly shall be installed above grade and in the horizontal position. If Assembly is placed outside of the structure, it shall be install between the water meter and the building foundation. If the Assembly is placed inside the structure it shall be installed within twenty four inches (24") of where the water service enters the structure. Backflow Assembly must have freeze protection.

12A) Hydronic heating will not require a backflow assembly if it is a "closed loop system" with a "stand alone" reservoir for make-up water. The system must have a Double Wall heat exchanger. All systems must be approved by a District inspector to be exempt from a backflow assembly.

13) All Fire Protection Systems require an approved Back Flow assembly installed on the Fire Line.

14) Back Flow Assemblies must be tested, by a District approved certified tester, after initial installation and annually thereafter. Test results need to be sent to the District's Customer Service Department.

15) All Water Services, Water Meters and Back Flow Assemblies shall be left exposed and be leak proof under static line pressure until witnessed and inspected. DO NOT STACK WATER BOXES or cover any work until it has been inspected and approved by the District inspector.

16) Meter box installation shall consist of three inch (3") rigid foam insulation placed inside the meter box on top of the meter. No "spray on" type rigid foam insulation will be accepted and rigid insulation SHALL NOT be attached to the lid. The meter box lid shall have a centered two inch (2") diameter hole to accommodate the meter reading system.

17) If work is approved, the inspector will notify you verbally or an Acceptance Notice will be left at the jobsite. If work is not approved, a Correction notice will be left at the jobsite. Please call for re-inspection. Excessive re-inspection may be subject to additional inspection fees.

18) A second meter inspection will take place approximately two (2) weeks after the initial water service inspection it will include correct installation of boxes, proper insulation and meter tolerances. The Inspector will lock-off the meter if it is not properly installed in the meter box.

19) If you have any questions regarding your water service hookup, call the District Inspectors at: (530) 544-6474.

20) IT IS THE RESPONSIBILITY OF THE PROPERTY OWNER, DEVELOPER AND/OR GENERAL CONTRACTOR TO ENSURE THAT ALL WORK IS PERFORMED BY AN APPROPRIATELY LICENSED CONTRACTOR.

GS-01 | STANDARDS SHEET | FILE | DRAWN | SCALE NO SCALE | DATE JUL 2016

GENERAL NOTES

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Street 1950 Water A PUBLIC AGENCY
1275 Meadow Crest Drive South Lake Tahoe, California 96150
Phone (530) 544-6474 Fax (530) 541-4399
WWW.STPUD.US

SOUTH TAHOE PUD GENERAL NOTES

EXHIBIT TITLE: DETAILS AND SECTIONS
PROJECT: EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHAKORI YARD 1121 SHAKORI DRIVE SOUTH LAKE TAHOE, CA 96150
A.P.N. 035-181-009-000 BENCHMARK ELEV.

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. C 58881 REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

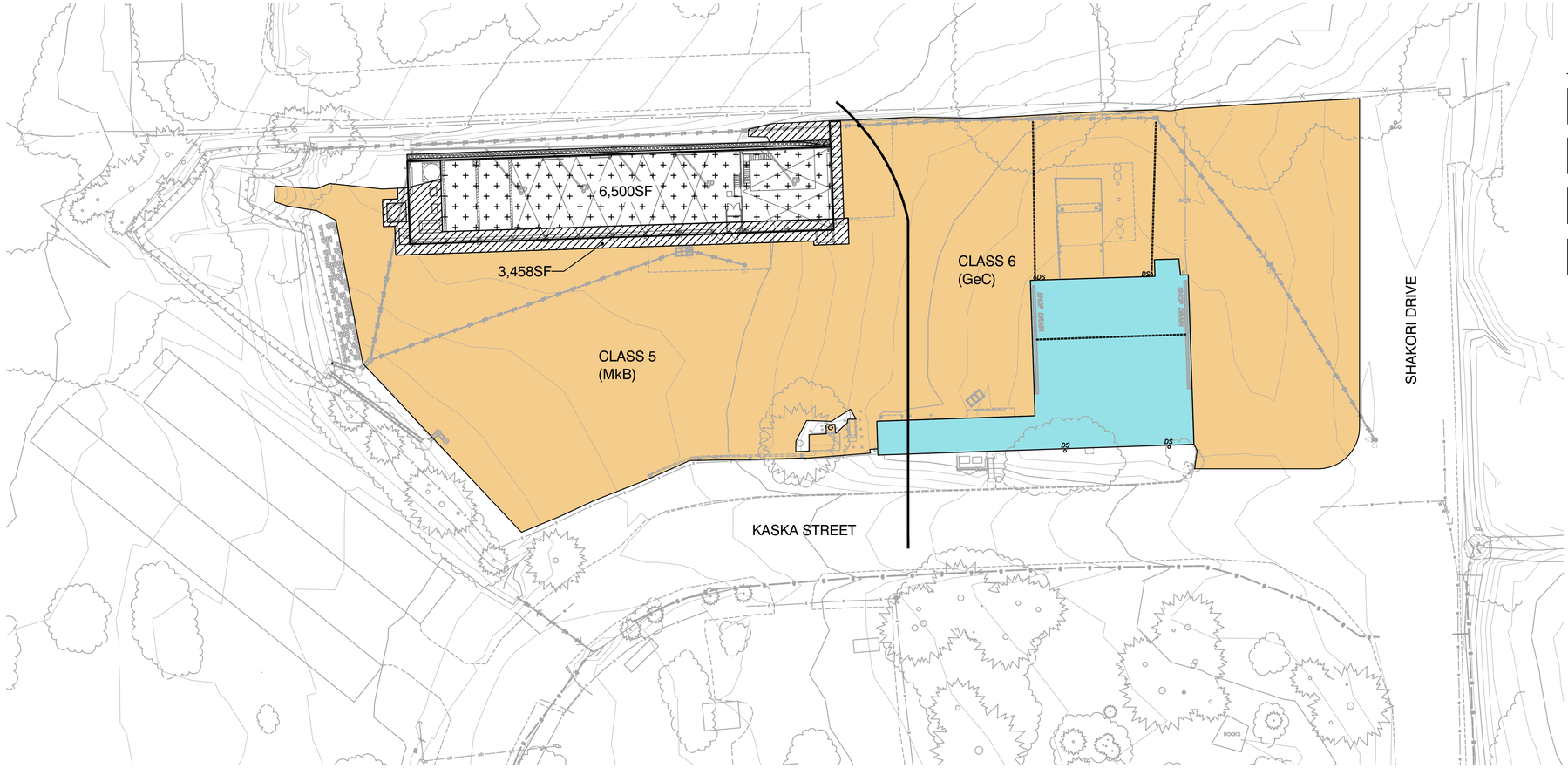
NO.	REVISIONS

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C6.2

FILENAME: I:\21-037\CIVIL\DWG\21-037-C61-C62.DWG



COVERAGE LEGEND

- EXISTING BUILDING COVERAGE TO BE REMOVED
- EXISTING HARD COVERAGE TO BE REMOVED
- EXISTING HARD COVERAGE TO REMAIN
- EXISTING BUILDING COVERAGE TO REMAIN

GRAPHIC SCALE

30' 0 15' 30' 60'

(IN FEET) 1 inch = 30 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000

BENCHMARK ELEV.

EXHIBIT TITLE: LAND COVERAGE - DEMOLITION

PROJECT: EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

REGISTERED PROFESSIONAL ENGINEER
ANTHONY J. TASSANO
No. 74485
CIVIL
STATE OF CALIFORNIA

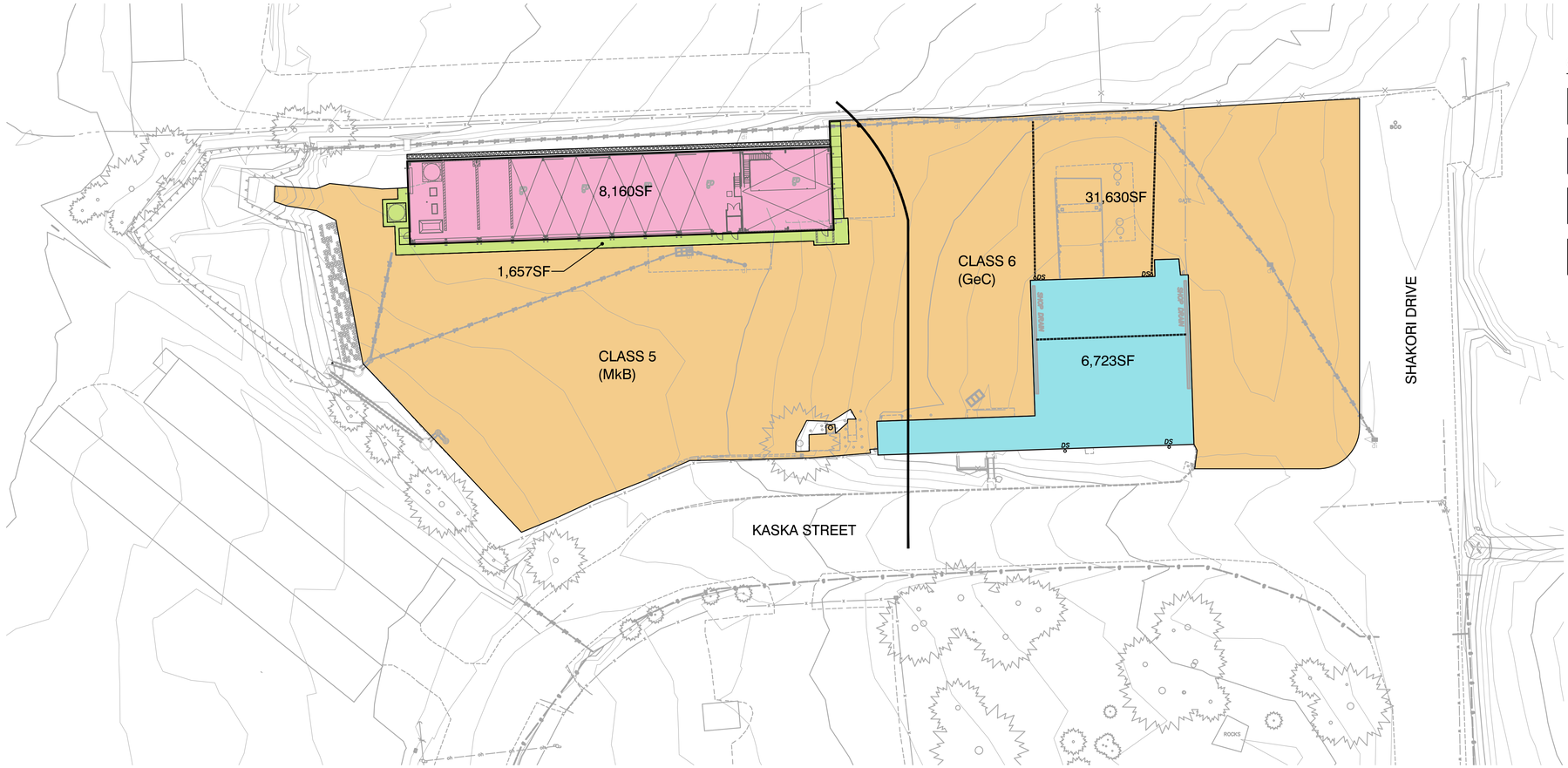
HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO.	REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C8.1

FILENAME: I: \21-037\CIVIL\DWG\21-037-C81.DWG



COVERAGE LEGEND

- PROPOSED BUILDING COVERAGE
- PROPOSED HARD COVERAGE
- EXISTING HARD COVERAGE
- EXISTING BUILDING COVERAGE

LAND CAPABILITY

LAND CAPABILITY DISTRICT	PERCENT COVERAGE	AREA (SF)	BASE ALLOWABLE COVERAGE (SF)
CLASS 5	25%	63,979	15,995
CLASS 6	30%	38,872	11,662
TOTAL COVERAGE		102,851	27,657

VERIFIED EXISTING COVERAGE

COVERAGE TYPE	CLASS 5	CLASS 6	TOTAL (SF)
BULDINGS	7,162	6,723	13,885
HARD COVERAGE (PAVING, ETC.)	33,474	31,757	65,231
TOTAL COVERAGE	40,636	38,480	79,116

PROPOSED COVERAGE

COVERAGE TYPE	CLASS 5	CLASS 6	TOTAL (SF)
BULDINGS	8,822	6,723	15,885
HARD COVERAGE (PAVING, ETC.)	31,673	31,757	63,430
TOTAL COVERAGE	40,495	38,480	78,975

GRAPHIC SCALE

30' 0 15' 30' 60'

(IN FEET) 1 inch = 30 feet

NORTH

THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000

BENCHMARK ELEV.

EXHIBIT TITLE: LAND COVERAGE - PROPOSED

PROJECT:
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

PROFESSIONAL ENGINEER ANTHONY J. TASSANO No. 71488 REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

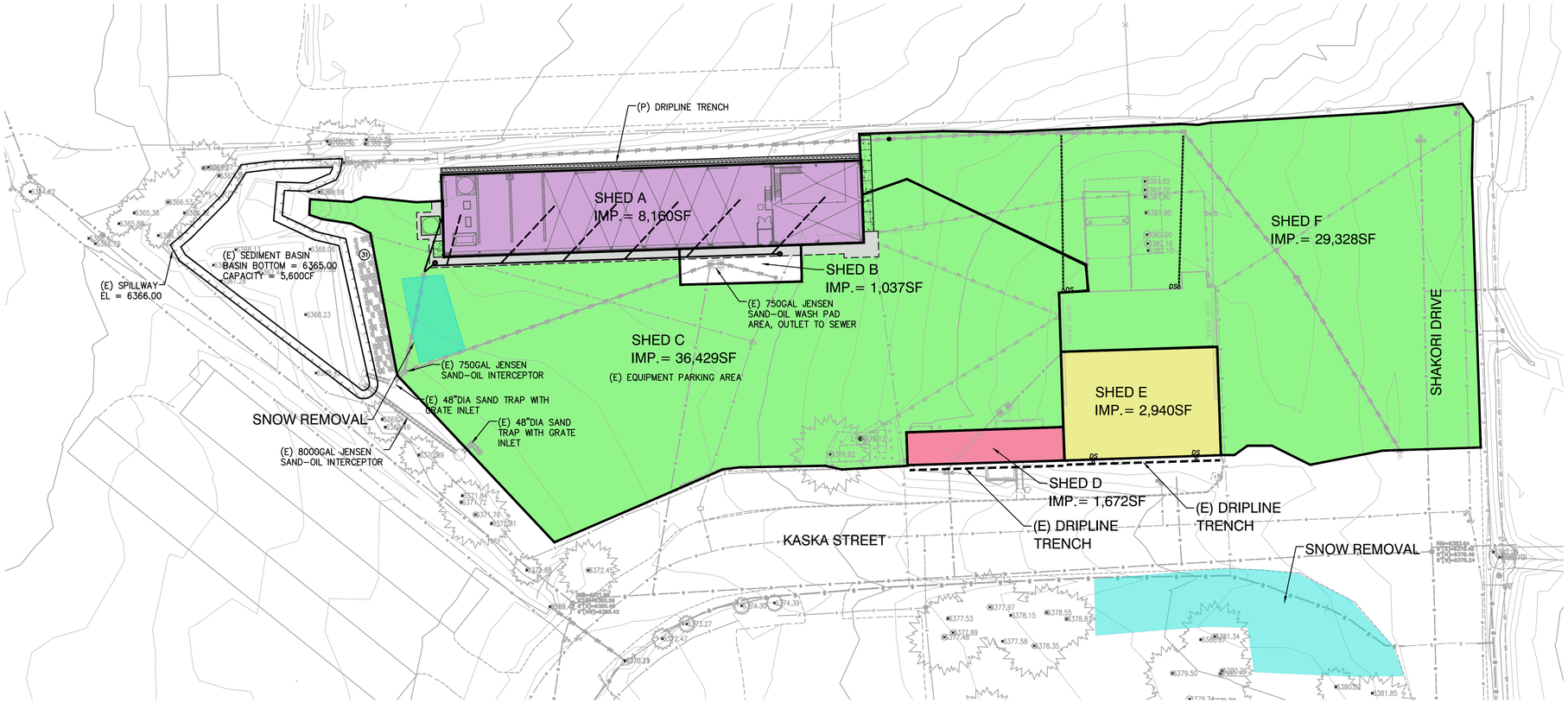
HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: NA
JOB NO.: 21-037

NO. REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C8.2

FILENAME: I: \21-037\CIVIL\DWG\21-037-C82.DWG



SHED A

Contributing Surface	roof		Total
# of Stories	1		
Length (ft.)			
Width (ft.)			
Area (ft2)			
Area (ft^2)	8160	0	
Runoff (ft^3)	680.0	0.0	**680.0**
Treatment Label:	Dripline		
Length (ft.)	204.0		
Width (in.)	28		
Depth (in.)	10		
On-Site Ksat ($^{in}/_{hr}$)	14.2		
mapped Ksat ($^{in}/_{hr}$)	14.2	14.2	
Prefab Void Space (%)			
Average Void Space (%)			
Effective Volume (yd^3)	7.3	0.0	
Treatment Capacity (ft^3)	697.4	0.0	**697.4**
Drain Rock Quantity (yd^3)	14.7	0.0	**14.7**
Excess Runoff (ft^3)			**0.0**
Excess Capacity (ft^3)			**17.4**

SHED AREA (IMPERVIOUS) = 8,160SF
RUNOFF (CF) = 680CF

DRIPLINE TRENCH CAPACITY = 697.4CF

SHED C AND F

	Basin 2:1 (rock lined or vegetated)				5:1 (mowable)			
Contributing Surface								
Length (ft.)								
Width (ft.)								
Area (ft2)	65757							
Area (ft^2)	**65757**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Runoff (ft^3)	**5479.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Treatment Label:	**BASIN**							
Top Length (ft.)	121.0							
Top Width (ft.)	48.0							
Depth (in.)	12							
Bottom Length (ft.)	117.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bottom Width (ft.)	44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume (yd^3)	202.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Site Ksat								
Mapped Ksat	**14.2**	**14.2**	**14.2**	**14.2**	**14.2**	**14.2**	**14.2**	**14.2**
Treatment Capacity (ft^3)	**12033.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Excess Runoff (ft^3)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Excess Capacity (ft^3)	**6553.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

SHED AREA (IMPERVIOUS) = 65,757SF
RUNOFF (CF) = 5,479.8CF

BASIN CAPACITY = 12,033.1CF

SHED D

Contributing Surface	roof		Total
# of Stories	1		
Length (ft.)			
Width (ft.)			
Area (ft2)			
Area (ft^2)	1672	0	
Runoff (ft^3)	139.3	0.0	**139.3**
Treatment Label:	Dripline		
Length (ft.)	76.0		
Width (in.)	12		
Depth (in.)	12		
On-Site Ksat ($^{in}/_{hr}$)	14.2		
mapped Ksat ($^{in}/_{hr}$)	14.2	14.2	
Prefab Void Space (%)			
Average Void Space (%)			
Effective Volume (yd^3)	1.4	0.0	
Treatment Capacity (ft^3)	149.9	0.0	**149.9**
Drain Rock Quantity (yd^3)	2.8	0.0	**2.8**
Excess Runoff (ft^3)			**0.0**
Excess Capacity (ft^3)			**10.6**

SHED AREA (IMPERVIOUS) = 1,672SF
RUNOFF (CF) = 139.3CF

DRIPLINE TRENCH CAPACITY = 149.9CF

SHED E

Contributing Surface	roof		Total
# of Stories	1		
Length (ft.)			
Width (ft.)			
Area (ft2)			
Area (ft^2)	2940	0	
Runoff (ft^3)	245.0	0.0	**245.0**
Treatment Label:	Dripline		
Length (ft.)	76.0		
Width (in.)	24		
Depth (in.)	12		
On-Site Ksat ($^{in}/_{hr}$)	18.0		
mapped Ksat ($^{in}/_{hr}$)	14.2	14.2	
Prefab Void Space (%)			
Average Void Space (%)			
Effective Volume (yd^3)	2.8	0.0	
Treatment Capacity (ft^3)	304.0	0.0	**304.0**
Drain Rock Quantity (yd^3)	5.6	0.0	**5.6**
Excess Runoff (ft^3)			**0.0**
Excess Capacity (ft^3)			**59.0**

SHED AREA (IMPERVIOUS) = 2,940SF
RUNOFF (CF) = 245CF

DRIPLINE TRENCH CAPACITY = 304CF

GRAPHIC SCALE
30' 0 15' 30' 60'
(IN FEET) 1 inch = 30 feet
NORTH
THIS DRAWING MAY HAVE BEEN ENLARGED OR REDUCED.

A.P.N. 035-181-009-000
BENCHMARK ELEV.

EXHIBIT TITLE: BMP PLAN

PROJECT:
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
SHAKORI YARD
1121 SHAKORI DRIVE
SOUTH LAKE TAHOE, CA 96150

WARREN CONSULTING ENGINEERS, INC.
1117 WINDFIELD WAY, SUITE 110
EL DORADO HILLS, CA 95762 | (916) 985-1970

PROFESSIONAL ENGINEER — ANTHONY J. TASSANO — C 74818 — CIVIL — STATE OF CALIFORNIA

HORIZONTAL SCALE: AS NOTED
VERTICAL SCALE: N/A
JOB NO.: 21-037

NO. REVISIONS

DESIGNED: AT
DRAWN: AT
CHECKED: AT
DATE: 04-18-22

SHEET NO. C8.3

FILENAME: I:\21-037\CIVIL\DWG\21-037-C83.DWG

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S101 GENERAL NOTES

GENERAL NOTES

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

GENERAL NOTES
1000N001

1. INTERPRETATION OF DRAWINGS & SPECIFICATIONS
   a. WHERE SPECIFICATIONS HAVE BEEN PREPARED FOR THIS PROJECT, THEY ARE ARRANGED IN SEVERAL SECTIONS, BUT SUCH SEPARATION SHALL NOT BE CONSIDERED AS THE LIMITS OF THE WORK REQUIRED OF ANY SEPARATE TRADE. THE TERMS AND CONDITIONS OF SUCH LIMITATIONS ARE WHOLLY BETWEEN THE CONTRACTOR AND THEIR SUBCONTRACTORS.
   b. IN GENERAL, THE WORKING DETAILS WILL INDICATE DIMENSIONS, POSITION AND KIND OF CONSTRUCTION, AND THE SPECIFICATIONS, QUALITIES AND METHODS. ANY WORK INDICATED ON THE WORKING DETAILS AND NOT MENTIONED IN THE SPECIFICATIONS, OR VICE VERSA, SHALL BE FURNISHED AS THOUGH FULLY SET FORTH IN BOTH. WORK NOT PARTICULARLY DETAILED, MARKED OR SPECIFIED, SHALL BE IDENTICAL OR SIMILAR TO LIKE CASES OF CONSTRUCTION THAT ARE MARKED OR SPECIFIED. IN CASE OF CONFLICTS OCCUR ON DRAWINGS AND/OR SPECIFICATIONS, THE MOST EXPENSIVE MATERIALS OR METHODS WILL PREVAIL.
   c. SHOULD AN ERROR APPEAR IN THE WORKING DETAILS OR SPECIFICATIONS OR IN WORK DONE BY OTHERS AFFECTING THIS WORK, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AT ONCE AND IN WRITING. IF THE CONTRACTOR PROCEEDS WITH THE WORK SO AFFECTED WITHOUT HAVING GIVEN SUCH WRITTEN NOTICE AND WITHOUT RECEIVING THE NECESSARY APPROVAL, DECISION OR INSTRUCTIONS IN WRITING FROM THE OWNER, THEN THE CONTRACTOR SHALL HAVE NO VALID CLAIM AGAINST THE OWNER, FOR THE COST OF SO PROCEEDING AND SHALL MAKE GOOD ANY RESULTING DAMAGE OR DEFECT. NO VERBAL APPROVAL, DECISION, OR INSTRUCTION SHALL BE VALID OR BE THE BASIS FOR ANY CLAIM AGAINST THE OWNER, ITS OFFICERS, EMPLOYEES OR AGENTS. THE FOREGOING INCLUDES TYPICAL ERRORS IN THE SPECIFICATIONS OR NOTATIONAL ERRORS IN THE WORKING DETAILS WHERE THE INTERPRETATION IS DOUBTFUL OR WHERE THE ERROR IS SUFFICIENTLY APPARENT AS TO PLACE A REASONABLY PRUDENT CONTRACTOR ON NOTICE THAT, SHOULD THE CONTRACTOR ELECT TO PROCEED, THEY ARE DOING SO AT THEIR OWN RISK.
2. CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE CODES AND REGULATIONS.
3. SHOP DRAWING NOTE:
   a. WHEN NOT ADDRESSED BY DIVISION 1 OF THE SPECIFICATIONS, SUBMITTALS SHALL BE ELECTRONIC PDF FORMAT.
   b. THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE STRUCTURAL ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT BY INDICATING WHICH MATERIAL THE CONTRACTOR INTENDS TO FURNISH AND INSTALL, AND BY DETAILING THE FABRICATION AND INSTALLATION METHODS THE CONTRACTOR INTENDS TO USE ON A STAND ALONE SET OF DOCUMENTS. DUPLICATION OF DESIGN DOCUMENTS FOR THE PURPOSE OF SHOP DRAWINGS IS NOT ACCEPTABLE.
   c. PRIOR TO FABRICATION, SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER. SHOP DRAWING SUBMITTALS SHALL INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, STRUCTURAL STEEL, REINFORCING STEEL, & GLUE-LAMINATED BEAMS.
   d. PRIOR TO SUBMISSION THE CONTRACTOR SHALL REVIEW ALL SUBMITTALS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND SHALL STAMP SUBMITTALS AS BEING "REVIEWED FOR CONFORMANCE".
   e. SHOP DRAWING SUBMITTALS PROCESSED BY THE STRUCTURAL ENGINEER ARE NOT CHANGE ORDERS.
   f. ANY DETAIL ON THE SHOP DRAWINGS THAT DEVIATES FROM THE CONTRACT DOCUMENTS SHALL CLEARLY BE MARKED WITH THE NOTE "THIS IS A CHANGE".
   g. SHOP DRAWINGS OR CALCULATIONS SUBMITTED FOR REVIEW THAT REQUIRE RESUBMITTAL FOR RE-REVIEW SHALL BE BILLED HOURLY FOR SUCH TIME TO THE GENERAL CONTRACTOR. RE-REVIEW WILL NOT PROCEED WITHOUT WRITTEN APPROVAL FROM THE GENERAL CONTRACTOR FOR ADDITIONAL ENGINEERING REVIEW SERVICES.
4. SAFETY NOTE:
   a. IT IS THE CONTRACTORS RESPONSIBILITY TO COMPLY WITH THE PERTINENT SECTIONS, AS THEY APPLY TO THIS PROJECT, OF THE "CONSTRUCTION SAFETY ORDERS" ISSUED BY THE STATE OF CALIFORNIA LATEST EDITION, AND ALL OSHA REQUIREMENTS.
   b. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE DESIGN AND CONSTRUCTION OF ALL FORMS AND SHORING REQUIRED (SHORING INDICATIONS (LOCATION, DIRECTION, DURATION, ETC.) ARE ONLY SHOWN ON THE STRUCTURAL DWGS WHEN REQUIRED TO IMPLEMENT THE DESIGN INTENT OF THE FINAL WORK PRODUCT. DETERMINATION WHETHER SHORING IS REQUIRED FOR TEMPORARY OR INTERMEDIATE CONDITIONS DURING CONSTRUCTION IS WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR.
   c. THE OWNER AND THE STRUCTURAL ENGINEER DO NOT ACCEPT ANY RESPONSIBILITY FOR THE CONTRACTOR'S FAILURE TO CONSTRUCT IN ACCORDANCE WITH SAFETY REQUIREMENTS.
5. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND STRUCTURAL ENGINEER WHERE A CONFLICT OR DISCREPANCY OCCURS BETWEEN THE STRUCTURAL DRAWINGS AND ANY OTHER PORTION OF THE CONTRACT DOCUMENTS OR EXISTING FIELD CONDITIONS. SUCH NOTIFICATION SHALL BE GIVEN IN DUE TIME SO AS NOT TO AFFECT THE CONSTRUCTION SCHEDULE. IN CASE OF A CONFLICT BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS THE MORE RESTRICTIVE CONDITION SHALL GOVERN UNLESS WRITTEN APPROVAL HAS BEEN GIVEN FOR THE LEAST RESTRICTIVE. CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH ARCHITECTURAL PRIOR TO COMMENCING ANY WORK.
6. WHEN CONSTRUCTION ATTACHES TO OR IS WITHIN AN EXISTING BUILDING, A COMPLETE SET OF DRAWINGS OF THE EXISTING BUILDING SHALL BE KEPT ON THE JOB SITE. CONTRACTOR TO OBTAIN THESE DRAWINGS FROM THE OWNER (IF THEY ARE AVAILABLE).
7. CONTRACTOR SHALL PROVIDE AN ALLOWANCE EQUAL TO 2% OF THE BID FOR STRUCTURAL STEEL, MISC. IRON AND REINFORCING STEEL TO BE USED AT THE DISCRETION OF THE STRUCTURAL ENGINEER. UNUSED AMOUNT TO REVERT TO THE OWNER UPON COMPLETION OF THE JOB.
8. ANY SUBSTITUTIONS FOR STRUCTURAL MEMBERS, HARDWARE OR DETAILS SHALL BE REVIEWED BY THE ARCHITECT AND STRUCTURAL ENGINEER. SUCH REVIEW WILL BE BILLED ON A TIME AND MATERIALS BASIS TO THE GENERAL CONTRACTOR WITH NO GUARANTEE THAT THE SUBSTITUTION WILL BE ALLOWED.
9. DO NOT SCALE DRAWINGS. CONTACT THE ARCHITECT OR STRUCTURAL ENGINEER FOR ANY DIMENSIONS NOT SHOWN.
10. THESE DRAWINGS ARE NOT COMPLETE UNTIL REVIEWED AND ACCEPTED BY LOCAL BUILDING OFFICIALS AND THE OWNER AND SIGNED BY THE STRUCTURAL ENGINEER.

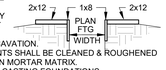
DESIGN CRITERIA
1000N010

1. CODES AND STANDARDS
   2019 CALIFORNIA BUILDING CODE (CBC)
   ASCE 7-16
   ACI 318-14
   AISC 360-16, 341-16, 358-16
   AISI S100-16, S240-15, S400-15
   TMS 402/602-16
   2018 NDS, 2015 SDPWS
2. VERTICAL LOADS
   ROOF LIVE LOAD = 20 PSF (SNOW)
   ROOF COLLATERAL LOAD = 11 PSF (HANGING)
   MEZZANINE: 125 PSF LL
   LIVE LOADS ARE REDUCED WHERE PERMITTED BY CODE.
3. SOILS VALUES
   ALLOWABLE SOILS PRESSURE
   a. DL + LL 3,000 PSF
   b. DL + LL + SEISMIC 4,000 PSF
   FOOTING
   MINIMUM DEPTH = 24"
   MINIMUM WIDTH = 18"
4. LATERAL LOADS
   SEISMIC:
   SITE CLASS D C_S = 0.195 (LAT)
   C_S = 0.210 (LONG)
   S_S = 1.294 ; S_{DS} = 1.035
   S_1 = 0.451 ; S_{D1} = NULL
   R = 3.5 OMF; I_E = 1.0
   R = 3.25 OCBF
   Ω_0= 3.0 OMF; C_d= 3.0 (STEEL OMF BY PEMB)
   Ω_0= 2.0 OCBF; C_d= 3.25 (STEEL OCBF BY PEMB)
   I_E = 1.0 TYPICAL
   I_E = 1.5 PER ASCE 7-16 SECT 13.1.3
   RISK CATEGORY: II
   SEISMIC DESIGN CATEGORY: D
   SEISMIC BASE SHEAR
   = ____ KIPS (OMF)
   SEISMIC FORCE RESISTING SYSTEM:
   STEEL OMF & STEEL OCBF
   ANALYSIS PROCEDURE: EQ LATERAL FORCE
   WIND:
   V_{ULT} = 100 MPH ; V_{ASD} = 77 MPH
   RISK CATEGORY: II
   EXPOSURE CATEGORY: C
   GC_{Pi} = ±0.018

FOUNDATIONS
2000N001

ALL FOUNDATION WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE GEOTECHNICAL REPORT # S1534-03-07B BY GEOCON DATED 12/8/2020.

1. FOUNDATIONS SHALL BEAR ON RECOMPACTED NATIVE SOILS OR ENGINEERED FILL. SEE NOTES AND DETAILS ON SHEET
2. ALL FILLING, BACKFILLING AND COMPACTION SHALL BE DONE UNDER THE OBSERVATION OF A REPRESENTATIVE OF THE SOILS ENGINEER AND MUST BE COMPACTED TO THE MINIMUM DENSITY SPECIFIED IN ACCORDANCE WITH THE PROCEDURE OUTLINED IN THE GEOTECHNICAL REPORT.
3. BUILDING PAD CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE GEOTECHNICAL REPORT. THE EXTENT AND DEPTH OF OVEREXCAVATION AND PLACEMENT OF ENGINEERED FILL SHALL AT A MINIMUM BE AS SHOWN ON THE PLANS. FINAL DEPTH AND EXTENT OF EXCAVATION AND FILL SHALL BE DETERMINED AT TIME OF CONSTRUCTION BY A REPRESENTATIVE OF THE SOILS ENGINEER. FOUNDATION DEPTHS INDICATED ON PLANS ARE FOR ESTIMATING PURPOSES ONLY.
4. BOTTOMS OF ALL FOUNDATIONS SHALL BE LEVEL. CHANGES IN BOTTOM OF FOUNDATION ELEVATION SHALL BE MADE ACCORDING TO STEPPED FOOTING DETAIL ON THE TYPICAL DETAIL SHEET.
5. FOUNDATION CONCRETE MAY BE PLACED DIRECTLY INTO NEAT EXCAVATIONS PROVIDED THE EXCAVATIONS ARE STABLE (AS DETERMINED BY A REPRESENTATIVE OF THE SOILS ENGINEER). OTHERWISE, FOUNDATIONS SHALL BE FULLY FORMED. USE MINIMUM PLANKING SHOWN TO PROTECT AGAINST SLOUGHING, AS REQUIRED. PLANKING DOES NOT REPLACE FORMWORK REQUIRED TO STABILIZE EXCAVATION.



6. THE SURFACE OF ALL HORIZONTAL CONSTRUCTION JOINTS SHALL BE CLEANED & ROUGHENED BY EXPOSING CLEAN AGGREGATE SOLIDLY EMBEDDED IN MORTAR MATRIX.
7. NOTIFY THE STRUCTURAL ENGINEER 48 HOURS BEFORE CASTING FOUNDATIONS.
8. A REPRESENTATIVE OF THE SOILS ENGINEER SHALL ADVISE THE BUILDING OFFICIAL IN WRITING THAT:
   a. THE BUILDING PAD WAS PREPARED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.
   b. THE UTILITY TRENCHES HAVE BEEN PROPERLY BACKFILLED AND COMPACTED AND;
   c. THE FOUNDATION EXCAVATION DEPTH AND MATERIAL ARE ADEQUATE TO ACHIEVE DESIGN BEARING CAPACITY; AND FORMING COMPLY WITH THE GEOTECHNICAL REPORT AND APPROVED PLAN.

CONCRETE
3000N001

1. CONCRETE SHALL ATTAIN 28 DAY COMPRESSIVE STRENGTH AS REQUIRED IN NOTE #28. MAXIMUM SLUMP SHALL NOT EXCEED 4 INCHES.
2. CONCRETE MIX DESIGNS SHALL BE PREPARED ACCORDING TO ACI 318-14 CHAPTER 26.4 AND ACI 301-10 SECTION 4, REVIEWED BY OWNER'S TESTING LABORATORY AND SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW.
3. CEMENTITIOUS MATERIALS:
   CEMENT SHALL CONFORM TO ASTM C-150 TYPE II OR V.
   FLY ASH SHALL CONFORM TO ASTM C-618. MAX. QUANTITY OF FLY ASH SHALL BE 25% OR AS GIVEN IN SPECS.
4. CONCRETE AGGREGATES SHALL CONFORM TO ASTM C-33 FOR NORMAL WEIGHT CONCRETE AND ASTM C-330 FOR LIGHTWEIGHT CONCRETE.
5. NON-SHRINK GROUT: DO NOT USE PREMIXED MIXTURE OF A PREMIXED NONMETALLIC FORMULA.
6. REINFORCING STEEL SHALL CONFORM TO ASTM A-615 GRADE 60 UNO. REINFORCING STEEL TO BE WELDED SHALL CONFORM TO ASTM A-706 GRADE 60. CONTRACTOR SHALL SUBMIT REBAR MILL CERTIFICATES. REINFORCING STEEL IN SPECIAL REINFORCED SHEAR WALLS OR MOMENT FRAMES, EXCEPT TIES AND HOOPS, SHALL CONFORM TO ASTM A-706.
7. ALL PREHEATING AND WELDING OF REINFORCING BARS SHALL BE DONE IN ACCORDANCE WITH AWS D1.4 LATEST EDITION AND SHALL BE CONTINUOUSLY INSPECTED BY A QUALIFIED LABORATORY. CONTRACTOR SHALL FURNISH WPS FOR ALL REBAR WELDING TO THE LABORATORY.
8. REINFORCING STEEL SHALL BE FABRICATED ACCORDING TO "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION".
9. WIRE FABRIC SHALL CONFORM TO ASTM A-185.
10. DIMENSIONS SHOWN FOR LOCATION OF REINFORCING ARE TO THE FACE OF BARS LISTED AND DENOTE CLEAR COVERAGE. NON-PRESTRESSED, CAST-IN-PLACE CONCRETE COVERAGE SHALL BE AS FOLLOWS, UNO:

CONCRETE POSITIONED DIRECTLY AGAINST GROUND (EXCEPT SLABS)----------	3"
CONCRETE EXPOSED TO GROUND OR WEATHER BUT PLACED IN FORMS:	
#5 AND SMALLER----------	1-1/2"
#6 AND LARGER----------	2"
BEAMS & COLUMNS (TIES)----------	1-1/2"
BEAMS & COLUMNS (MAIN REINFORCING)----------	2"
CAST-IN-PLACE WALLS (EXTERIOR FACE & SOIL SIDE)----------	SEE ABOVE
CAST-IN-PLACE WALLS (INTERIOR FACE-#11 & SMALLER)----------	3/4"
TILT-UP WALLS----------	SEE DETAILS
SLABS (ON FORMS)----------	3/4"
SLABS (ON GROUND)----------	2" CLEAR FROM TOP

11. SPLICES IN CONTINUOUS REINFORCEMENT SHALL BE LAPPED UNO, SEE SCHEDULE THIS SHEET. SPLICES IN ADJACENT BARS SHALL BE GREATER THAN 5'-0" APART. SPLICE CONTINUOUS BARS IN SOIL-BEARING GRADE BEAMS, STRUCTURAL SLABS ON GRADE AND MAT FOUNDATIONS AS FOLLOWS: TOP BARS AT CENTERLINE OF SUPPORT; BOTTOM BARS AT MID-SPAN. SPLICE CONTINUOUS BARS IN ELEVATED SLABS AND BEAMS, ETC. AS FOLLOWS UNO: TOP BARS AT MID-SPAN; BOTTOM BARS AT CENTERLINE OF SUPPORT. ALL BARS SIZE #14 AND LARGER SHALL BE CONTINUOUS FOR FULL STRENGTH SHOWN OR SPLICED WITH MECHANICAL COUPLERS AS NOTED IN DETAILS. SPLICES IN WWF SHALL BE 1-1/2 MESHES WIDE.
12. THE MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN THE LARGER OF ONE DIAMETER, 1", OR 33% LARGER THAN THE MAXIMUM AGGREGATE SIZE (NOMINAL), WHICHEVER IS GREATEST. THIS REQUIREMENT ALSO APPLIES TO THE CLEAR SPACING BETWEEN THE DIFFERENT LAYERS OF PARALLEL BARS AND TO THE CLEAR DISTANCE BETWEEN A CONTACT LAP SPLICE AND ADJACENT SPLICES OR BARS.
13. ALL HOOKS SHALL BE STANDARD HOOKS UNLESS OTHERWISE SHOWN OR NOTED. AT WALLS, PROVIDE HOOKS AT ENDS OF ALL REINFORCING AT ENDS, CORNERS AND INTERSECTIONS, UNO.
14. CONSTRUCTION JOINTS SHALL BE MADE ROUGH AND ALL LAITANCE REMOVED FROM THE SURFACE. CONCRETE SHALL BE ROUGHENED BY EXPOSING THE ENTIRE SURFACE, SAND BLASTING, OR RAKING THE SURFACE TO PROVIDE 1/4" DEEP DEFORMATIONS.
15. REMOVE ALL DEBRIS FROM FORMS BEFORE CASTING ANY CONCRETE.
16. REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, ETC. TO BE EMBEDDED IN CONCRETE SHALL BE SECURELY POSITIONED BEFORE PLACING CONCRETE.
17. ANCHOR BOLTS (AB'S) CAST IN CONCRETE FOR WALL SILL AND LEDGER APPLICATIONS SHALL BE HEADED BOLTS WITH CUT THREADS CONFORMING TO ASTM A307, UNO. REFER TO "WOOD" NOTES FOR ADDITIONAL REQUIREMENTS FOR BOLTS IN CONTACT WITH PRESSURE TREATED OR FIRE RETARDANT MATERIAL. REFER TO 'STRUCTURAL STEEL' NOTE FOR REQUIREMENTS FOR ANCHOR RODS (AR'S) CAST IN CONCRETE FOR COLUMN BASE PLATE AND STEEL EMBED APPLICATIONS.
18. WALLS SHALL BE CAST IN HORIZONTAL LAYERS OF 2'-0" MAXIMUM DEPTH.
19. CONCRETE FOR WALLS, PIERS OR COLUMNS SHALL SET AT LEAST 2 HOURS BEFORE PLACING CONCRETE IN BEAMS, SPANDRELS, OR SLABS SUPPORTED THEREON.
20. HORIZONTAL WALL BARS IN MULTI-CURTAIN CAST IN PLACE WALLS SHALL BE STAGGERED.
21. DOWEL ALL VERTICAL REINFORCING IN WALLS AND COLUMNS FROM FOUNDATION WITH SAME SIZE BAR.
22. CONSOLIDATE CONCRETE PLACED IN FORMS BY MECHANICAL VIBRATING EQUIPMENT SUPPLEMENTED BY HAND-SPADING, RODDING OR TAMPING. USE EQUIPMENT AND PROCEDURES FOR CONSOLIDATION OF CONCRETE IN ACCORDANCE WITH THE RECOMMENDED PRACTICES OF ACI 309 TO SUIT THE TYPE OF CONCRETE AND PROJECT CONDITIONS. CONCRETE SHALL NOT BE DROPPED FREE THROUGH REINFORCING STEEL (AS IN WALLS) SO AS TO CAUSE SEGREGATION OF AGGREGATES. IN SUCH CASES HOPPERS AND CHUTES OR TRUNKS OF VARIABLE LENGTHS SHALL BE USED SO THAT THE FREE UNCONFINED FALL OF CONCRETE SHALL NOT EXCEED 6 FEET.
23. NO WOOD SPREADERS ALLOWED. NO WOOD STAKES ALLOWED IN AREAS TO BE CONCRETED.
24. ADDITIONAL REINFORCING IN PRECAST OR TILT-UP PANELS REQUIRED FOR LIFTING STRESSES SHALL BE SUPPLIED BY CONTRACTOR.
25. PROVIDE #5x4'-0" DIAGONAL REINFORCING AT TOP AND BOTTOM OF SLAB AT ALL RE-ENTRANT CORNERS TYPICAL, THIS APPLIES TO SLAB ON GRADE, CONCRETE OVER METAL DECK, AND ELEVATED STRUCTURAL SLAB CONDITIONS.
26. ALL SAW CUTTING SHALL BE DONE AFTER INITIAL SET HAS OCCURRED TO AVOID TEARING OR DAMAGE BY THE SAW BLADE, BUT BEFORE INITIAL SHRINKAGE HAS OCCURRED.
27. NOTIFY STRUCTURAL ENGINEER A MINIMUM OF 48 HOURS BEFORE PLACING ANY CONCRETE.
28. CONCRETE STRENGTHS & MIX PROPERTIES:

ITEM	F'C @ 28 DAYS	MAX AGGR SIZE	WEIGHT	MAX W/CM* RATIO
a. FOUNDATIONS	3000 PSI	1-1/2"	NW	0.58
b. SLAB ON GRADE AND TOPPING	3500 PSI	1"	NW	0.45
c. COLUMNS, WALLS	4000 PSI	1"	NW	0.50
SITE & MISCELLANEOUS - SEE CIVIL OR ARCH DRAWINGS				

* W/CM = WATER : CEMENTITIOUS MATERIAL RATIO

REINFORCEMENT LAP SPLICE SCHEDULE
3000N002
ACI 318 CBC/IBC

(ALL LENGTHS SHOWN ARE IN INCHES)

SPLICE CLASS	REINF LOCATION	#3	#4	#5	#6	#7	#8	#9	#10	#11
		f'c' = 3000 PSI CONC								
B	TOP	28	37	47	56	81	93	105	118	131
	OTHER	22	29	36	43	63	72	81	91	101
		f'c' = 3500 PSI CONC								
B	TOP	26	35	43	52	75	86	97	109	121
	OTHER	20	27	33	40	58	66	75	84	93
		f'c' = 4000 PSI CONC								
B	TOP	24	32	40	48	70	80	91	102	113
	OTHER	19	25	31	37	54	62	70	79	87
		f'c' = 5000 PSI CONC								
B	TOP	22	29	36	43	63	72	81	91	101
	OTHER	17	22	28	33	49	55	63	70	78

NOTES:
1. SCHEDULE APPLIES TO NORMAL WEIGHT CONCRETE WITH UNCOATED, GRADE 60 REINFORCING STEEL FOR #3 BARS AND LARGER.
2. TOP REINFORCEMENT IS HORIZONTAL REINFORCEMENT LOCATED SUCH THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE SPLICE.
3. WHEN LIGHTWEIGHT CONCRETE IS USED, MULTIPLY LAP LENGTHS BY 1.30.
4. WHERE CLEAR SPACING OF BARS BEING SPLICED IS LESS THAN 2 BAR DIA. OR WHERE CLEAR COVER OF BARS BEING SPLICED IS LESS THAN 1 BAR DIA., MULTIPLY LAP LENGTHS BY 1.50, UNO.
5. WHERE NOTES #3 AND #4 OCCUR, MULTIPLY LAP LENGTHS BY 2.00, UNO.
6. WHERE CLASS A LAP SPLICE IS NOTED IN DETAIL, DIVIDE LENGTHS ABOVE BY 1.30.

STRUCTURAL STEEL
5000N001

1. FABRICATION, ERECTION AND MATERIALS SHALL CONFORM WITH THE AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, THE AISC SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS, AND THE CALIFORNIA BUILDING CODE, LATEST EDITIONS UNO IN THE DESIGN CRITERIA NOTES.
2. STRUCTURAL STEEL WIDE FLANGE SHAPES SHALL CONFORM WITH ASTM A992. ALL OTHER STRUCTURAL STEEL ROLLED SHAPES (CHANNELS, ANGLES, ETC) AND PLATES SHALL CONFORM WITH ASTM A36, UNO.
3. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPES E OR S, GRADE B.
4. ALL HOLLOW STRUCTURAL SECTIONS (HSS) SHALL CONFORM TO ASTM A500, GRADE C, OPTIONALLY, OR WHERE SPECIFIED ON DRAWINGS, ASTM A1085 MATERIAL SHALL BE SUPPLIED.
5. ALL STRUCTURAL STEEL SHALL RECEIVE A MINIMUM OF ONE SHOP COAT OF RED PRIMER PAINT. DO NOT PAINT SURFACES TO BE WELDED, FIREPROOFED, GALVANIZED, OR PREPARED TO RECEIVE SLIP-CRITICAL HIGH STRENGTH BOLTS, OR TO BE EMBEDDED IN CONCRETE. PROVIDE ADDITIONAL PAINTING AS NOTED IN THE SPECIFICATIONS.
6. ALL STRUCTURAL STEEL SHALL BE ERECTED PLUMB AND TRUE TO LINE. TEMPORARY BRACING SHALL BE INSTALLED AND SHALL BE LEFT IN PLACE UNTIL OTHER MEANS ARE PROVIDED TO ADEQUATELY BRACE THE STRUCTURE. CONTRACTOR RESPONSIBLE FOR REVIEWING ALL BASE PLATE AND SUPPORT CONDITIONS DURING ERECTION AND BRACING AS REQUIRED. SEE AISC AND OSHA REQUIREMENTS.
7. PLACE NON-SHRINK GROUT UNDER ALL BASE PLATES BEFORE ADDING VERTICAL LOAD.
8. STRUCTURAL STEEL BELOW GRADE SHALL HAVE 3 INCHES MINIMUM OF CONCRETE COVER.
9. BOLTED CONNECTIONS:
   a. BOLTED CONNECTIONS SHALL CONSIST OF UNFINISHED BOLTS CONFORMING TO ASTM A325 UNO.
   b. WHERE HIGH-STRENGTH BOLT GAVE SPECIFIED, BOLTS CONFORMING TO ASTM F3125, GRADE A325 OR A490 SHALL BE PROVIDED AS INDICATED.
   c. ANCHOR RODS CAST IN CONCRETE OR MASONRY SHALL BE HEADED BOLTS WITH CUT THREAD, FULL DIAMETER BODY STYLE CONFORMING TO ASTM F1554 GR. 36, 55 (WELDABLE PER S1 SUPPLEMENTARY REQUIREMENTS), OR 105 AS INDICATED ON DRAWINGS. IN LIEU OF HEADED ANCHOR BOLTS, BENT ROD CONFORMING TO THE ABOVE SPECIFICATIONS MAY BE USED WITH A SINGLE NUT WELDED TO THE ROD OR DOUBLE NUTS TIGHTENED TO PREVENT ROTATION. ANCHOR ROD PROJECTION ABOVE TOP OF FOUNDATION SHALL BE AS NOTED ON THE ELEVATION/SECTION.
   d. BOLTED CONNECTIONS SHALL HAVE WASHERS CONFORMING TO ASTM F436 UNO. WASHERS MAY BE OMITTED AT SNUG-TIGHTENED AND SLIP-CRITICAL CONNECTIONS, EXCEPT WHERE REQUIRED BY THE RCSC SPECIFICATION FOR STRUCTURAL JOINTS, LATEST EDITION.
   e. BASE PLATES SHALL HAVE NUTS AND WASHERS AT TOP AND BOTTOM OF PLATE. WASHERS FOR BASE PLATES SHALL BE A36 SQUARE OR CIRCULAR PLATE UNLESS ASTM F844 WASHERS ARE PERMITTED. SEE BASE PLATE DETAILS FOR PLATE SIZE AND PERFORATED WASHER TYPE.
10. ADDITIONAL REQUIREMENTS FOR "SLIP-CRITICAL" BOLTED CONNECTIONS:
   a. "SLIP-CRITICAL" CONNECTIONS (A325SC DESIGN VALUES WITH SPECIAL INSPECTION) ARE REQUIRED AT ALL CONNECTIONS AT ALL CONNECTIONS ALONG CHORD LINES AND DRAG LINES (AS NOTED ON PLANS), AND UNO, AT ALL BOLTS IN OVERSIZED OR SLOTTED HOLES.
   b. THE SPECIAL INSPECTOR MUST BE PRESENT DURING INSTALLATION AND TIGHTENING OPERATION OF "SLIP-CRITICAL" CONNECTIONS.
11. PROVIDE 3/4" DIAMETER STITCH BOLTS AND DRIFTING FILLS, SPACED AT NOT MORE THAN 2'-0" ON CENTER FOR ALL DOUBLE ANGLE MEMBERS UNO.
12. AT WOOD TO STEEL PARALLEL CONTACT, BOLT WITH 1/2" DIAMETER BOLTS AT MAXIMUM 24"CC.
13. HOLES FOR UNFINISHED BOLTS SHALL BE 1/16" LARGER THAN THE SAME NOMINAL DIAMETER OF THE BOLT PLUS 1/16". USE STANDARD AISC GAGE AND PITCH FOR BOLTS EXCEPT AS NOTED OTHERWISE.
14. WELDING SHALL BE DONE BY THE ELECTRIC ARC PROCESS IN ACCORDANCE WITH AMERICAN WELDING SOCIETY STANDARDS, USING MANUALLY CERTIFIED WELDERS. WELDS SHALL HAVE COMPLETE PENETRATION UNLESS NOTED OTHERWISE. ALL EXPOSED WELDS SHALL BE GROUND SMOOTH. ALL ELECTRODES FOR WELDING SHALL COMPLY WITH AWS CODE, E70 SERIES MINIMUM.
15. WELD LENGTHS CALLED FOR ON PLANS ARE THE NET EFFECTIVE LENGTHS REQUIRED.
16. MINIMUM FILLET WELDS: 3/16" @ T < 1/2"
    1/4" @ T < 3/4"
    5/16" @ T > 3/4"
17. WELDING PROCEDURE SPECIFICATIONS (WPS) FOR SHOP AND FIELD PREQUALIFIED WELD JOINTS AND WELD JOINTS NOT CONFORMING TO ASTM A307, UNO. REFER TO "WOOD" NOTES FOR ADDITIONAL REQUIREMENTS FOR BOLTS IN CONTACT WITH PRESSURE TREATED OR FIRE RETARDANT MATERIAL. REFER TO 'STRUCTURAL STEEL' NOTE FOR REQUIREMENTS FOR ANCHOR RODS (AR'S) CAST IN CONCRETE FOR COLUMN BASE PLATE AND STEEL EMBED APPLICATIONS.
18. FOR NONDESTRUCTIVE TESTING OF WELDED CONNECTIONS EXCLUDING PRIMARY MEMBERS OF MOMENT RESISTING FRAMES:
   a. WELDED CONNECTIONS SHALL BE TESTED BY NONDESTRUCTIVE METHODS FOR COMPLIANCE WITH AISC N5.5, AND JOB SPECIFICATIONS. ULTRASONIC TESTING SHALL BE IN ACCORDANCE WITH AWS D1.1, ASTM E164 AND ASME SECTION V. RADIOGRAPHY SHALL BE IN ACCORDANCE WITH ASTM E94 AND ASME SECTION V. THIS TESTING SHALL BE PART OF THE SPECIAL INSPECTION REQUIREMENTS OF CBC SECTION 1705 PERFORMED BY AN APPROVED INDEPENDENT TESTING LABORATORY AS FOLLOWS:
      1. BASE METAL THICKER THAN 1-1/2 INCH WHEN SUBJECT TO THROUGH THICKNESS WELD SHRINKAGE STRAINS.
      2. ALL COMPLETE JOINT PENETRATION GROOVE OR BUTT WELDS.
      3. ALL PARTIAL JOINT PENETRATION GROOVE WELDS WHEN USED IN COLUMN SPLICES.
   b. ANY MATERIAL DISCONTINUITIES SHALL BE ACCEPTED OR REJECTED ON THE BASIS OF DEFECT RATING IN ACCORDANCE WITH THE (LARGER REFLECTOR) CRITERIA OF AISC N5.5.

METAL DECK NOTES
5200N001

1. PROVIDE METAL DECKING OF TYPE AND GAUGE AS SHOWN ON PLANS AND AS INDICATED IN THE

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GENERAL NOTES

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

CONCRETE MASONRY UNITS (CMU)
410090601

1. ALL MASONRY SHALL BE MANUFACTURED AND PLACED IN ACCORDANCE WITH TMS 402, "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES", AND TMS 602 "SPECIFICATION FOR MASONRY STRUCTURES".
2. MASONRY UNITS AND COMPONENTS THAT ARE DAMAGED ARE NOT TO BE INSTALLED IN THIS PROJECT. REINFORCEMENTS AND ACCESSORIES ARE NOT TO BE STORED ON THE GROUND AND ARE TO BE PROTECTED FROM PERMANENT DISTORTIONS.
3. WHEN THE AMBIENT AIR TEMPERATURE IS BELOW 40°F, THE COLD WEATHER PROCEDURES FROM TMS 602, ARTICLE 1.8C ARE TO BE IMPLEMENTED. WHEN THE AMBIENT AIR TEMPERATURE IS ABOVE 90°F, THE HOT WEATHER PROCEDURES FROM TMS 602, ARTICLE 1.8D ARE TO BE IMPLEMENTED.
4. CONCRETE BLOCK UNITS SHALL CONFORM TO ASTM C90. f'm = 2000 PSI. f'm SHALL BE VERIFIED IN ACCORDANCE WITH TMS 602, ARTICLE 1.4 B.2. CONCRETE BLOCK UNITS SHALL BE MEDIUM WEIGHT LIGHTWEIGHT. ALL MASONRY CONSTRUCTION IS TO BE GROUTED SOLID.
5. MORTAR SHALL BE TYPE S PER ASTM C270.
6. GROUT SHALL CONFORM TO ASTM C476. THE CONTRACTOR IS TO DETERMINE THE PROPER APPLICATION OF FINE GROUT OR COARSE GROUT BASED ON THE GROUT POUR HEIGHT USED AND THE CLEAR GROUT SPACE WIDTH (FOR MULTI-WYTHE CONSTRUCTION) OR CLEAR GROUT SPACE DIMENSIONS IN ACCORDANCE WITH TMS 402 TABLE 3.2.1. GROUT SHALL BE PROPORTIONED TO ATTAIN A 28 DAY COMPRESSIVE STRENGTH EQUAL TO THE SPECIFIED f'm VALUE NOTED ABOVE. NOT MORE THAN 5% OF THE PEA GRAVEL SHALL PASS THE NO. 8 SIEVE AND 100% SHALL PASS THE 3/8" SIEVE. WHEN REQUIRED, GROUT STRENGTH SHALL BE VERIFIED IN ACCORDANCE WITH ASTM C1019. GROUT MIX SHALL HAVE APPROXIMATELY 1 LB OF SIKAGROUT AID, OR APPROVED EQUAL, PER 100 LBS OF CEMENTITIOUS MATERIAL.
7. REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 UNO. REINFORCING STEEL TO BE WELDED SHALL CONFORM TO ASTM A706 GRADE 60. CONTRACTOR SHALL SUBMIT REBAR MILL CERTIFICATES.
8. VERTICAL REINFORCING SHALL CONSIST OF #5 BARS AT 16" ON CENTER, LOCATED AT EACH FACE OF MASONRY WALL, UNO. LOCATE BARS AT ALL CORNERS, WALL ENDS, INTERSECTIONS, JAMBS AND AT EACH SIDE OF A WALL JOINT. LOCATE BARS OR ADD ADDITIONAL BARS DIRECTLY UNDER FRAMING MEMBERS SUCH AS BEAMS, JOISTS, GIRDERS, AND TRUSSES WHERE CENTER TO CENTER SPACING OF FRAMING MEMBERS EXCEED 48"CC. DOWELS WITH STANDARD 90° HOOKS INTO THE FOUNDATION TO WITHIN 3" CLR OF BOTTOM OF FOUNDATION SHALL MATCH AND LAP VERTICAL REINFORCING PER TABLE BELOW, TYPICAL, UNLESS NOTED OTHERWISE.
9. INTERMEDIATE HORIZONTAL REINFORCING SHALL CONSIST OF #4 BARS AT 24" ON CENTER, LOCATED AT THE CENTER OF THE MASONRY WALL, UNO. LOCATE TWO (2) #5 HORIZONTAL BARS AT ALL ELEVATED FRAMING ASSEMBLIES, SUCH AS ROOFS, FLOORS, AND STAIRS. ALSO, LOCATE ONE #5 HORIZONTAL BAR AT TOPS OF PARAPETS, TOPS OF FREE-STANDING WALLS, AT THE BOTTOM OF ALL WALLS, AND ALIGNED WITH THE SLAB-ON-GRADE. PLACE A #5 BAR AT EACH FACE OF THE MASONRY WALL ABOVE AND BELOW ALL WALL OPENINGS, UNO. EXTEND THESE BARS A MINIMUM OF A LAP LENGTH PAST THE EDGE OF THE OPENING. WHERE EXTENSION CAN NOT BE ACHIEVED, BEND BARS UP OR DOWN FOR A DISTANCE EQUAL TO THE SPECIFIED LAP LENGTH.
10. PLACE ALL HORIZONTAL BARS IN BOND BEAM UNITS. WHEN 2 BARS ARE USED, STAGGER LAPS MINIMUM OF 5'-0".
11. MINIMUM REBAR CLEARANCE TO FACE SHELL IS ONE BAR DIAMETER OR 1/2", WHICHEVER IS GREATER. WHERE WALLS ARE EXPOSED TO EARTH OR WEATHER, A MINIMUM COVER FOR THE REINFORCING BARS OF 2" SHALL BE MAINTAINED.
12. BEFORE BLOCK IS PLACED ON CONCRETE, THOROUGHLY CLEAN CONCRETE OF ALL LAITANCE AND ALL LOOSE MATERIAL. ROUGHEN AS IN A CONCRETE CONSTRUCTION JOINT.
13. CONCRETE BLOCK MASONRY SHALL BE BUILT TO PRESERVE THE UNOBSTRUCTED VERTICAL CONTINUITY OF THE CELLS. ALL HEAD AND END JOINTS SHALL BE SOLIDLY FILLED WITH MORTAR FOR A DISTANCE IN FROM THE FACE OF THE WALL OR UNIT NOT LESS THAN THE THICKNESS OF THE LONGITUDINAL FACE SHELLS. BOND SHALL BE PROVIDED BY LAPPING SUCCESSIVE COURSES OR BY EQUIVALENT MECHANICAL ANCHORAGE.
14. GROUT PLACEMENT SHALL CONFORM TO TMS 602 SECTION 3.5.
15. CLEAN OUT OPENINGS SHALL BE PROVIDED AT THE BOTTOMS OF ALL CELLS TO BE FILLED AT EACH LIFT OR POUR OF GROUT WHERE SUCH LIFT OR POUR OF GROUT IS IN EXCESS OF 5'-4" IN HEIGHT, IN ACCORDANCE WITH TMS 602 SECTION 3.2F. ANY OVERHANGING MORTAR OR OTHER OBSTRUCTION OR DEBRIS SHALL BE REMOVED FROM INSIDE OF SUCH CELLS. THE CLEAN OUTS SHALL BE SEALED AFTER INSPECTION AND BEFORE GROUTING. MECHANICALLY VIBRATE ALL GROUT POURS.
16. REINFORCEMENT IS TO BE SUPPORTED IN PLACE TO PREVENT DISPLACEMENTCAUSED BY PLACEMENT OF GROUT AND MORTAR OR BY CONSTRUCTION LOADS.
17. THOROUGHLY CLEAN ALL CELLS AND BOND BEAMS OF MORTAR BEFORE GROUTING.
18. ALL CELLS SHALL BE FILLED SOLIDLY WITH GROUT. ALL GROUTING SHALL BE DONE UNDER THE OBSERVATION OF A QUALIFIED INSPECTOR. REFER TO SPECIAL STRUCTURAL INSPECTION SECTION OF THESE NOTES FOR FREQUENCY OF GROUTING INSPECTION.
19. WHEN GROUTING IS STOPPED FOR ONE HOUR OR LONGER, HORIZONTAL CONSTRUCTION JOINTS, OR KEYS, SHALL BE FORMED BY STOPPING THE POUR OF GROUT 1-1/2" BELOW THE TOP OF THE UPPERMOST UNIT.
20. ALL EMBEDDED ITEMS (BOLTS, STRAPS, ETC.) SHALL BE SECURED IN PLACE PRIOR TO GROUTING. CUT A HOLE IN THE FACE SHELL TO ATTAIN A MINIMUM OF 1/2" GROUT ALL AROUND EMBEDDED ITEMS AT THE FACE SHELL. WITHIN THE CELL OF THE UNIT, PROVIDE A MINIMUM OF 8" OF GROUT AROUND EMBEDDED ITEMS. AT HORIZONTAL ANCHOR INSTALLATIONS, MAINTAIN A MINIMUM CLEAR DISTANCE OF 1/2" BETWEEN END OF ANCHOR AND FACE SHELL OF UNIT.
21. SINGLE CONDUITS (3/4" MAX) MAY BE PLACED IN VERTICAL CELLS NOT CONTAINING VERTICAL. REBAR. NO HORIZONTAL CONDUITS ALLOWED IN WALL CONSTRUCTION.
22. ANCHOR BOLTS CAST IN MASONRY SHALL BE HEADED BOLTS WITH CUT THREADS CONFORMING TO ASTM F1554 GRADE 36, UNO. BENT BAR ANCHOR BOLTS ARE NOT PERMITTED.
23. USE OPEN END BLOCK FOR ALL CONSTRUCTION NOT LAID IN RUNNING BOND.
24. ALL REBAR SHALL BE LAP SPLICED AND DEVELOPED AS FOLLOWS (UNO). WHERE EPOXY COATED REBAR IS USED, MULTIPLY LAP LENGTHS BY 1.5. BARS LARGER THAN #8 ARE TO BE LAPPED WITH MECHANICAL SPLICES THAT DEVELOP AT LEAST 125 PERCENT OF THE YIELD STRENGTH OF THE BAR.

CMU SPLICE & DEVELOPMENT LENGTHS (f'm = 2000 PSI)									
BAR SIZE	fy (KSI)	6" CMU		8" CMU		10" CMU		12" CMU	
		CENTER	EF	CENTER	EF	CENTER	EF	CENTER	EF
#3	60	12"	-	12"	14"	12"	13"	12"	12"
#4	60	22"	-	15"	24"	12"	22"	12"	21"
#5	60	37"	-	24"	45"	19"	35"	19"	33"
#6	60	54"	-	48"	-	36"	-	36"	-
#7	60	-	-	63"	-	50"	-	49"	-

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S102
GENERAL NOTES

STRUCTURAL SPECIAL INSPECTIONS AND TESTING

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

STATEMENT OF STRUCTURAL SPECIAL INSPECTIONS AND TESTING

110TN001

1. SPECIAL INSPECTIONS AND TESTING SHALL BE PROVIDED BY A TESTING AND INSPECTION AGENCY, EMPLOYED BY THE OWNER (OR OWNER'S AUTHORIZED AGENT), AND APPROVED BY THE BUILDING OFFICIAL TO PROVIDE SPECIAL INSPECTIONS AND TESTING FOR THE PARTICULAR TYPE OF CONSTRUCTION.
2. TABLES OF SPECIAL INSPECTIONS AND TESTING ARE DERIVED FROM THE STRUCTURAL PROVISIONS OF THE CBC AND REFERENCED STANDARDS AND ARE FOR REFERENCE ONLY. THE INCLUDED TABLES ARE PROVIDED FOR THE CONVENIENCE OF THE OWNER, TESTING AGENCY AND CONTRACTOR IN DEVELOPING THE SCOPE OF WORK FOR REQUIRED TESTING AND INSPECTION OF STRUCTURAL MATERIALS AND COMPONENTS. FINAL DEFINITION OF THIS SCOPE OF WORK IS TO BE DETERMINED BY THE TESTING AGENCY AND THE OWNER (OR OWNER'S AUTHORIZED AGENT).
3. FREQUENCY OF SPECIAL INSPECTIONS AND TESTING SHALL BE, AT A MINIMUM, AS NOTED FOR THE INDIVIDUAL ELEMENTS WITHIN THE TABLES BELOW. THE CONTRACTOR SHALL COORDINATE TIMING OF SPECIAL INSPECTIONS AND TESTING WITH THE SPECIAL INSPECTION AND TESTING AGENCY.
4. PRIOR TO THE START OF CONSTRUCTION, THE TESTING AND INSPECTION AGENCY SHALL PROVIDE DOCUMENTATION TO THE BUILDING OFFICIAL DEMONSTRATING COMPETENCE AND RELEVANT EXPERIENCE OR TRAINING OF THE SPECIAL INSPECTORS WHO WILL PERFORM THE SPECIAL INSPECTIONS AND TESTS DURING CONSTRUCTION, IN ACCORDANCE WITH CBC SECTION 1704A.2.1.
5. THE TESTING AND INSPECTION AGENCY SHALL SUBMIT REPORTS OF SPECIAL INSPECTIONS AND TESTS TO THE BUILDING OFFICIAL, STRUCTURAL ENGINEER OF RECORD AND THE CONTRACTOR, PER CBC SECTION 1704A.2.4. THE REPORTS SHALL INDICATE WHETHER WORK INSPECTED OR TESTED CONFORMED TO THE APPROVED CONSTRUCTION DOCUMENTS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF DISCREPANCIES ARE NOT CORRECTED, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE STRUCTURAL ENGINEER OF RECORD.
6. SPECIAL INSPECTION AND TESTING RECORDS SHALL BE RETAINED BY THE CONTRACTOR ON SITE UNTIL COMPLETION OF CONSTRUCTION.
7. THE CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT TO THE BUILDING OFFICIAL ACKNOWLEDGING RESPONSIBILITY FOR CONSTRUCTION OF THE MAIN LATERAL-FORCE RESISTING SYSTEM PRIOR TO COMMENCEMENT OF THAT WORK AS REQUIRED BY CBC SECTION 1704A.4.
8. THE OWNER OR THE OWNER'S AUTHORIZED AGENT SHALL SUBMIT TO THE BUILDING OFFICIAL, A FINAL REPORT DOCUMENTING SPECIAL INSPECTIONS AND TESTS PER CBC SECTION 1704A.2.4, AND REPORTS AND CERTIFICATES PER CBC SECTION 1704A.5.
9. ALL SOILS AND FOUNDATION EXCAVATION INSPECTIONS SHALL BE BY THE GEOTECHNICAL ENGINEER OF RECORD, OR A GEOTECHNICAL FIRM HIRED BY THE OWNER PER CBC SECTION 1705A.6.
10. SPECIAL INSPECTION IS REQUIRED FOR ALL SHOP FABRICATED MEMBERS OR ASSEMBLIES UNLESS WAIVED PER THE EXCEPTIONS IN CBC SECTION 1704A.2.5.
11. DEFINITIONS:
    a. CONTINUOUS - SPECIAL INSPECTION BY THE SPECIAL INSPECTOR WHO IS CONTINUOUSLY PRESENT WHEN AND WHERE THE WORK TO BE INSPECTED IS BEING PERFORMED.
    b. PERIODIC - SPECIAL INSPECTION BY THE SPECIAL INSPECTOR WHO IS INTERMITTENTLY PRESENT WHERE THE WORK TO BE INSPECTED HAS BEEN OR IS BEING PERFORMED.
    c. QUALITY ASSURANCE (QA) - MONITORING AND INSPECTION TASKS PERFORMED BY AN AGENCY OR FIRM OTHER THAN THE FABRICATOR OR ERECTOR TO ENSURE THAT THE MATERIAL PROVIDED AND WORK PERFORMED BY THE FABRICATOR AND ERECTOR MEET THE REQUIREMENTS OF THE APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS. QUALITY ASSURANCE INCLUDES THOSE TASKS DESIGNATED 'SPECIAL INSPECTION' BY THE APPLICABLE CODE.
    d. QUALITY CONTROL (QC) - CONTROLS AND INSPECTIONS IMPLEMENTED BY THE FABRICATOR OR ERECTOR, AS APPLICABLE, TO ENSURE THAT THE MATERIAL PROVIDED AND WORK PERFORMED MEET THE REQUIREMENTS OF THE APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS.
    e. OBSERVE (O) - OBSERVE THESE ITEMS ON A RANDOM BASIS (DAILY FOR LFRS). OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS.
    f. PERFORM (P) - PERFORM THOSE TASKS PRIOR TO FINAL ACCEPTANCE FOR EACH ITEM OR ELEMENT.
    g. DOCUMENT (D) - THE INSPECTOR SHALL PREPARE REPORTS INDICATING THAT THE WORK HAS BEEN PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE REPORT NEED NOT PROVIDE DETAILED MEASUREMENTS FOR JOINT FIT-UP, WPS SETTINGS, COMPLETED WELDS, OR OTHER INDIVIDUAL ITEMS LISTED IN THE TABLES. FOR SHOP FABRICATION, THE REPORT SHALL INDICATE THE PIECE MARK OF THE PIECE INSPECTED. FOR FIELD WORK, THE REPORT SHALL INDICATE THE REFERENCE GRID LINES AND FLOOR OR ELEVATION INSPECTED. WORK NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS AND WHETHER THE NONCOMPLIANCE HAS BEEN SATISFACTORILY REPAIRED SHALL BE NOTED IN THE INSPECTION REPORT.
12. SPECIAL INSPECTIONS AND TESTING SHALL BE PERFORMED DURING CONSTRUCTION ON THE WORK SHOWN IN THE CONSTRUCTION DOCUMENTS AS REQUIRED BY CBC CHAPTER 17A, THE TABLES LISTED BELOW, AND THE JURISDICTION'S SPECIAL INSPECTION AND TESTING FORM. IF DISCREPANCIES ARE NOTED, CONTACT THE SEOR. ALL EXCEPTIONS INCLUDED IN CBC CHAPTER 17A ARE PERMITTED TO BE USED.
    - SOILS
    - CONCRETE CONSTRUCTION
    - CONCRETE CONSTRUCTION (POST-INSTALLED ANCHORS)
    - STEEL CONSTRUCTION - WELDING TESTING
    - STEEL CONSTRUCTION - BOLTING
    - COLD-FORMED STEEL DECK
    - STEEL CONSTRUCTION
    - STEEL WELDING INSPECTIONS
      LFRS (SEE NOTE #13)
    - STRUCTURAL STEEL LFRS - WELDING INSPECTIONS
    - STRUCTURAL STEEL LFRS - WELDING TESTING
    - STRUCTURAL STEEL LFRS BOLTING
13. SPECIAL INSPECTIONS AND TESTING ARE REQUIRED FOR THE LATERAL FORCE-RESISTING SYSTEM (LFRS) AND SHALL BE PROVIDED FOR ALL COMPONENTS AND CONNECTIONS ASSOCIATED WITH THE DESCRIPTION BELOW. SPECIAL INSPECTIONS AND TESTING FOR THE LFRS SHALL BE PER THE LFRS TABLES ABOVE, AND ARE IN ADDITION TO ALL OTHER REQUIRED INSPECTIONS AND TESTING. IF NO LFRS TABLES ARE INCLUDED, INSPECTIONS AND TESTING FOR THE LFRS ITEMS NOTED SHALL BE PER THE TYPICAL MATERIAL TABLES.

    LFRS DESCRIPTION:
    - ROD BRACING, HSS STRUTS AND L CROSS BRIDGING AT ROOF
    - CONCRETE OVER METAL DECK ROOF ATT MECH WELLS
    - BRACED FRAMES ON GRIDS:
    - MECH WELL BRACED FRAMES ON GRID
    - WF BEAMS WITH CONECTION INDICATED AS:
    - FOUNDATIONS AT BRACED FRAMES

SOILS - REQUIRED SPECIAL INSPECTIONS AND TESTS. [1]
CBC TABLE 1705A.6
110TN201

TYPE	CONTINUOUS	PERIODIC
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	-	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	-	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	-	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X
6. EARTH-RETAINING SHORING - SPECIAL INSPECTIONS AND TESTS SHALL BE IN ACCORDANCE WITH APPLICABLE PORTIONS OF SECTION 1812A.	-	-
7. VIBRO STONE COLUMNS - SPECIAL INSPECTIONS AND TESTS SHALL BE IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF SECTION 1813A.	-	-

[1] GEOTECHNICAL ENGINEER SHALL PROVIDE INSPECTION AND VERIFIED REPORT PER CBC SECTION 1705A.6.1

CONCRETE CONSTRUCTION - REQUIRED SPECIAL INSPECTIONS AND TESTS
CBC TABLE 1705A.3
110TN301

TYPE	CONTINUOUS	PERIODIC	REFERENCED STANDARD [a]
1. INSPECT AND TEST REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	-	X	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3
2. REINFORCING BAR WELDING:			AWS D1.4 ACI 318: 26.6.4
a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706	-	X	
b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"	-	X	
c. INSPECT ALL OTHER WELDS	X	-	
3. INSPECT ANCHORS CAST IN CONCRETE.	-	X	ACI 318: 17.8.2, 26.7.2, 26.8.2
4. INSPECT AND TEST ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS. [b/c]			ACI 318: 17.8.2.4, 17.8.2
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	X	-	
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.	-	X	
5. VERIFY USE OF REQUIRED DESIGN MIX.	-	X	ACI 318: CH. 19, 26.4
6. PRIOR TO AND DURING CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-	ASTM C172 ASTM C31 ACI 318: 26.4, 26.12
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	ACI 318: 26.5 ACI 506: 3.4
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X	ACI 318: 26.5.3-26.5.5
9. INSPECT PRESTRESSED CONCRETE FOR:			ACI 318: 26.10.2
a. APPLICATION OF PRESTRESSING FORCES	X	-	
b. GROUTING OF BONDED PRESTRESSING TENDONS.	X	-	
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	-	X	ACI 318: Ch. 26.9.2
11. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	-	X	ACI 318: 26.11.2
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X	ACI 318: 26.11.1.2(b)
13. BATCH PLANT - QUALITY AND QUANTITY OF MATERIALS USED IN TRANSIT-MIXED CONCRETE AND BATCHED AGGREGATES. AT LOCATION WHERE MATERIALS ARE MEASURED. [d]	X	-	
14. CONCRETE PREPLACEMENT INSPECTION - CONCRETE SHALL NOT BE PLACED UNTIL THE FORMS AND REINFORCEMENT HAVE BEEN INSPECTED, ALL PREPARATIONS FOR THE PLACEMENT HAVE BEEN COMPLETED, AND THE PREPARATIONS HAVE BEEN CHECKED BY THE INSPECTOR OF RECORD.			
15. PLACING RECORD - A RECORD SHALL BE KEPT ON THE SITE OF THE TIME AND DATE OF PLACING THE CONCRETE IN EACH PORTION OF THE STRUCTURE. SUCH RECORD SHALL BE KEPT UNTIL THE COMPLETION OF THE STRUCTURE AND SHALL BE OPEN TO THE INSPECTION OF THE ENFORCEMENT AGENCY.			
16. COMPOSITE CONSTRUCTION CORES - COMPOSITE CONSTRUCTION CORES SHALL BE TAKEN AND TESTED IN ACCORDANCE WITH CBC SECTION 1910A.4			

a. WHERE APPLICABLE, SEE ALSO SECTION 1705.12, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.

b. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.8.2 IN ACI 318, OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO COMMENCEMENT OF THE WORK.

c. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.8.2 IN ACI 318, OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO COMMENCEMENT OF THE WORK.

d. SEE 1705A.3.3 FOR WAIVER/EXCEPTIONS.

CONCRETE CONSTRUCTION - POST-INSTALLED ANCHORS.
REQUIRED SPECIAL INSPECTIONS AND TESTS
CBC TABLE 1705A.3
110TN302

TYPE	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. INSPECT AND TEST ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS. [a,b,c]			ACI 318: 17.8.2.4, 17.8.2
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	x	-	
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 1.A.	-	X	

a. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.8.2 IN ACI 318, OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO COMMENCEMENT OF THE WORK.

b. INSTALLATION OF ALL ADHESIVE ANCHORS IN HORIZONTAL AND UPWARDLY INCLINED POSITIONS SHALL BE PERFORMED BY AN ACI/CRSI CERTIFIED ADHESIVE ANCHOR INSTALLER, EXCEPT WHERE THE FACTORED DESIGN TENSION ON THE ANCHORS IS LESS THAN 100 LBS AND THOSE ANCHORS ARE CLEARLY NOTED ON THE APPROVED CONSTRUCTION DOCUMENTS OR WHERE THE ANCHORS ARE SHEAR DOWELS ACROSS COLD JOINTS IN SLABS ON GRADE WHERE THE SLAB IS NOT PART OF THE LATERAL FORCE-RESISTING SYSTEM.

c. SEE THE POST-INSTALLED ANCHOR NOTES FOR ADDITIONAL INFO.

STEEL CONSTRUCTION - REQUIRED SPECIAL INSPECTIONS & TESTS
AISC 360 - TABLE 1705A.2.1
110TN508

TYPE	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. MATERIAL IDENTIFICATION AND TESTING OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS:			
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS	-	X	RCSC: 1.5, AISC 360: SECTION A3.3, J3.1 AND APPLICABLE ASTM MATERIAL STANDARDS
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED	-	X	RCSC: 1.5 & 2.1, AISC 360: A3.3 & N3.2
c. TESTING OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS	-	-	RCSC: 7.2, APPLICABLE ASTM MATERIAL STANDARDS
2. INSPECTION OF HIGH-STRENGTH BOLTING			
a. SNUG-TIGHT JOINTS	-	X	RCSC: 7-9, AISC 360: J3.1, J3.2, M2.5 & N5.6
b. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITH MATCHMARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHODS OF INSTALLATION	-	X	
c. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITHOUT MATCHMARKING, OR CALIBRATED WRENCH METHODS OF INSTALLATION	X	-	
3. MATERIAL IDENTIFICATION AND TESTING OF STRUCTURAL STEEL AND COLD-FORMED STEEL DECK			
a. FOR STRUCTURAL STEEL, IDENTIFICATION MARKINGS TO CONFORM TO AISC 360	-	X	AISC 360, SECTION A3.1
b. FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENT	-	X	APPLICABLE ASTM MATERIAL STANDARDS
c. MANUFACTURER'S CERTIFIED TEST REPORTS	-	X	AISC 360: A3.1 & N3.2
d. TESTING OF UNIDENTIFIED STEEL	-	-	APPLICABLE ASTM MATERIAL STANDARDS
4. MATERIAL IDENTIFICATION OF WELDING CONSUMABLES AND TESTING OF WELDED ELEMENTS:			
a. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS	-	X	AISC 360, A3.5 & N3.2 AND APPLICABLE AWS A5 DOCUMENTS
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED	-	X	AISC 360: N3.2
c. NONDESTRUCTIVE TESTING OF WELDED JOINTS	-	-	AISC 360: N5.5
5. INSPECTION OF WELDING			
a. STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:			
1. COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS	X	-	AISC 360: J2, M2.4, & M4.5 AWS D1.1 AWS D1.8
2. MULTIPASS FILLET WELDS	X	-	
3. SINGLE-PASS FILLET WELDS > 5/16"	X	-	
4. PLUG AND SLOT WELDS	X	-	
5. SINGLE-PASS FILLET WELDS ≤ 5/16"	-	X	
6. FLOOR AND ROOF DECK WELDS	-	X	AWS D1.3, SDI QA/QC
7. END-WELDED STUDS	-	X	AWS D1.1
8. WELDED SHEET STEEL FOR COLD-FORMED FRAMING MEMBERS	-	X	AWS D1.3
b. REINFORCING STEEL:			
1. VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A706	-	X	AWS D1.4 ACI 318: SECTIONS 26.6.4.1, 18.2.8, 25.5.7.4
2. REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL STRUCTURAL WALLS OF CONCRETE AND SHEAR REINFORCEMENT.	X	-	
3. SHEAR REINFORCEMENT	X	-	
4. OTHER REINFORCING STEEL	-	X	
5. TESTS OF REINFORCING BARS	-	-	-
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE:			
a. DETAILS SUCH AS BRACING AND STIFFENING	-	X	AISC 360: N5.8
b. MEMBER LOCATIONS	-	X	
c. APPLICATION OF JOINT DETAILS AT EACH CONNECTION	-	X	

a. WHERE APPLICABLE, SEE ALSO SECTION 1705A.12, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE

STEEL CONSTRUCTION - WELDING - REQUIRED TESTING
AISC 360 - SECTION N5.5 NONDESTRUCTIVE TESTING (NDT) OF WELDED JOINTS
110TN502

a. PROCEDURES
ULTRASONIC TESTING (UT), MAGNETIC PARTICLE TESTING (MT), PENETRANT TESTING (PT) AND RADIOGRAPHIC TESTING (RT), WHERE REQUIRED, SHALL BE PERFORMED BY QA IN ACCORDANCE WITH AWS D1.1/D1.1M.

b. CJP GROOVE WELD NDT
FOR STRUCTURES IN RISK CATEGORY II (DSA ONLY), III OR IV, UT SHALL BE PERFORMED BY QA ON ALL CJP GROOVE WELDS SUBJECT TO TRANSVERSELY APPLIED TENSION LOADING IN BUTT, T- AND CORNER JOINTS, IN MATERIALS 5/16" THICK OR GREATER. FOR STRUCTURES IN RISK CATEGORY II, UT SHALL BE PERFORMED BY QA ON 10% OF CJP GROOVE WELDS IN BUTT, T- AND CORNER JOINTS SUBJECT TO TRANSVERSELY APPLIED TENSION LOADING, IN MATERIALS 5/16" THICK OR GREATER.

c. WELDED JOINTS SUBJECTED TO FATIGUE
WHEN REQUIRED BY APPENDIX 3, TABLE A-3.1, WELDED JOINTS REQUIRING WELD SOUNDNESS TO BE ESTABLISHED BY RADIOGRAPHIC OR ULTRASONIC INSPECTION SHALL BE TESTED BY QA AS PRESCRIBED. REDUCTION IN THE RATE OF UT IS PROHIBITED.

d. ULTRASONIC TESTING REJECTION RATE
THE ULTRASONIC TESTING REJECTION RATE SHALL BE DETERMINED AS THE NUMBER OF WELDS CONTAINING DEFECTS DIVIDED BY THE NUMBER OF WELDS COMPLETED. WELDS THAT CONTAIN ACCEPTABLE DISCONTINUITIES SHALL NOT BE CONSIDERED AS HAVING DEFECTS WHEN THE REJECTION RATE IS DETERMINED. FOR EVALUATING THE REJECTION RATE OF CONTINUOUS WELDS OVER 3 FEET IN LENGTH WHERE THE EFFECTIVE THROAT IS 1 INCH OR LESS, EA 12 INCH INCREMENT OR FRACTION THEREOF SHALL BE CONSIDERED AS ONE WELD. FOR EVALUATING THE REJECTION RATE ON CONTINUOUS WELDS OVER 3 FEET IN LENGTH WHERE THE EFFECTIVE THROAT IS GREATER THAN 1 INCH, EA 6 INCH OF LENGTH, OR FRACTION THEREOF, SHALL BE CONSIDERED ONE WELD.

e. REDUCTION OF ULTRASONIC TESTING RATE
FOR PROJECTS THAT CONTAIN 40 OR FEWER WELDS, THERE SHALL BE NO REDUCTION IN THE ULTRASONIC TESTING RATE. THE RATE OF UT IS PERMITTED TO BE REDUCED IF APPROVED BY THE EOR AND THE AHJ. WHERE THE INITIAL RATE OF UT IS 100%, THE NDT RATE FOR AN INDIVIDUAL WELDER OR WELDING OPERATOR IS PERMITTED TO BE REDUCED TO 25%, PROVIDED THE REJECTION RATE, THE NUMBER OF WELDS CONTAINING UNACCEPTABLE DEFECTS DIVIDED BY THE NUMBER OF WELDS COMPLETED, IS DEMONSTRATED TO BE 5% OR LESS OF THE WELDS TESTED FOR THE WELDER OR WELDING OPERATOR. A SAMPLING OF AT LEAST 40 COMPLETED WELDS SHALL BE MADE FOR SUCH REDUCED EVALUATION ON EA PROJECT.

f. INCREASE IN ULTRASONIC TESTING RATE
FOR STRUCTURES IN RISK CATEGORY II AND HIGHER, (WHERE THE INITIAL RATE FOR UT IS 10%) THE NDT RATE FOR AN INDIVIDUAL WELDER OR WELDING OPERATOR SHALL BE INCREASED TO 100% SHOULD THE REJECTION RATE (THE NUMBER OF WELDS CONTAINING UNACCEPTABLE DEFECTS DIVIDED BY THE NUMBER OF WELDS COMPLETED) EXCEEDS 5% OF THE WELDS TESTED FOR THE WELDER OR WELDING OPERATOR. SEE AISC 360, SECTION N5.5F FOR ADDITIONAL INFORMATION.

g. DOCUMENTATION
ALL NDT PERFORMED SHALL BE DOCUMENTED. FOR SHOP FABRICATION, THE NDT REPORT SHALL IDENTIFY THE TESTED WELD BY PIECE MARK AND LOCATION IN THE PIECE. FOR FIELD WORK, THE NDT REPORT SHALL IDENTIFY THE TESTED WELD BY LOCATION IN THE STRUCTURE, PIECE MARK, AND LOCATION IN THE PIECE. WHEN A WELD IS REJECTED ON THE BASIS OF NDT, THE NDT RECORD SHALL INDICATE THE LOCATION OF THE DEFECT AND THE BASIS OF REJECTION.

STEEL CONSTRUCTION - BOLTING - REQUIRED SPECIAL INSPECTIONS
AISC360 TABLE N5.6-1, N5.6-2, N5.6-3
110TN503

INSPECTION TASKS PRIOR TO BOLTING	QC	QA
MANUFACTURER CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS	O	P
FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	O	O
CORRECT FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM THE SHEAR PLANE)	O	O
CORRECT BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	O	O
CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	O	O
PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED	P	O
PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	O	O
INSPECTION TASKS DURING BOLTING	**QC**	**QA**
FASTENER ASSEMBLIES PLACED IN ALL HOLES AND WASHERS AND NUTS ARE POSITIONED AS REQUIRED	O	O
JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	O	O
FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	O	O
FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	O	O
INSPECTION TASKS AFTER BOLTING	**QC**	**QA**
DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	P	P

COLD-FORMED STEEL DECK - REQUIRED SPECIAL INSPECTIONS AND TESTS
CBC SECTION 1705A.2.2/SDI QA/QC STANDARD TABLES 1.1-1.8
110TN505

INSPECTION OR EXECUTION TASKS PRIOR TO DECK PLACEMENT	QC	QA
A. VERIFY COMPLIANCE OF MATERIALS (DECK AND ALL ACCESSORIES) WITH CONSTRUCTION DOCUMENTS, INCLUDING PROFILES, MATERIAL PROPERTIES, AND BASE METAL THICKNESS	P	P
B. DOCUMENT ACCEPTANCE OR REJECTION OF DECK AND DECK ACCESSORIES	P	P
INSPECTION OR EXECUTION TASKS AFTER DECK PLACEMENT	**QC**	**QA**
A. VERIFY COMPLIANCE OF DECK AND ALL DECK ACCESSORIES INSTALLATION WITH CONSTRUCTION DOCUMENTS	P	P
B. VERIFY DECK MATERIALS ARE REPRESENTED BY THE MILL CERTIFICATIONS THAT COMPLY WITH THE CONSTRUCTION DOCUMENTS	N/A	P
C. DOCUMENT ACCEPTANCE OR REJECTION OF INSTALLATION OF DECK AND DECK ACCESSORIES	P	P
INSPECTION OR EXECUTION TASKS PRIOR TO WELDING	**QC**	**QA**
A. WELDING PROCEDURE SPECIFICATIONS (WPS) AVAILABLE	O	O
B. MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	O	O
C. MATERIAL IDENTIFICATION (TYPE/GRADE)	O	O
D. CHECK WELDING EQUIPMENT	O	O
INSPECTION OR EXECUTION TASKS DURING WELDING	**QC**	**QA**
A. USE OF QUALIFIED WELDERS	O	O
B. CONTROL AND HANDLING OF WELDING CONSUMABLES	O	O
C. ENVIRONMENTAL CONDITIONS (WIND SPEED, MOISTURE, TEMPERATURE)	O	O
D. WPS FOLLOWED	O	O
INSPECTION OR EXECUTION TASKS AFTER WELDING	**QC**	**QA**
A. VERIFY SIZE AND LOCATION OF WELDS, INCLUDING SUPPORT, SIDELAP, AND PERIMETER WELDS	P	P
B. WELDS MEET VISUAL ACCEPTANCE CRITERIA	P	P
C. VERIFY REPAIR ACTIVITIES	P	P
D. DOCUMENT ACCEPTANCE OR REJECTION OF WELDS	P	P
INSPECTION OR EXECUTION TASKS PRIOR TO MECHANICAL FASTENING	**QC**	**QA**
A. MANUFACTURER INSTALLATION INSTRUCTIONS AVAILABLE FOR MECHANICAL FASTENERS	O	O
B. PROPER TOOLS AVAILABLE FOR FASTENER INSTALLATION	O	O
C. PROPER STORAGE FOR MECHANICAL FASTENERS	O	O
INSPECTION OR EXECUTION TASKS DURING MECHANICAL FASTENING	**QC**	**QA**
A. FASTENERS ARE POSITIONED AS REQUIRED	O	O
B. FASTENERS ARE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS	O	O
INSPECTION OR EXECUTION TASKS AFTER MECHANICAL FASTENING	**QC**	**QA**
A. CHECK SPACING, TYPE, AND INSTALLATION OF SUPPORT FASTENERS	P	P
B. CHECK SPACING, TYPE, AND INSTALLATION OF SIDELAP FASTENERS	P	P
C. CHECK SPACING, TYPE, AND INSTALLATION OF PERIMETER FASTENERS	P	P
D. VERIFY REPAIR ACTIVITIES	P	P
E. DOCUMENT ACCEPTANCE OR REJECTION OF MECHANICAL FASTENERS	P	P

ADDITIONAL INSPECTIONS:
SEE REQUIREMENTS IN 'STEEL CONSTRUCTION - REQUIRED VERIFICATION AND SPECIAL INSPECTIONS' TABLE, AND 'STEEL CONSTRUCTION - WELDING - REQUIRED SPECIAL INSPECTIONS' TABLE

STEEL CONSTRUCTION - WELDING - SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL WELDING
CBC SECTION 1705A.2.5
110TN509

INSPECTION AND TESTING (INCLUDING NON-DESTRUCTIVE TESTING) OF ALL SHOP AND FIELD WELDING OPERATIONS SHALL BE MADE BY A QUALIFIED WELDING INSPECTOR APPROVED BY THE ENFORCEMENT AGENCY. THE MINIMUM REQUIREMENTS FOR A QUALIFIED WELDING INSPECTOR SHALL BE AS THOSE FOR AN AWS CERTIFIED WELDING INSPECTOR (CWI), AS DEFINED IN THE PROVISIONS OF THE AWS QC1.

THE WELDING INSPECTOR SHALL MAKE A SYSTEMATIC DAILY RECORD OF ALL WELDS. IN ADDITION TO OTHER REQUIRED RECORDS, THIS RECORD SHALL INCLUDE:
1. IDENTIFICATION MARKS OF WEL

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STRUCTURAL SPECIAL INSPECTIONS AND TESTING

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

STRUCTURAL STEEL LFRS - WELDING - REQUIRED SPECIAL INSPECTIONS AISC341 TABLE J6-1, J6-2, J6-3 110TN512				
VISUAL INSPECTION TASKS PRIOR TO WELDING	QC		QA	
	TASK	DOC	TASK	DOC
MATERIAL IDENTIFICATION (TYPE/GRADE)	O	-	O	-
WELDER IDENTIFICATION SYSTEM	O	-	O	-
FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY) • JOINT PREPARATION • DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL) • CLEANLINESS (CONDITION OF STEEL SURFACES) • TACKING (TACK WELD QUALITY AND LOCATION) • BACKING TYPE AND FIT (IF APPLICABLE)	P/O**	-	O	-
CONFIGURATION AND FINISH OF ACCESS HOLES	O	-	O	-
FIT-UP OF FILLET WELDS • DIMENSIONS (ALIGNMENT, GAPS AT ROOT) • CLEANLINESS (CONDITION OF STEEL SURFACES) • TACKING (TACK WELD QUALITY AND LOCATION)	P/O**	-	O	-
VISUAL INSPECTION TASKS DURING WELDING	QC		QA	
	TASK	DOC	TASK	DOC
WPS FOLLOWED • SETTINGS ON WELDING EQUIPMENT • TRAVEL SPEED • SELECTED WELDING MATERIALS • SHIELDING GAS TYPE/FLOW RATE • PREHEAT APPLIED • INTERPASS TEMPERATURE MAINTAINED (MIN./MAX.) • PROPER POSITION (F, V, H, OH) • INTERMIX OF FILLER METALS AVOIDED UNLESS APPROVED	O	-	O	-
USE OF QUALIFIED WELDERS	O	-	O	-
CONTROL AND HANDLING OF WELDED CONSUMABLES • PACKAGING • EXPOSURE CONTROL	O	-	O	-
ENVIRONMENTAL CONDITIONS • WIND SPEED WITHIN LIMITS • PRECIPITATION AND TEMPERATURE	O	-	O	-
WELDING TECHNIQUES • INTERPASS AND FINAL CLEANING • EACH PASS WITHIN PROFILE LIMITATIONS • EACH PASS MEETS QUALITY REQUIREMENTS	O	-	O	-
NO WELDING OVER CRACKED TACKS	O	-	O	-
VISUAL INSPECTION TASKS AFTER WELDING	QC		QA	
	TASK	DOC	TASK	DOC
WELDS CLEANED	O	-	O	-
SIZE, LENGTH AND LOCATION OF WELDS	P	-	P	-
WELDS MEET VISUAL ACCEPTANCE CRITERIA • CRACK PROHIBITION • WELD/BASE-METAL FUSION • CRATER CROSS SECTION • WELD PROFILES AND SIZE • UNDERCUT • POROSITY	P	D	P	D
K-AREA[1]	P	D	P	D
PLACEMENT OF REINFORCING OR CONTOURING FILLET WELDS (IF REQD)	P	D	P	D
BACKING REMOVED, WELD TABS REMOVED AND FINISHED, AND FILLET WELDS ADDED (IF REQD)	P	D	P	D
REPAIR ACTIVITIES	P	-	P	D

** FOLLOWING PERFORMANCE OF THIS INSPECTION TASK FOR TEN WELDS TO BE MADE BY A GIVEN WELDER, WITH THE WELDER DEMONSTRATING UNDERSTANDING OF REQUIREMENTS AND POSSESSION OF SKILLS AND TOOLS TO VERIFY THESE ITEMS, THE PERFORM DESIGNATION OF THIS TASK SHALL BE REDUCED TO OBSERVE, AND THE WELDER SHALL PERFORM THIS TASK. SHOULD THE INSPECTOR DETERMINE THAT THE WELDER HAS DISCONTINUED PERFORMANCE OF THIS TASK, THE TASK SHALL BE RETURNED TO PERFORM UNTIL SUCH TIME AS THE INSPECTOR HAS RE-ESTABLISHED ADEQUATE ASSURANCE THAT THE WELDER WILL PERFORM THE INSPECTION TASKS LISTED.

[1] WHEN WELDING OF DOUBLER PLATES, CONTINUITY PLATES OR STIFFENERS HAS BEEN PERFORMED IN THE K-AREA, VISUALLY INSPECT THE WEB K-AREA FOR CRACKS WITHIN 3 INCHES (75MM) OF THE WELD. THE VISUAL INSPECTION SHALL BE PERFORMED NO SOONER THAN 48 HOURS FOLLOWING COMPLETION OF THE WELDING.

STRUCTURAL STEEL LFRS - WELDING - REQUIRED TESTING AISC 341 - SECTION J6.2 NONDESTRUCTIVE TESTING (NDT) OF WELDED JOINTS 110TN513
ALL REQUIREMENTS OF THE 'STEEL CONSTRUCTION - WELDING - REQUIRED TESTING' TABLE SHALL APPLY IN ADDITION TO THE TESTING NOTED BELOW.
a. CJP GROOVE WELD NDT ULTRASONIC TESTING (UT) SHALL BE PERFORMED ON 100% OF CJP GROOVE WELDS IN MATERIALS 5/16" THICK OR GREATER. UT IN MATERIALS LESS THAN 5/16" THICK IS NOT REQUIRED. WELD DISCONTINUITIES SHALL BE ACCEPTED OR REJECTED ON THE BASIS OF AWS D1.1/D1.1M TABLE 6.2. MAGNETIC PARTICLE TESTING (MT) SHALL BE PERFORMED ON 25% OF ALL BEAM-TO-COLUMN CJP GROOVE WELDS. THE RATE OF UT AND MT IS PERMITTED TO BE REDUCED IN ACCORDANCE WITH SECTIONS J6.2G AND J6.2H, RESPECTIVELY.
b. COLUMN SPLICE AND COLUMN TO BASE PLATE PJP GROVE WELD NTD UT SHALL BE PERFORMED BY QA ON 100% OF PARTIAL-JOINT-PENETRATION (PJP) GROOVE WELDS IN COLUMN SPLICES AND COLUMN TO BASE PLATE WELDS. THE RATE OF UT IS PERMITTED TO BE REDUCED IN ACCORDANCE WITH SECTION J6.2G. SEE AISC 341 SECTION J6.2B FOR ADDITIONAL INFO ON PROCEDURES, MOCK-UPS AND ACCEPTANCE/REJECTION.
c. BASE METAL NDT FOR LAMELLAR TEARING AND LAMINATIONS AFTER JOINT COMPLETION, BASE METAL THICKER THAN 1 1/2" LOADED IN TENSION IN THE THROUGH-THICKNESS DIRECTION IN T- AND CORNER-JOINTS, WHERE THE CONNECTED MATERIAL IS GREATER THAN 3/4" AND CONTAINS CJP GROOVE WELDS, SHALL BE ULTRASONICALLY TESTED FOR DISCONTINUITIES BEHIND AND ADJACENT TO THE FUSION LINE OF SUCH WELDS. ANY BASE METAL DISCONTINUITIES FOUND WITHIN T/4 OF THE STEEL SURFACE SHALL BE ACCEPTED OR REJECTED ON THE BASIS OF CRITERIA OF AWS D1.1/D1.1M TABLE 6.2, WHERE "T" IS THE THICKNESS OF THE PART SUBJECTED TO THE THROUGH-THICKNESS STRAIN.
d. BEAM COPE AND ACCESS HOLE NDT AT WELDED SPLICES AND CONNECTIONS, THERMALLY CUT SURFACES OF BEAM COPES AND ACCESS HOLES SHALL BE TESTED USING MAGNETIC PARTICLE TESTING OR PENETRANT TESTING, WHEN THE FLANGE THICKNESS EXCEEDS 1 1/2" FOR ROLLED SHAPES, OR WHEN THE WEB THICKNESS EXCEEDS 1 1/2" FOR BUILT-UP SHAPES.
e. REDUCED BEAM SECTION REPAIR NDT MAGNETIC PARTICLE TESTING SHALL BE PERFORMED ON ANY WELD AND ADJACENT AREA OF THE REDUCED BEAM SECTION (RBS) CUT SURFACE THAT HAS BEEN REPAIRED BY WELDING, OR ON THE BASE METAL OF THE RBS CUT SURFACE IF A SHARP NOTCH HAS BEEN REMOVED BY GRINDING.
f. WELD TAB REMOVAL SITES AT THE END OF WELDS WHERE WELD TABS HAVE BEEN REMOVED, MAGNETIC PARTICLE TESTING SHALL BE PERFORMED ON THE SAME BEAM-TO-COLUMN JOINTS RECEIVING UT AS REQUIRED UNDER SECTION J6.2A. THE RATE OF MT IS PERMITTED TO BE REDUCED IN ACCORDANCE WITH SECTION J6.2H. MT OF CONTINUITY PLATE WELD TABS REMOVAL SITES IS NOT REQUIRED.
g. REDUCTION OF PERCENTAGE OF ULTRASONIC TESTING THE REDUCTION OF PERCENTAGE OF UT IS PERMITTED TO BE REDUCED, SEE 'STEEL CONSTRUCTION - WELDING - REQUIRED TESTING' TABLE ITEM (E). EXCEPT NO REDUCTION IS PERMITTED FOR DEMAND CRITICAL WELDS.
h. REDUCTION OF PERCENTAGE OF MAGNETIC PARTICLE TESTING THE AMOUNT OF MT ON CJP GROOVE WELDS IS PERMITTED TO BE REDUCED IF APPROVED BY THE ENGINEER OF RECORD AND THE AUTHORITY HAVING JURISDICTION, PER AISC 341 SECTION J6.2H.

STRUCTURAL STEEL LFRS BOLTING - REQUIRED SPECIAL INSPECTIONS AISC341 TABLE J7-1, J7-2, J7-3 110TN514				
INSPECTION TASKS PRIOR TO BOLTING	QC		QA	
	TASK	DOC	TASK	DOC
PROPER FASTENERS SELECTED FOR THE JOINT DETAIL	O	-	O	-
PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	O	-	O	-
CONNECTING ELEMENTS, INCLUDING THE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	O	-	O	-
PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED FOR FASTENER ASSEMBLIES AND METHODS USED	P	D	O	D
PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	O	-	O	-
INSPECTION TASKS DURING BOLTING	QC		QA	
	TASK	DOC	TASK	DOC
FASTENER ASSEMBLIES PLACED IN ALL HOLES AND WASHERS (IF REQUIRED) ARE POSITIONED AS REQUIRED	O	-	O	-
JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	O	-	O	-
FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	O	-	O	-
BOLTS ARE PRETENSIONED PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	O	-	O	-
INSPECTION TASKS AFTER BOLTING	QC		QA	
	TASK	DOC	TASK	DOC
DOCUMENT ACCEPTED OR REJECTED CONNECTIONS	P	D	P	D

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STRUCTURAL SPECIAL INSPECTIONS & TESTING

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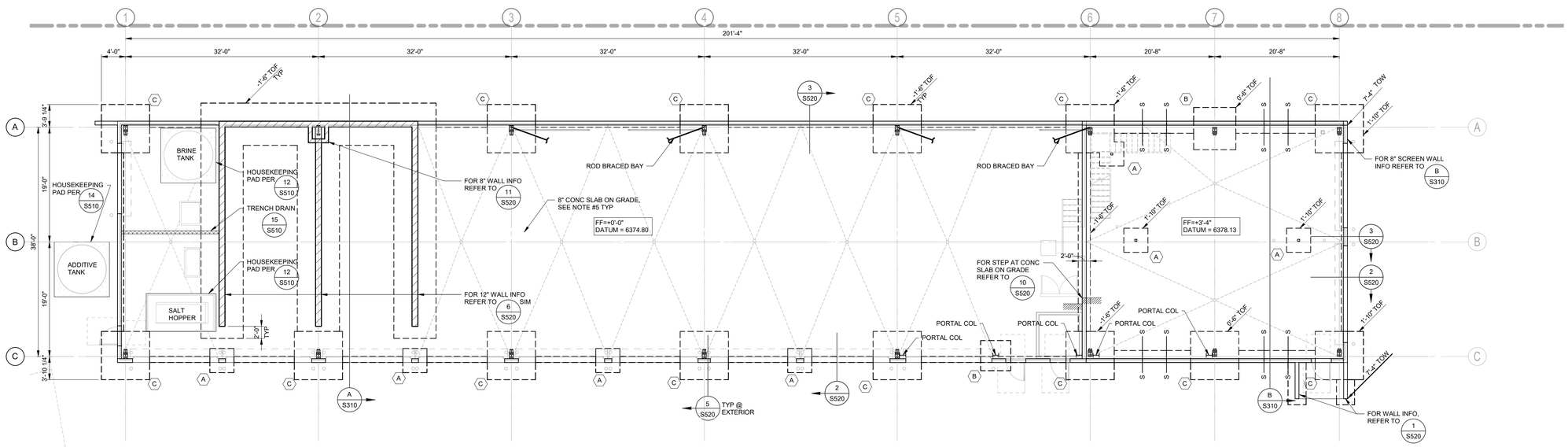

FOUNDATION PLAN

1/8" = 1'-0"

FOOTING SCHEDULE

NOTE:
TOP OF FOOTING AT -1'-6" TYP UNO ON PLANS.

Mk	SIZE (WxLxD)	BOTT REINF	TOP REINF
A	4'-0" x 4'-0" x 2'-0"	(6) #5 EW	
B	5'-0" x 5'-0" x 2'-0"	(6) #5 EW	
B	7'-0" x 7'-0" x 2'-0"	(9) #6 EW	(9) #6 EW
C	8'-0" x 8'-0" x 2'-0"	(9) #7 EW	(9) #7 EW

FOUNDATION PLAN NOTES

1. **SEE SHEETS** S1.1 FOR GENERAL NOTES WHICH ARE APPLICABLE TO ALL DRAWINGS UNO.
2. VERIFY ALL BUILDING DIMENSIONS AND ELEVATIONS w/ ARCH DRAWINGS. NOTIFY THE ARCHITECT IMMEDIATELY IF THERE ARE ANY CONFLICTS w/ DIMENSIONS SHOWN.
3. DIMENSIONS SHOWN ARE TO THE CL OF COLUMN UNO.
4. SITE PREPARATION AND BUILDING PAD CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT LISTED IN THE FOUNDATION GENERAL NOTES. BOTTOM OF FOOTING EXCAVATIONS SHALL BE REVIEWED BY GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF REINFORCING STEEL.
5. SLAB ON GRADE SHALL BE 8" THICK CONCRETE w/ #4 @ 18"cc EW AT MID-DEPTH. CONCRETE SHALL BE INSTALLED OVER 15 MIL VAPOR RETARDER OVER 4" CLEAN CRUSHED ROCK. TOP OF CONCRETE SLAB IS 0'-0" UNO. VERIFY WITH CIVIL DWGS.
6. CONTRACTOR SHALL SUBMIT AN EDGE OF SLAB PLAN TO ARCHITECT & SEOR FOR REVIEW. SUBMITTAL SHALL BE DIMENSIONED AND LOCATED RELATIVE TO STRUCTURAL GRIDS.
7. PROVIDE SLAB ON GRADE CONTROL JOINTS (SJ) AS INDICATED PER **5/S510** TYP AT ALL INTERIOR SLABS. CONSTRUCTION JOINTS (CJ) MAY REPLACE CONTROL JOINTS AS REQUIRED.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE SLAB CONTROL JOINTS WITH ANY ARCHITECTURALLY EXPOSED SLAB AREAS OR THE LOCATION OF TILE CRACK CONTROL JOINTS. VERIFY SPECIAL CONDITION CONTROL JOINTS WITH ARCH DRAWINGS.
9. CONTRACTOR TO COORDINATE EXACT DIMENSIONS AND LOCATIONS OF THICKENED SLABS, HOUSEKEEPING PADS, ETC. WITH ALL OTHER DISCIPLINE'S DRAWINGS AS WELL AS WITH THE EQUIPMENT PROVIDED, PRIOR TO COMMENCING WORK.
10. ALL DEPRESSIONS, SLOPES, CURBS, ETC. ARE SHOWN FOR REFERENCE ONLY. FOR EXACT DEPTHS, SLOPES, EXTENTS, ETC. SEE OTHER DISCIPLINES' DRAWINGS.
11. TEMPORARY LOADS APPLIED DURING CONSTRUCTION HAVE NOT BEEN CONSIDERED IN SLAB ON GRADE DESIGN.
12. SEE ARCH & CIVIL DRAWINGS FOR ALL EXTERIOR CURBS, FLATWORK, PLANTERS, RAMPS, ETC.
13. PROVIDE 3" MIN. CONCRETE COVER AT STRUCTURAL STEEL AND ANCHOR BOLTS BELOW GRADE, TYP.
14. CONTINUE ALL REINFORCING IN CONTINUOUS FOOTINGS THROUGH SPREAD FOOTINGS, TYP UNO.
15. SEE SHEETS - FOR TYPICAL METAL STUD WALL FRAMING DETAILS.

FOUNDATION LEGEND

- (MN) — FOOTING PER SCHEDULE THIS SHEET. TOP REINFORCING AS NOTED IN SCHEDULE SHALL BE PLACED @ 2" CLR OF TOP OF FOOTING.
- CONCRETE CURB. FOR CURBS BELOW NON-STRUCTURAL WALLS SEE **10/S510** & **11/S510** VERIFY EXACT EXTENT w/ ARCH DWGS.
- X'-X" TOF — TOP OF FOOTING ELEVATION WITH RESPECT TO REFERENCE TOP OF CONCRETE (0'-0"). THE BOTTOM OF ALL FOOTINGS SHALL BE AT LEAST 24" BELOW ADJACENT MINIMUM PREPARED BUILDING PAD ELEVATION (ON ALL SIDES), TYP UNO OR AS SHOWN ON SECTIONS.
- +2'-0" — TOP OF CONCRETE SLAB ELEVATION RELATIVE TO REFERENCED TOP OF CONCRETE 0'-0".
- 8" CONC STEM WALL
- 8" CMU WALL
- STEEL BRACE BY OTHERS, TYP

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No. 3592
STRUCTURAL
STATE OF CALIFORNIA

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SACRAMENTO, CA 95811
916 443 0303

Shakori Lower Garage Replacement

1121 Shakori Way,
Myers, CA
El Dorado County
Department of
Transportation

REVISIONS

JOB NO.	00200035.00
DRAWN	WBR
DATE	04-18-2022
SCALE	1/8" = 1'-0"
FILENAME	

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S210
FOUNDATION PLAN

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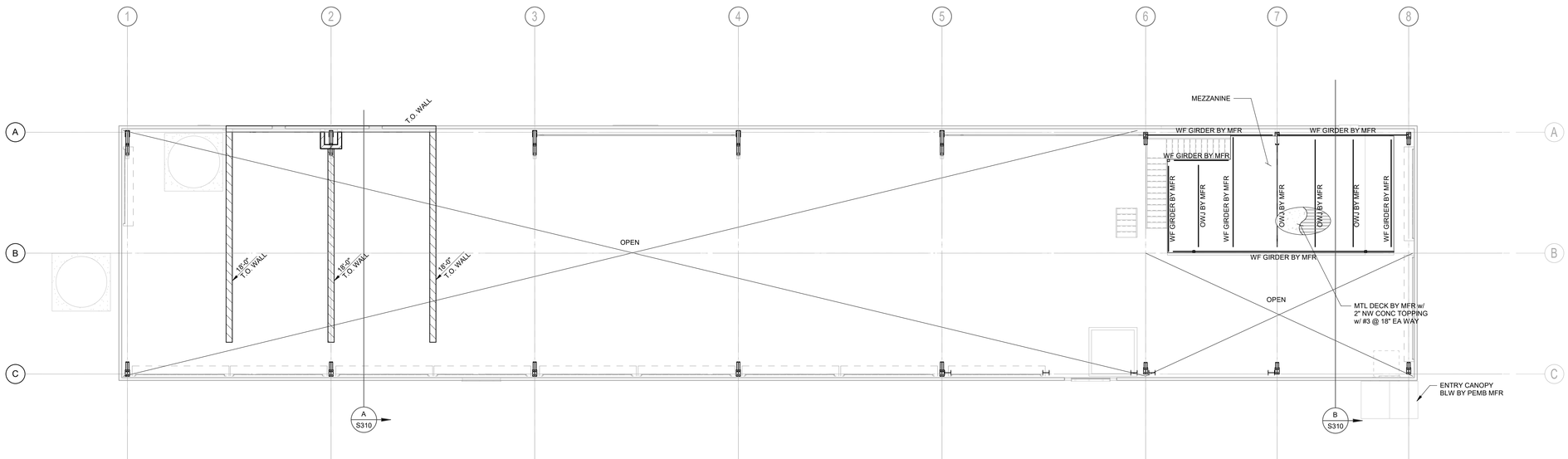
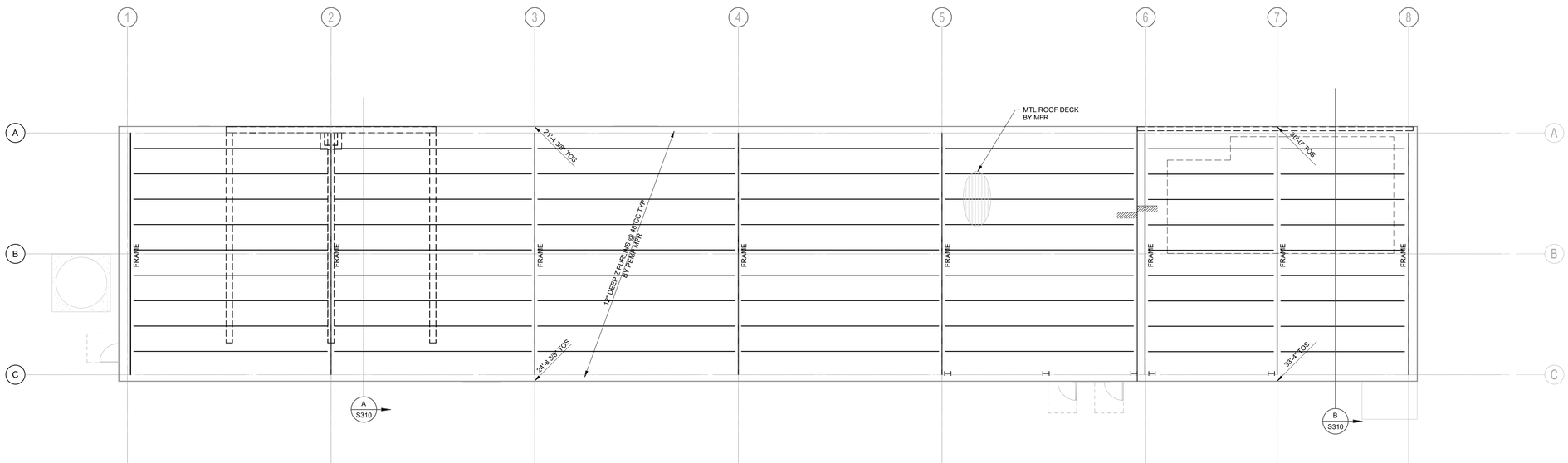


MEZZANINE FRAMING PLAN 1/8" = 1'-0"



ROOF FRAMING PLAN 1/8" = 1'-0"

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S220

MEZZANINE AND ROOF FRAMING PLAN

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S220 MEZZANINE AND ROOF FRAMING PLAN 9/13/2022 1:34:49 PM C:\revit2020\346000_El Dorado County DOT Shakori Lower Garage Repl_R21_Central_dotm.rvt

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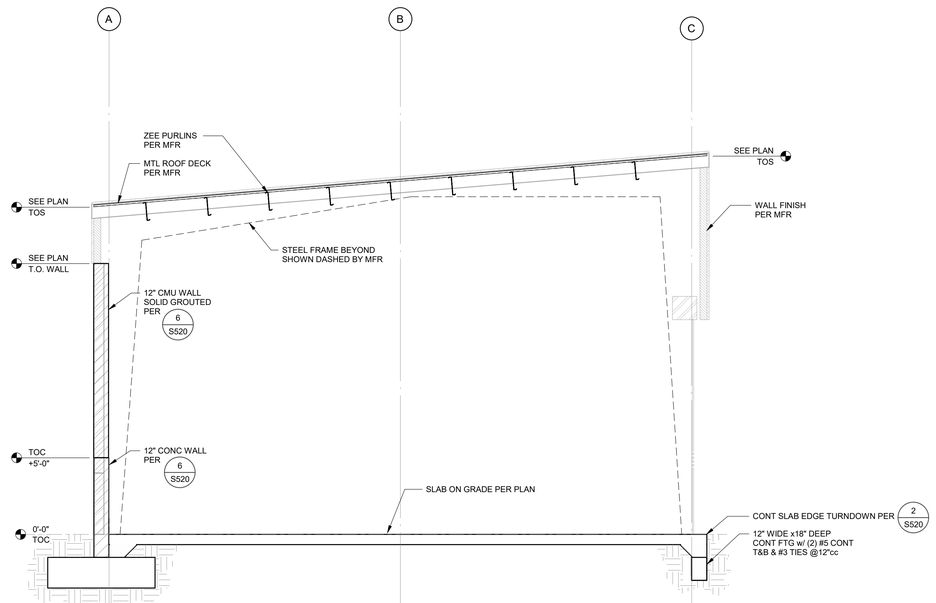
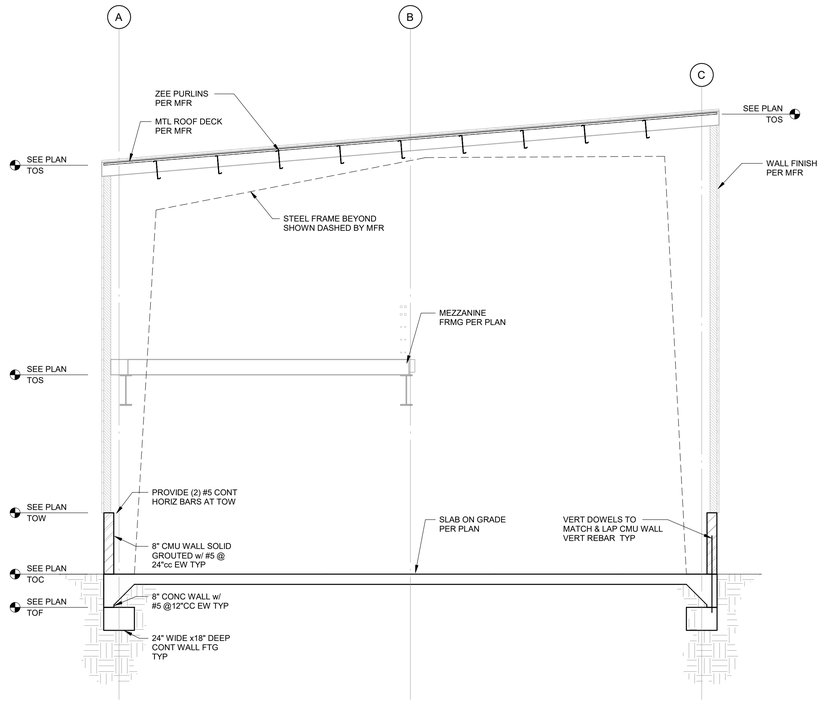


SECTION A S310 — 1/4" = 1'-0"



SECTION B S310 — 1/4" = 1'-0"

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S310
SECTIONS

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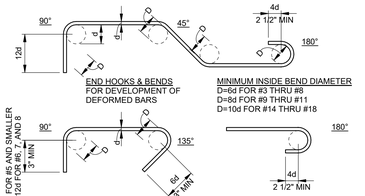
S310 SECTIONS
9/13/2022 1:34:50 PM
C:\nrvd\00035\dwg\00_El Dorado County DOT Shakori Lower Garage Repl_R2_Central_.dwg.rvt

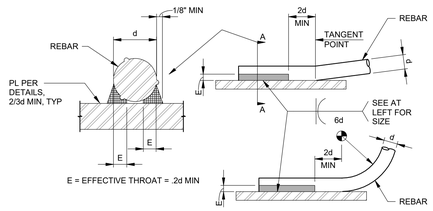
TYPICAL DETAILS

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE



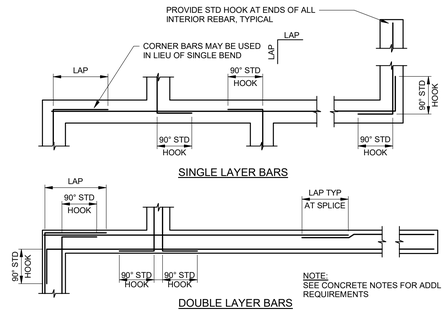
NOTE:
ALL HOOKS SHALL BE 90° OR 180° STANDARD HOOKS UNLESS OTHERWISE SHOWN OR NOTED.

DETAIL 1 S510 — **STANDARD REBAR HOOKS & BENDS** — NO SCALE



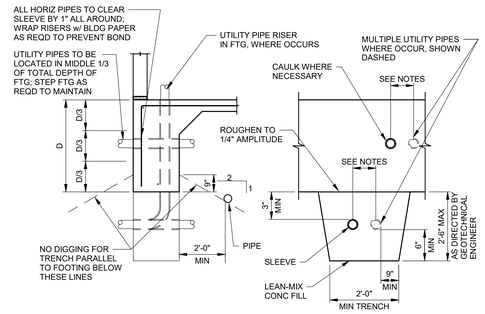
NOTES:
1. REINFORCING TO BE WELDED, EXCEPT ASTM A706, SHALL CONFORM TO THE MATERIAL PROPERTY REQUIREMENTS OF ANSI/AWS D1.4, NEWEST EDITION.
2. ALL PREHEATING AND WELDING SHALL BE DONE IN ACCORDANCE WITH ANSI/AWS D1.4, NEWEST EDITION.
3. ALL WELDING SHALL BE CONTINUOUSLY INSPECTED BY A QUALIFIED LABORATORY.

DETAIL 2 S510 — **REBAR WELDING** — NO SCALE



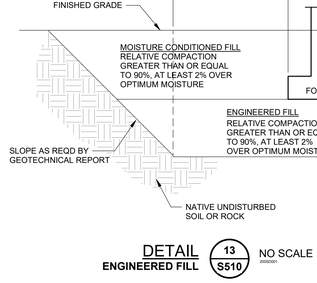
NOTE:
SEE CONCRETE NOTES FOR ADDL REQUIREMENTS

DETAIL 3 S510 — **INTERSECTION & CORNER REINF AT FTGS** — NO SCALE



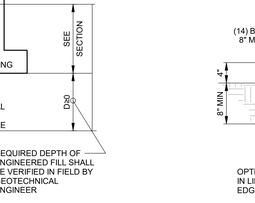
NOTES:
1. THE PROVISIONS HEREIN ARE APPLICABLE TO CONTINUOUS FOOTINGS AND GRADE BEAMS.
2. NO PIPES SHALL BE PLACED BELOW ISOLATED SPREAD FOOTINGS OR WITHIN 2 TO 1 BEARING ZONE AROUND SPREAD FOOTINGS.
3. REINFORCING SHALL NOT BE INTERRUPTED, CUT OR DISPLACED BY PLACEMENT OF UTILITY PIPE.
4. LEAN MIX CONCRETE FILL TO BE PLACED BEFORE FOOTING IS CAST (MONO-POUR FOOTING CONC OPTIONAL.) MAKE SAME WIDTH AS FOOTING AND FULL WIDTH OF PIPE TRENCH.
5. STEP FOOTING IF PIPE OCCURS OUTSIDE OF MIDDLE THIRD OF ORIGINAL FOOTING DEPTH.
6. IF PIPE IS IN PLACE PRIOR TO CASTING CONCRETE, WRAP PIPE w/ 1" STYROFOAM INSULATION IN LIEU OF SLEEVE.
7. UTILITY PIPES ARE NOT ALLOWED PARALLEL IN FOOTING.
8. MULTIPLE UTILITY PIPES (TWO OR MORE) MAY BE INSTALLED AS SHOWN, PROVIDED THEY ARE SPACED A MINIMUM OF (4) PIPE/CONDUIT DIAMETERS ON CENTER WITH A MINIMUM OF 3" OF CONCRETE BETWEEN. PIPE DIAMETER INDICATED IS THE ROUGH HOLE SIZE THRU FOOTING.
9. UTILITY PIPE RISERS MAY OCCUR IN CONTINUOUS FOOTINGS PROVIDED THEY ARE NO LARGER THAN (FOOTING WIDTH/6) AND OCCUR WITHIN THE MIDDLE 1/2 OF THE FOOTING WIDTH. MULTIPLE RISERS MAY OCCUR IF SPACED AS NOTED ABOVE.
10. UTILITY PIPES PERPENDICULAR TO FOOTINGS AND MORE THAN 2'-0" BELOW BOTTOM OF FOOTINGS DO NOT REQUIRE LEAN-MIX CONCRETE ENCASEMENT, SUBJECT TO ACCEPTANCE BY THE GEOTECHNICAL ENGINEER.
11. CONDITIONS NOT CONFORMING TO THE PARAMETERS NOTED ABOVE SHALL BE REVIEWED ON A CASE-BY-CASE BASIS.

DETAIL 4 S510 — **FOOTINGS AT UTILITY PIPES** — NO SCALE

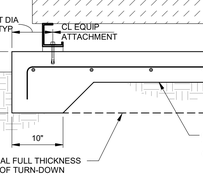


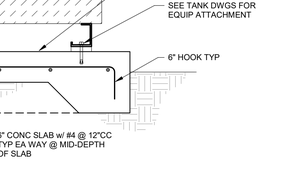
OPTION:
USE METAL K-LATH
IN LIEU OF KEYS FOR FULL
DEPTH OF FOUNDATION AT
UNEXPOSED FOUNDATIONS
ONLY.

DETAIL 5 S510 — **FOUNDATION CONSTRUCTION JOINT** — NO SCALE



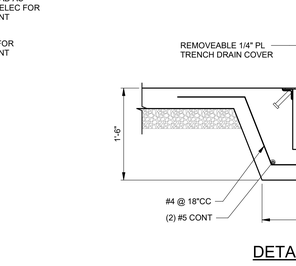
CONSTRUCTION JOINT (CJ)



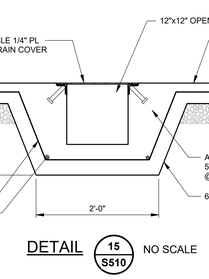


NOTES:
1. CONSTRUCTION JOINTS AND CONTROL JOINTS SHALL DIVIDE SLAB INTO AREAS NOT EXCEEDING 225 SQ FT WITHOUT REENTRANT CORNERS AND WITH LENGTH TO WIDTH RATIOS NOT EXCEEDING 1 1/2 TO 1. JOINT SPACING SHALL NOT EXCEED 15 FEET IN EITHER DIRECTION.
2. CONTRACTOR SHALL SUBMIT LAYOUT PLAN SHOWING PROPOSED CONTROL AND CONSTRUCTION JOINT LOCATIONS TO ARCHITECT & STRUCTURAL ENGINEER FOR REVIEW & APPROVAL.
3. SEMIRIGID SEALANT TO BE EUCLID EUCO #700 OR EQUAL.

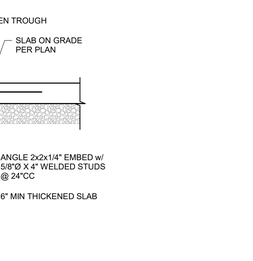
DETAIL 6 S510 — **SLAB ON GRADE JOINTS** — NO SCALE



EDGE CONDITION



CORNER CONDITION



INTERIOR CONDITION

NOTES:
1. SLAB BLOCKOUT SHALL NOT EXTEND BEYOND FOOTING.
2. AT EXPOSED CONCRETE CONDITIONS, COORDINATE BLOCKOUT SHAPE AND SIZE w/ ARCH DWGS.

DETAIL 7 S510 — **SLAB ON GRADE BLOCKOUT** — NO SCALE

NOTE:
DETAIL APPLIES TO DEPRESSION / STEPS ≤ 2". FOR LARGER DEPRESSION / STEPS, SEE **9/S510**

DETAIL 8 S510 — **SLAB DEPRESSION** — NO SCALE

DETAIL 9 S510 — **STEP IN SLAB** — NO SCALE

DETAIL 10 S510 — **CURB AT SOG** — NO SCALE

DETAIL 11 S510 — **CURB AT SLAB DEPRESSION** — NO SCALE

DETAIL 12 S510 — **HOUSEKEEPING PAD AT SLAB ON GRADE** — NO SCALE

DETAIL 13 S510 — **ENGINEERED FILL** — NO SCALE

DETAIL 14 S510 — **HOUSEKEEPING PAD AT GRADE** — NO SCALE

DETAIL 15 S510 — NO SCALE

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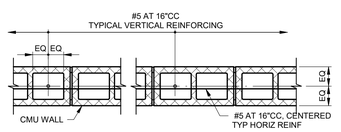
TYPICAL CONCRETE DETAILS

TYPICAL DETAILS

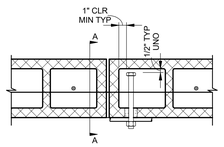
APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE



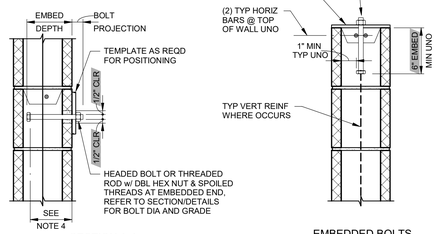
REINFORCING CENTERED

1. REFER TO CMU GENERAL NOTES ON SHEET FOR CONCRETE BLOCK UNITS, MORTAR AND GROUT REQUIREMENTS.
2. VERTICAL REINFORCING:
   A. DOWELS WITH STANDARD 90° HOOKS INTO THE FOUNDATION SHALL MATCH AND LAP VERTICAL REINFORCING.
   B. WHERE VERTICAL REINFORCING IS LOCATED AT EACH FACE, THE BARS DO NOT NEED TO BE PLACED IN THE SAME CELL, BUT THE SPACING NOTED NEEDS TO BE MAINTAINED FOR EACH SIDE OF THE WALL.
3. HORIZONTAL REINFORCING:
   A. INSTALL STD 180° HOOK AROUND VERTS AT WALL ENDS AND JOINTS IN ALL HORIZONTAL REINFORCING BARS.
   B. WHERE THE VERTICAL BARS ARE CENTERED IN THE WALL, HORIZONTAL REINFORCING BARS SHALL BE LOCATED ON ONE SIDE (OR BOTH SIDES) OF THE VERTICAL BARS, ALLOWING THE VERTICAL BARS TO BE CENTERED.
   C. WHERE THE VERTICAL BARS ARE AT EACH FACE IN THE WALL, HORIZONTAL REINFORCING BARS SHALL BE LOCATED TOWARD THE CENTER OF THE CELL, ALLOWING THE VERTICAL BARS TO BE LOCATED BETWEEN THE HORIZONTAL REINFORCING AND THE NEAREST FACE OF THE WALL.

DETAIL **CMU WALL REINFORCING** 1/S511 NO SCALE

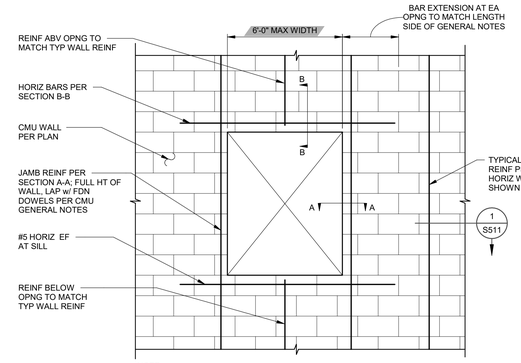


EMBEDDED BOLTS @ FACE OF WALL

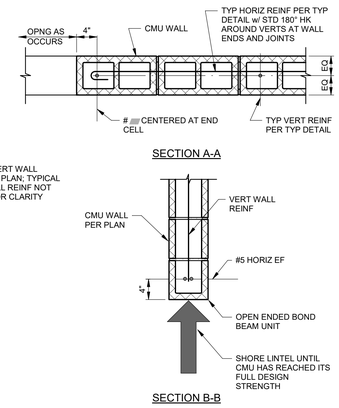


NOTES:
1. ANCHORS IN CMU SHALL BE HEADED BOLTS UNLESS NOTED OTHERWISE.
2. LENGTHS OF BOLTS SHALL BE AS REQUIRED FOR BOLT PROJECTION PLUS SPECIFIED EMBED DEPTH. WHERE EMBEDMENT DEPTH IS NOT SPECIFIED, EMBED BOLT TO 1/2" CLR OF BLOCK FACE AS SHOWN ABOVE. CONTRACTOR TO COORDINATE MINIMUM REQUIRED BOLT PROJECTION TO PROVIDE MIN (3) THREADS CLEAR PAST END OF HEX NUT.
3. CLEAR SPACING BETWEEN BOLTS SHALL NOT BE LESS THAN 1 BOLT DIAMETER, NOR SHALL IT BE LESS THAN 1".
4. EFFECTIVE EMBEDMENT LENGTH IS THE DISTANCE FROM MASONRY SURFACE TO BOTTOM OF BOLT HEAD OR HEX NUT. EFFECTIVE EMBED SHALL NOT BE LESS THAN THE GREATER OF 4 TIMES THE BOLT DIAMETER OR 2 INCHES.

DETAIL **ANCHOR BOLTS IN CMU WALLS** 2/S511 NO SCALE



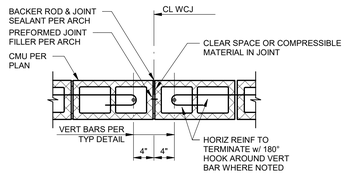
NOTE:
WHERE STRAIGHT EXTENSION LENGTH CANNOT BE ACHIEVED, BEND BAR 90° VERTICALLY. EXTENSION LENGTH SHALL BE MAINTAINED.



DETAIL **REINFORCING AT WALL OPENING** 3/S511 NO SCALE

ELEVATION

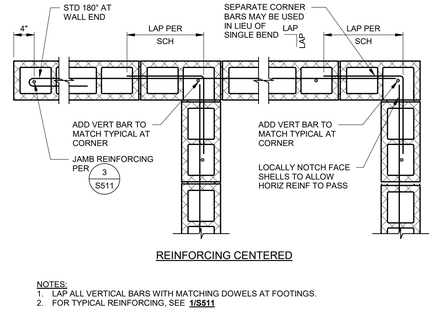
SECTION A-A



SECTION B-B

NOTES:
1. LOCATE WALL JOINTS AT ALL BUILDING WALLS PER THE DIMENSIONS SHOWN IN THESE DRAWINGS. WCJ INDICATES A WALL CONTROL JOINT. LOCATE WALL JOINTS AT SCREEN WALLS, RETAINING WALLS AND OTHER SITE STRUCTURES AT A SPACING NOT EXCEEDING 24FT OR 1.5*HEIGHT, WHICHEVER IS LESS, UNO.
2. THE CONTRACTOR SHALL COORDINATE LOCATION OF WALL JOINTS W/ JOINTS IN FINISH MATERIAL AND OPENINGS IN WALL. SUBMIT PLANS OF FINAL JOINT LOCATIONS FOR REVIEW BY ARCHITECT/ENGINEER.
3. DO NOT SPLICE CHORD BARS WITHIN 5'-0" OF CONTROL JOINT

DETAIL **WALL CONTROL JOINT** 4/S511 NO SCALE



REINFORCING CENTERED

NOTES:
1. LAP ALL VERTICAL BARS WITH MATCHING DOWELS AT FOOTINGS.
2. FOR TYPICAL REINFORCING, SEE **1/S511**

DETAIL **INTERSECTION & CORNER REINF AT WALLS** 5/S511 NO SCALE

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S511

TYPICAL CONCRETE DETAILS

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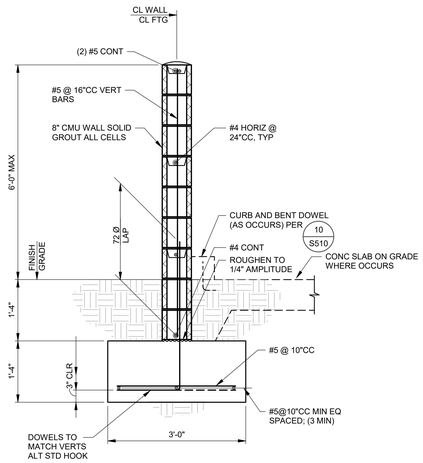
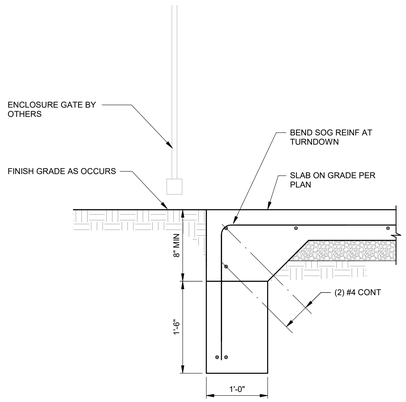
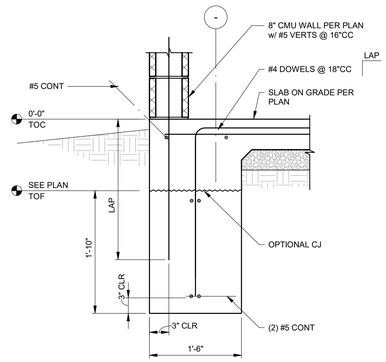


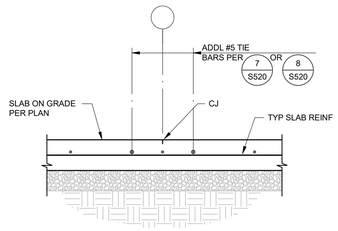
DETAIL 1 S520 — NO SCALE
CANTILEVERED CMU SCREEN WALL



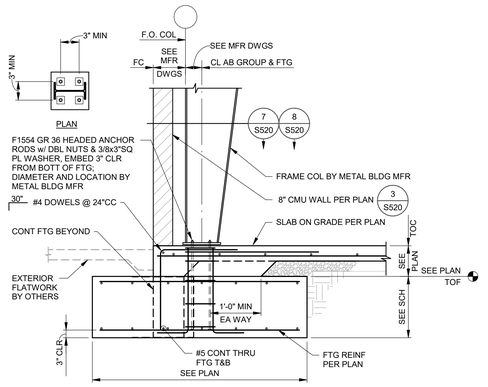
DETAIL 2 S520 — NO SCALE
TYPICAL SLAB TURNDOWN



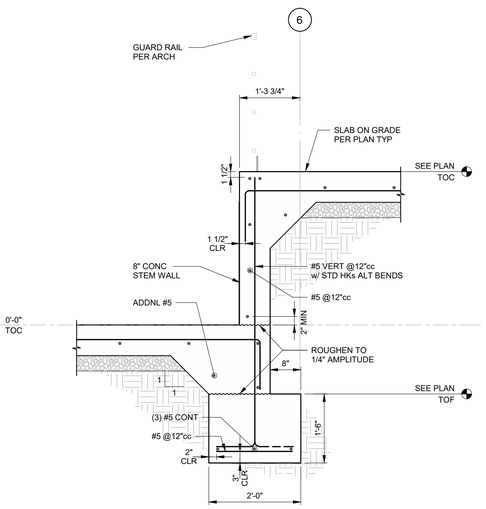
DETAIL 3 S520 — NO SCALE
TYP CMU WALL FOUNDATION



DETAIL 4 S520 — NO SCALE
SLAB AT TIE BARS

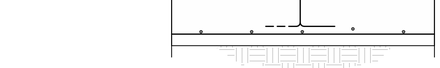


DETAIL 5 S520 — NO SCALE
SLAB EDGE AT FRAME COLUMN



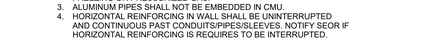
PLAN VIEW

DETAIL 7 S520 — NO SCALE
SLAB EDGE AT FRAME COLUMN



PLAN VIEW

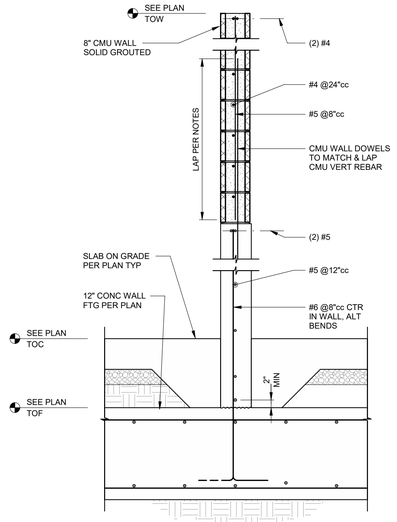
DETAIL 8 S520 — NO SCALE
SLAB EDGE AT FRAME & PORTAL FRAME COLUMN



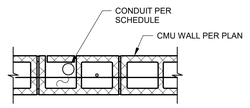
DETAIL 9 S520 — NO SCALE
TYP FOUNDATION AT STEM WALL

PUSHWALL DETAIL 6 S520 — 3/4" = 1'-0"

STEP @CONC SLAB ON GRADE 10 S520 — 3/4" = 1'-0"



8" CMU PUSH WALL 11 S520 — 3/4" = 1'-0"



PLAN

WALL THICKNESS	REINFORCED CELL	UN-REINFORCED CELL
8"	(2) 1/2"Ø (1) 3/4"Ø	(3) 1/2"Ø (2) 3/4"Ø (1) 1"Ø
12"	(4) 1/2"Ø (3) 3/4"Ø (2) 1"Ø (1) 1 1/4Ø	(5) 1/2"Ø (4) 3/4"Ø (3) 1"Ø (2) 1 1/4Ø

NOTES:
1. CONDUIT, PIPES AND SLEEVES MAT BE EMBEDDED IN MASON ONLY IF COMPLYING WITH THE FOLLOWING REQUIREMENTS:
   A. THEY SHALL BE SPACED NO CLOSER THAN 3 DIAMETERS CENTER-TO CENTER.
   B. THE MAXIMUM AREA OF VERTICAL PIPES, CONDUITS, OR SLEEVES PLACED IN MASONRY COLUMNS OR PILASTERS SHALL NOT EXCEED 2% OF THE TOTAL CROSS SECTIONAL AREA.
   C. THE MAXIMUM NUMBER OF PIPES ALLOWED IN A CELL FOR WALLS IS AS NOTED ABOVE.
   D. ALL EMBEDDED CONDUITS SHALL BE PVS OR ABS. NO EMBEDDED METALLIC CONDUITS OR PIPES.
2. NO EMBEDDED PIPES SHALL CONTAIN LIQUIDS SUBJECT TO FREEZING OR PRESSURIZED GAS.
3. ALUMINUM PIPES SHALL NOT BE EMBEDDED IN CMU.
4. HORIZONTAL REINFORCING IN WALL SHALL BE UNINTERRUPTED AND CONTINUOUS PAST CONDUITS/PIPES/SLEEVES. NOTIFY SEOR IF HORIZONTAL REINFORCING IS REQUIRES TO BE INTERRUPTED.

DETAIL 12 S520 — 1" = 1'-0"
PIPES/CONDUIT IN CMU WALL

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REGISTERED PROFESSIONAL ENGINEER
WILLIAM B. RADER
No. 3592
STRUCTURAL
STATE OF CALIFORNIA

BUEHLER
600 Q STREET, SUITE 200
SACRAMENTO, CA 95811
916 443 0303

Shakori Lower Garage Replacement

1121 Shakori Way,
Myers, CA
El Dorado County
Department of Transportation

REVISIONS

JOB NO.	00200035.00
DRAWN	WBR
DATE	04-18-2022
SCALE	As indicated
FILENAME	
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S520
DETAILS

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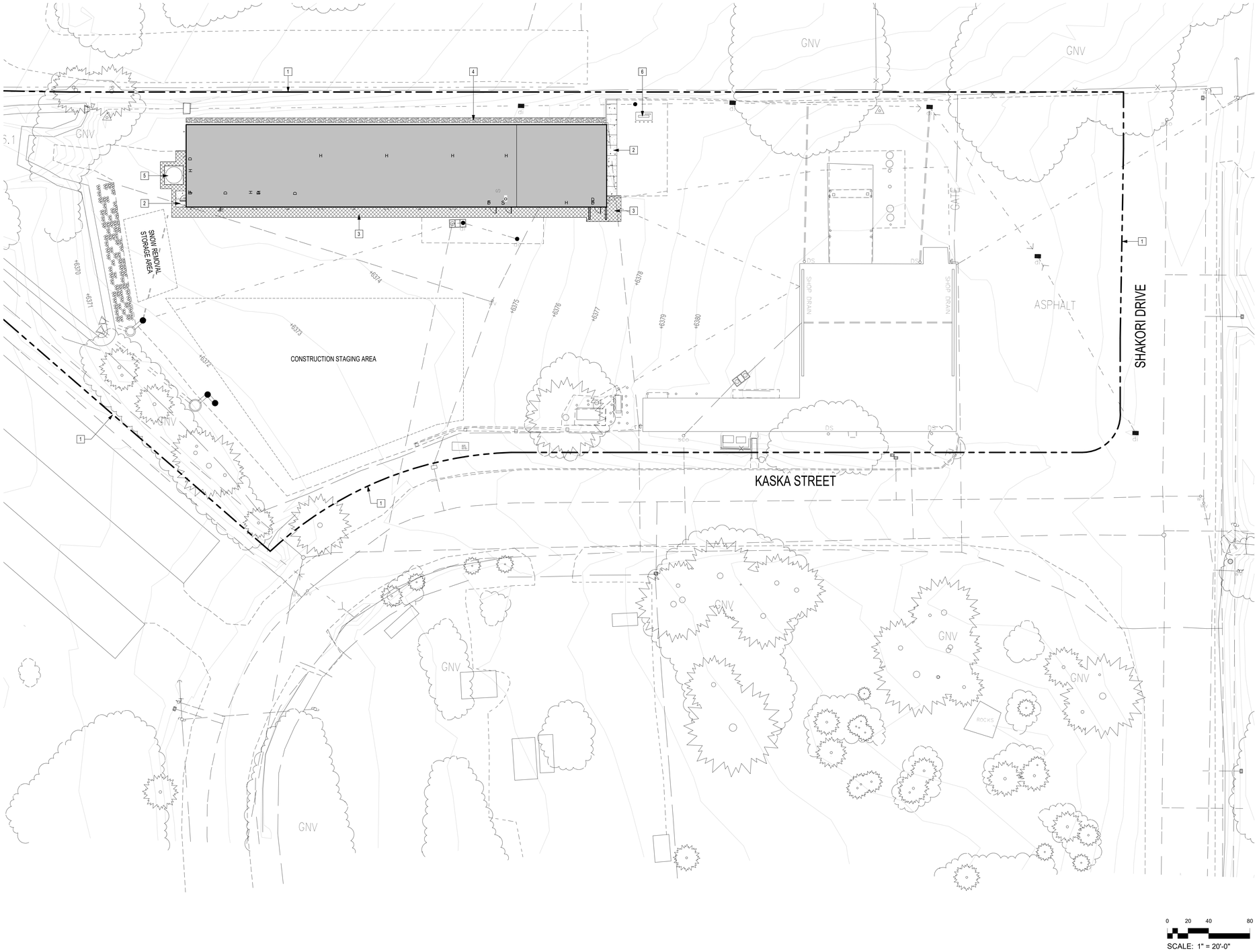
AS-101 SITE PLAN



1 SITE PLAN
1" = 20'-0"

SHEET NOTES AS-101

1 PROPERTY LINE
2 CONCRETE FLATWORK PER CIVIL
3 ASPHALT CONCRETE PAVING PER CIVIL
4 DRIPLINE TRENCH PER CIVIL
5 ADDITIVE TANK ON CONCRETE PAD
6 GAS METER PER PLUMBING

SITE SIGNAGE SCHEDULE

SIGN MARK	DESCRIPTION	DETAIL REFERENCE(S)

GENERAL NOTES

A. FOR SIGNAGE, REFER TO SPECIFICATION SECTION 10440, DETAILS AND THIS SHEET
B. COORDINATE THIS PLAN WITH DOCUMENTS INCLUDING BUT NOT LIMITED TO SITE PLANS, FLOOR PLANS, ELEVATIONS AND CEILING PLANS BY ALL DISCIPLINES.

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LICENSED ARCHITECT
GREGORY M. PADDON
No. C18650
Ren. 2/28/23
STATE OF CALIFORNIA
AIA

SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

REVISIONS

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DRAWN	MA
DATE	04-18-2022
SCALE	As indicated
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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AS-101
SITE PLAN

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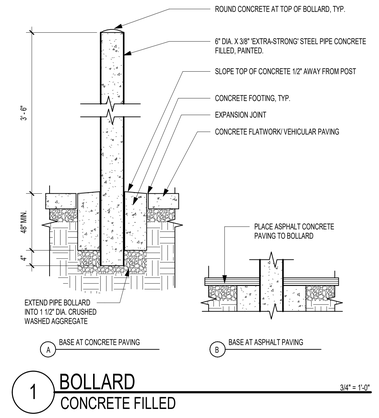

1 BOLLARD
CONCRETE FILLED
3/4" = 1'-0"

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DEPARTMENT OF
TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	3/4" = 1'-0"
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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AS-601
SITE DETAILS

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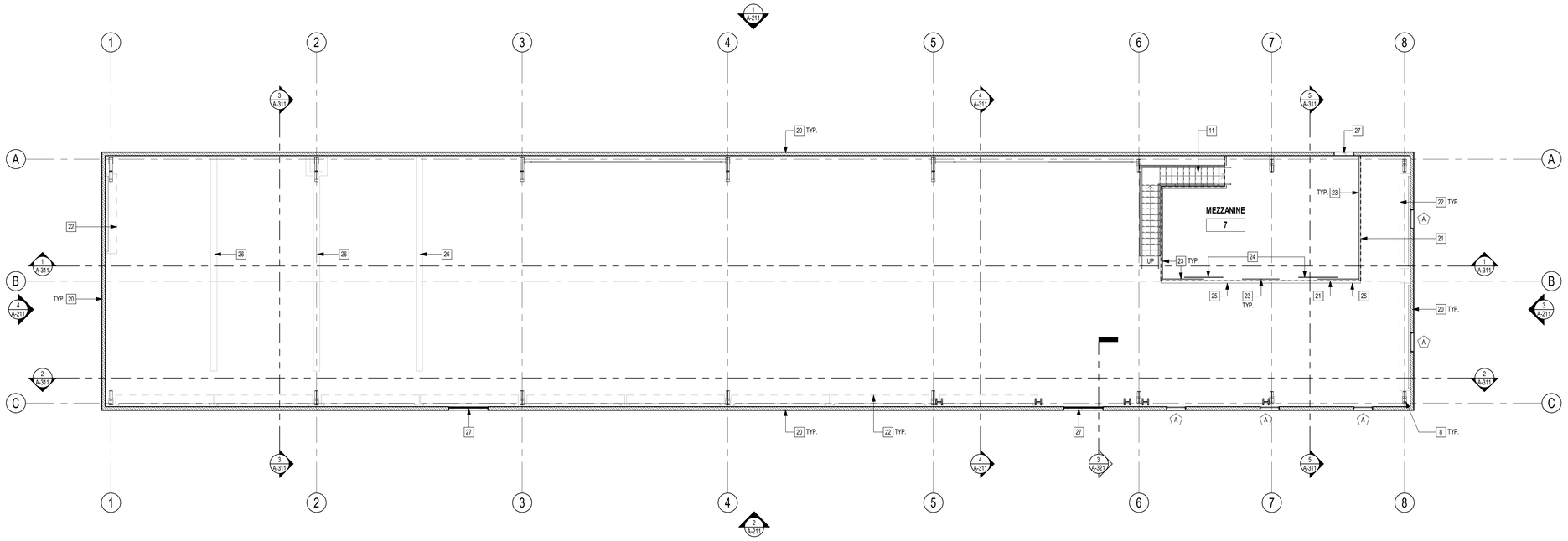
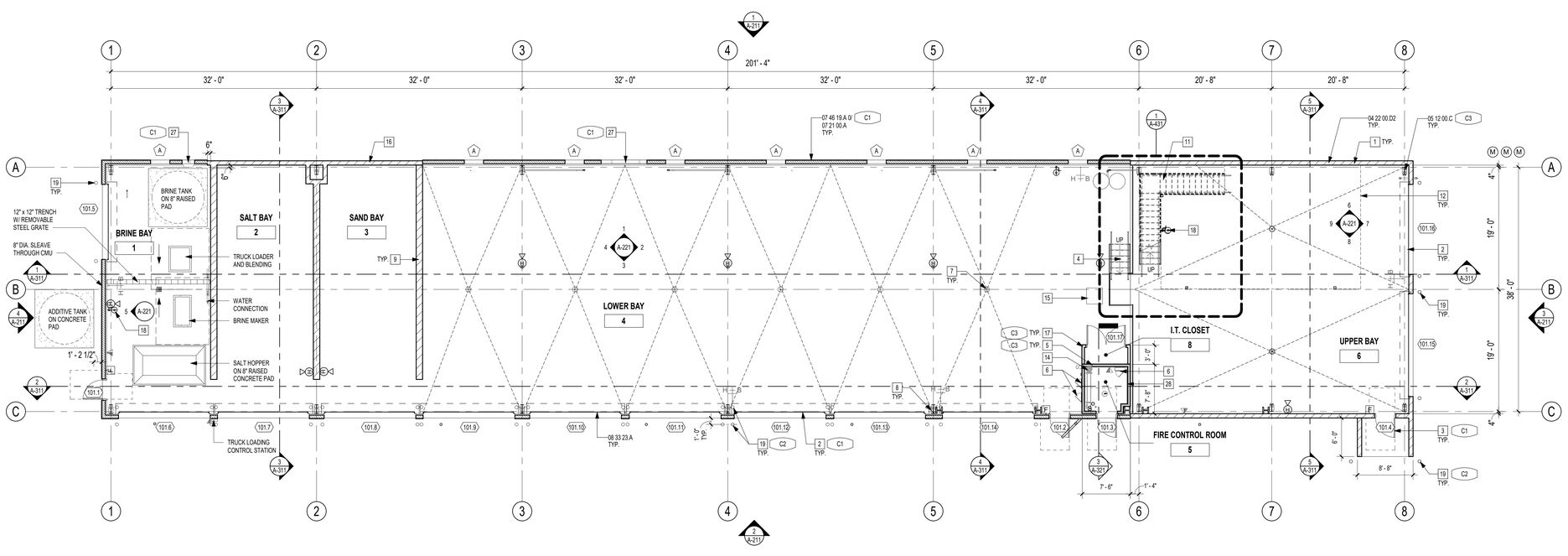


2 FLOOR PLAN - MEZZANINE
1/8" = 1'-0"



1 FLOOR PLAN
1/8" = 1'-0"

KEYNOTES

04 22 00.D2	CONCRETE MASONRY UNIT: SPLIT FACE FINISH
05 12 00.C	STEEL COLUMN
07 21 00.A	BATT INSULATION
07 46 19.A	METAL SIDING & SOFFIT ASSEMBLY
08 33 23.A	OVERHEAD COILING DOOR: INSULATED

SHEET NOTES A-111

1. 8" CMU WALL
2. OH INSULATED COILING DOOR, AUTOMATIC SEE DOOR SCHEDULE
3. PERSONNEL DOOR, SEE DOOR SCHEDULE
4. METAL STAIRS
5. INTERIOR WALL, 1-HR RATED, 3 5/8" METAL STUDS, (1) LAYER 5/8" GYP. BOARD EACH SIDE
6. ELECTRICAL PANEL LOCATION
7. FLOOR DRAIN, TYP
8. STEEL COLUMN, PRE-ENGINEERED METAL BUILDING, TYP
9. 12" CMU WALL
10. OWNER EQUIPMENT - OFCI
11. METAL STAIRS, MEZZANINE
12. LINE OF MEZZANINE ABOVE
13. INTERIOR WALL, NON-RATED
14. FIRE SPRINKLER RISER
15. TRANSFORMER, FLOOR MOUNTED, REFER TO ELECTRICAL
16. 8" CMU WALL - DOUBLE WYTHE
17. INTERIOR WALL, NON-RATED, 3 5/8" METAL STUDS, (1) LAYER 5/8" GYP. BOARD EACH SIDE
18. EYE WASH STATION, REFER TO PLUMBING
19. BOLLARD, REFER TO DETAIL 4 / AS-601
20. METAL WALL PANEL OVER BATT INSULATION
21. LINE OF MEZZANINE EDGE
22. OH INSULATED COILING DOOR HOOD BELOW
23. 42" TALL GUARDRAIL AT MEZZANINE
24. 6' WIDE SLIDING GATE AT MEZZANINE
25. DOCK BUMPER
26. 12" CMU WALL BELOW
27. EXTERIOR LOUVER
28. ADD ADDITIONAL LAYER OF 3/4" PLYWOOD SHEATHING TO INTERIOR SIDE OF WALL

COLOR LEGEND

C1	COLOR TO MATCH METL SPAN "WEATHERED COPPER" #437R1124
C2	COLOR TO MATCH SHERWIN WILLIAMS "SAFETY YELLOW" SW4084
C3	COLOR TO MATCH SHERWIN WILLIAMS "TBD" SWxxxx
C4	COLOR TO MATCH SHERWIN WILLIAMS "TBD" SWxxxx
C5	COLOR TO MATCH SHERWIN WILLIAMS "TBD" SWxxxx

GENERAL NOTES

A. EXTERIOR AND INTERIOR WINDOW TYPES INDICATED WITH (1) REFER TO SHEET A-521
B. CONTRACTOR SHALL PROVIDE BLOCKING AND/OR STRAPPING INSIDE WALLS/PARTITIONS FOR ATTACHING SHELVES, CABINETS, RAILINGS MILLWORK, AND OTHER ITEMS REQUIRING SUPPORT INSIDE WALLS/PARTITIONS.
C. FOR WALL TYPES, CURB LOCATIONS AND DIMENSIONS, REFER TO SHEET A-111
D. FOR EXTERIOR AND INTERIOR DOOR TYPES INDICATED WITH (101.1) REFER TO A-521
E. FOR ALL INTERIOR SIGNAGE AND EXITING, REFER TO SHEET G-111
F. FOR INTERIOR FINISH LEGEND, REFER TO A-541.
G. REFER TO DOOR SCHEDULE FOR EXTENT OF DOOR SWING.
H. INSTALL R-19 BATT INSULATION IN ALL EXTERIOR WALLS EXCLUDING EXTERIOR CMU WALLS BELOW SOFFITS. INSTALL INSULATION ABOVE SOFFITS AT CMU.
I. FRAMED WALLS TO BE CENTERED ON STRUCTURAL COLUMNS, U.N.O.
J. FOR EXTERIOR SITE SIGNAGE & EXTERIOR BUILDING SIGNAGE SEE SHEET AS-101.

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EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	MA
DATE	04-18-2022
SCALE	1/8" = 1'-0"
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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A-111
FLOOR PLAN

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A-111 FLOOR PLAN

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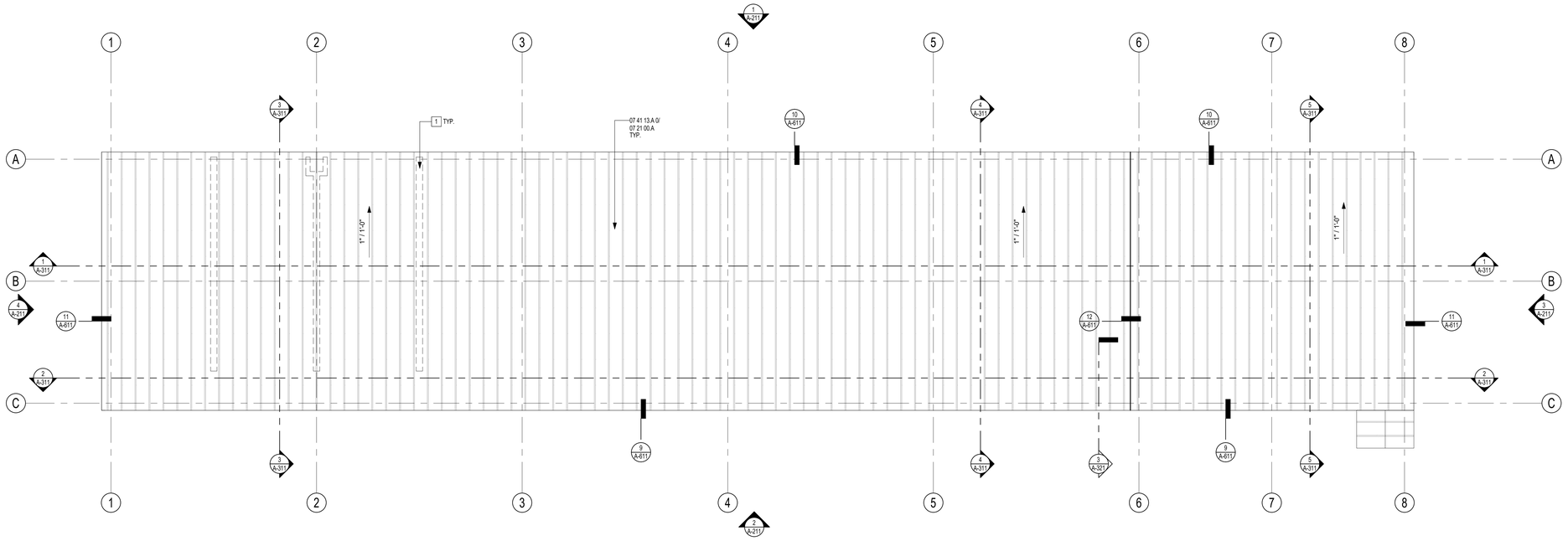

1 ROOF PLAN
1/8" = 1'-0"

KEYNOTES

07 21 00.A	BATT INSULATION
07 41 13.A	METAL ROOF PANEL ASSEMBLY

SHEET NOTES A-113

1 DASHED LINES REPRESENT OUTLINE OF WALL BELOW

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DRAWN	Author
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A-113
ROOF PLAN

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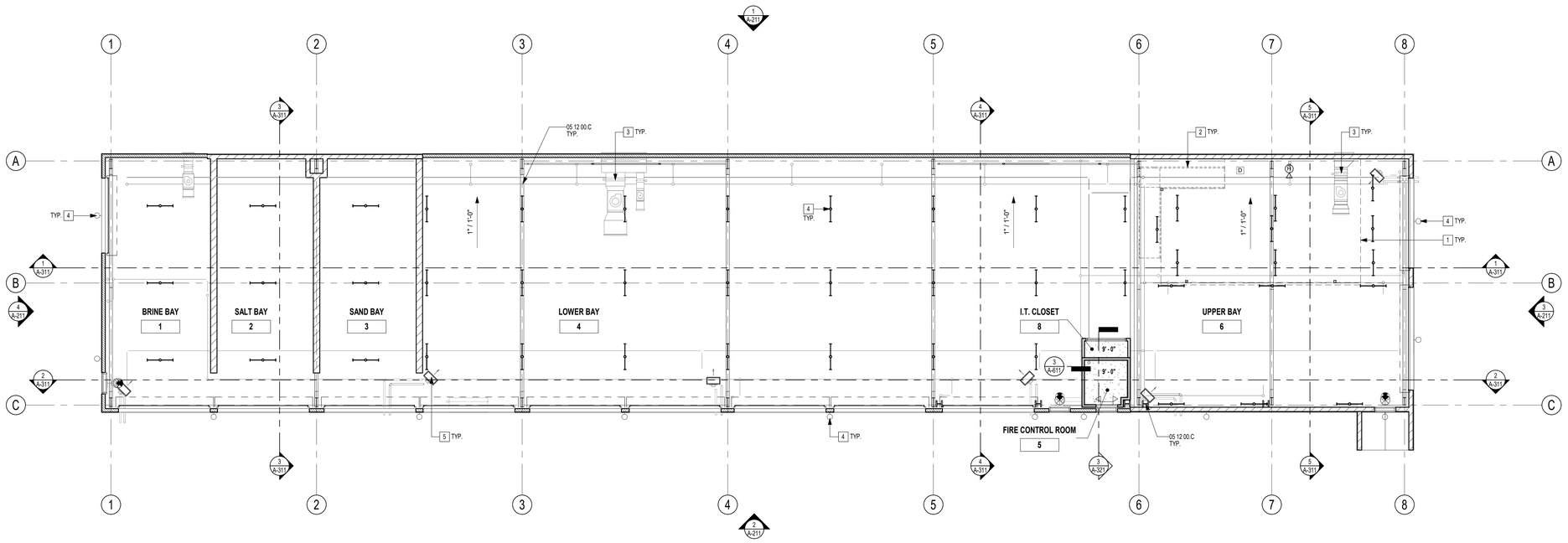

1 REFLECTED CEILING PLAN
1/8" = 1'-0"

KEYNOTES

05 12 00.C STEEL COLUMN

SHEET NOTES A-131

1 DASHED LINES REPRESENT OUTLINE OF MEZZANINE
2 DASHED LINES REPRESENT OUTLINE OF STAIR
3 MECHANICAL EQUIPMENT, REFER TO MECHANICAL
4 LIGHT FIXTURE, REFER TO ELECTRICAL
5 UNIT HEATER, REFER TO MECHANICAL

CEILING LEGEND

GYPSUM BOARD CEILING (4 / A-611)
DIRECT/ INDIRECT SUSPENDED LIGHT FIXTURE
UNIT HEATER
ILLUMINATED EXIT SIGN

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REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	1/8" = 1'-0"
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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A-131
REFLECTED CEILING PLAN

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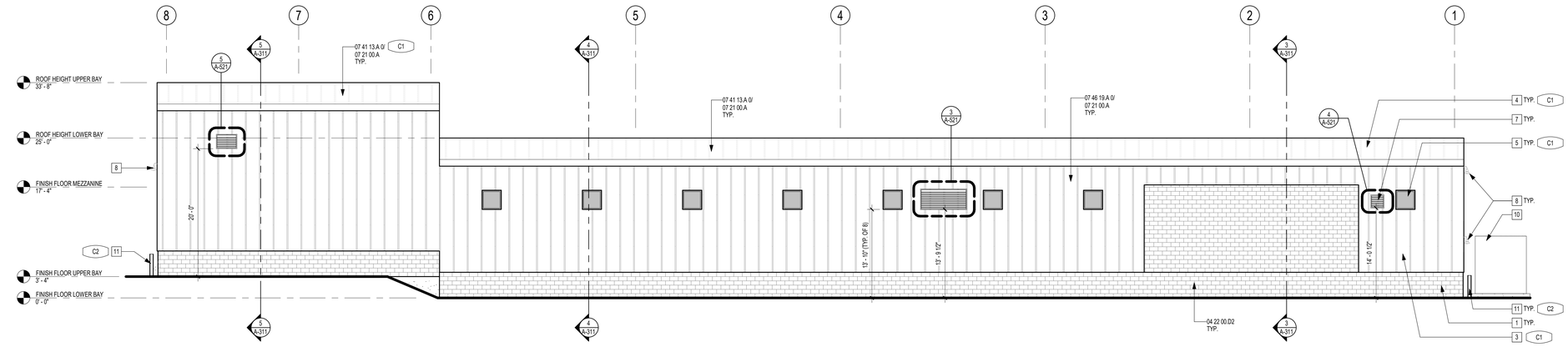
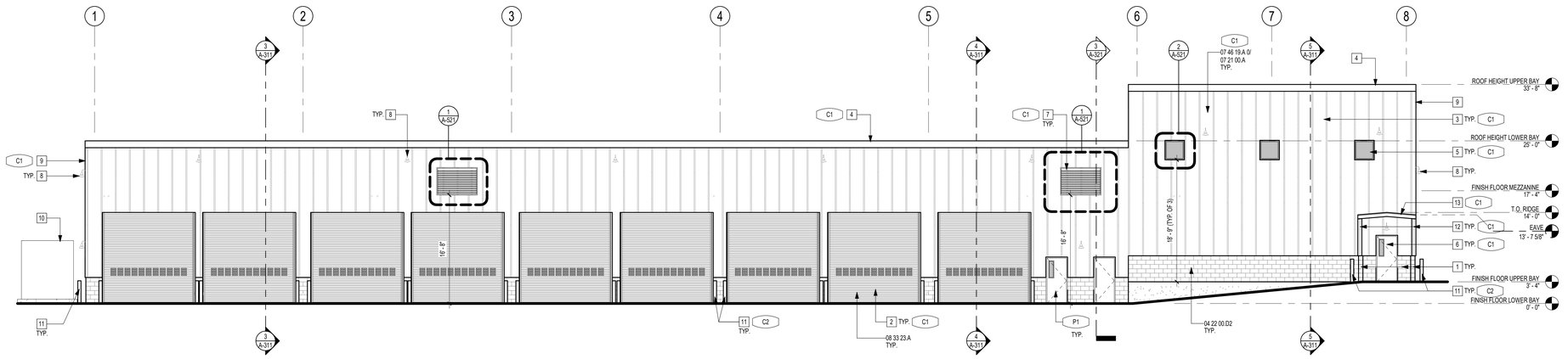
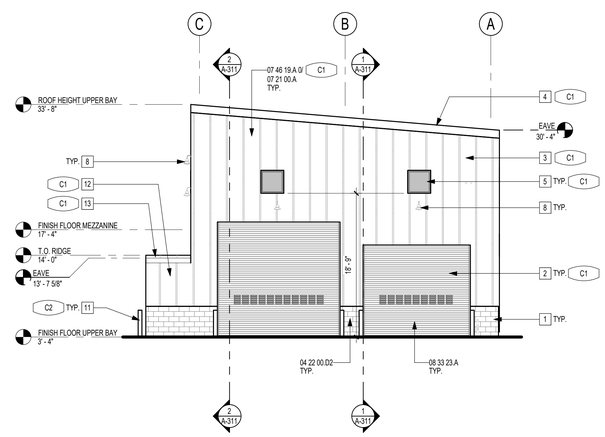


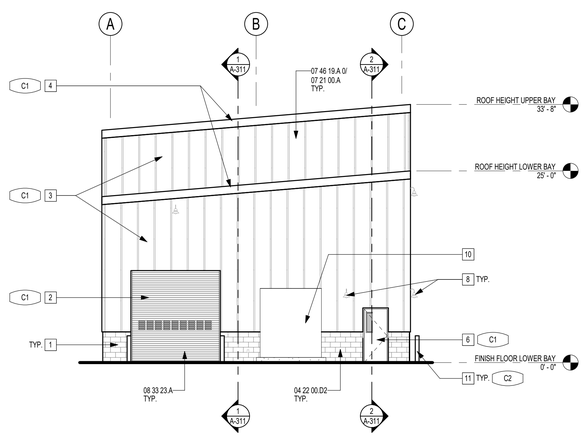
1 NORTH ELEVATION
1/8" = 1'-0"



2 SOUTH ELEVATION
1/8" = 1'-0"



3 EAST ELEVATION
1/8" = 1'-0"



4 WEST ELEVATION
1/8" = 1'-0"

KEYNOTES

04 22 00.D2	CONCRETE MASONRY UNIT: SPLIT FACE FINISH
07 21 00.A	BATT INSULATION
07 41 13.A	METAL ROOF PANEL ASSEMBLY
07 46 19.A	METAL SIDING & SOFFIT ASSEMBLY
08 33 23.A	OVERHEAD COILING DOOR: INSULATED

SHEET NOTES A-211

1 CMU WALL
2 OH INSULATED COILING DOOR
3 METAL WALL PANEL OVER BATT INSULATION
4 METAL ROOF PANEL OVER BATT INSULATION
5 WINDOW
6 METAL DOOR AND FRAME
7 EXTERIOR LOUVER
8 LIGHT FIXTURE, REFER TO ELECTRICAL
9 SECURITY CAMERA - OFOI
10 ADDITIVE TANK ON CONCRETE PAD
11 STEEL BOLLARD, REFER TO DETAIL 4 / AS-601
12 NON-INSULATED METAL WALL PANEL
13 NON-INSULATED METAL ROOF PANEL

COLOR LEGEND

C1 COLOR TO MATCH METL SPAN "WEATHERED COPPER" #437R1124
C2 COLOR TO MATCH SHERWIN WILLIAMS "SAFETY YELLOW" SW4084
C3 COLOR TO MATCH SHERWIN WILLIAMS "TBD" SWxxxx
C4 COLOR TO MATCH SHERWIN WILLIAMS "TBD" SWxxxx
C5 COLOR TO MATCH SHERWIN WILLIAMS "TBD" SWxxxx

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SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	1/8" = 1'-0"
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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A-211
EXTERIOR ELEVATIONS

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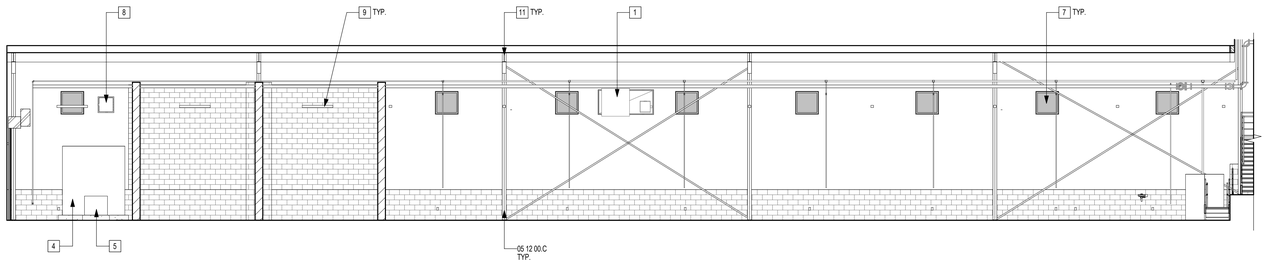
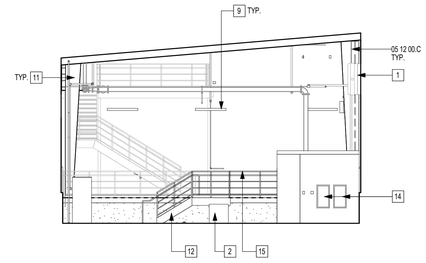
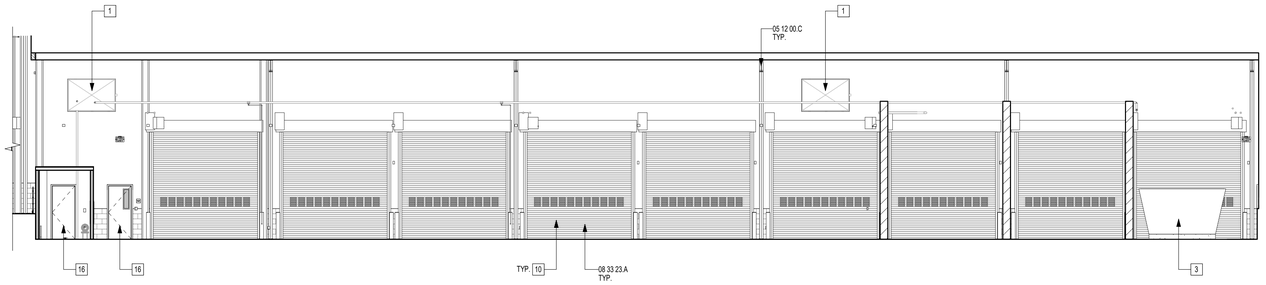


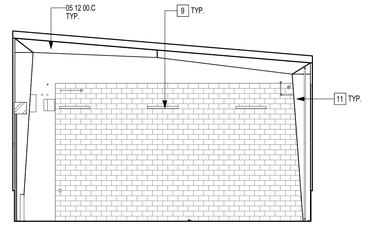
1 LOWER BAY - NORTH ELEVATION
1/8" = 1'-0"



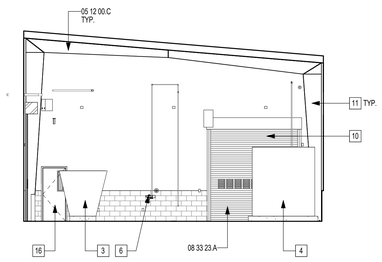
2 LOWER BAY - EAST ELEVATION
1/8" = 1'-0"



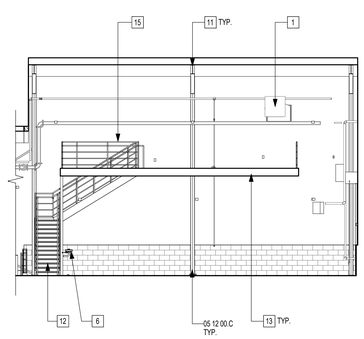
3 LOWER BAY - SOUTH ELEVATION
1/8" = 1'-0"



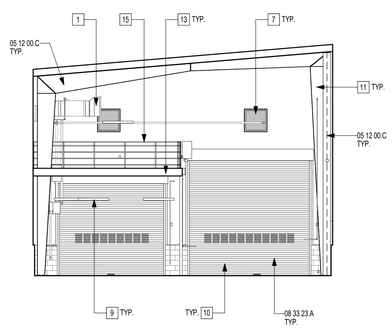
4 LOWER BAY - WEST ELEVATION
1/8" = 1'-0"



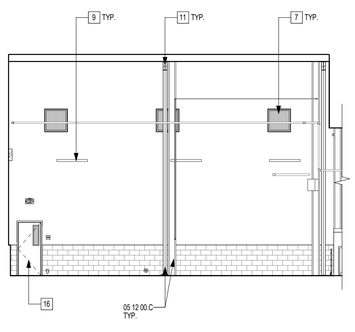
5 LOWER BAY - WEST ELEVATION - BRINE ROOM
1/8" = 1'-0"



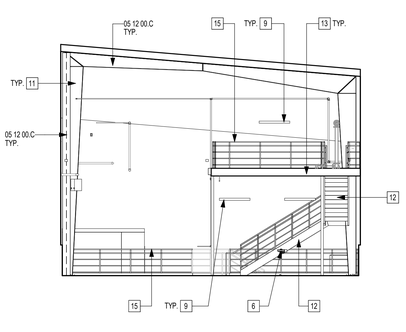
6 UPPER BAY - NORTH ELEVATION
1/8" = 1'-0"



7 UPPER BAY - EAST ELEVATION
1/8" = 1'-0"



8 UPPER BAY - SOUTH ELEVATION
1/8" = 1'-0"



9 UPPER BAY - WEST ELEVATION
1/8" = 1'-0"

KEYNOTES

05 12 00.C	STEEL COLUMN
08 33 23.A	OVERHEAD COILING DOOR: INSULATED

SHEET NOTES A-221

1	MECHANICAL EQUIPMENT, REFER TO MECHANICAL
2	TRANSFORMER, FLOOR MOUNTED, REFER TO ELECTRICAL
3	SALT HOPPER
4	BRINE TANK
5	V2
6	EYE WASH STATION, REFER TO PLUMBING
7	WINDOW
8	EXTERIOR LOUVER
9	LIGHT FIXTURE, REFER TO ELECTRICAL
10	OH INSULATED COILING DOOR
11	STEEL COLUMN, PRE-ENGINEERED METAL BUILDING, TYP
12	METAL STAIRS
13	MEZZANINE
14	ELECTRICAL PANEL LOCATION
15	STEEL HANDRAIL / GUARDRAIL ASSEMBLY, SEE DETAIL 9 / A-451
16	METAL DOOR AND FRAME

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A-221
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A-221 INTERIOR ELEVATIONS
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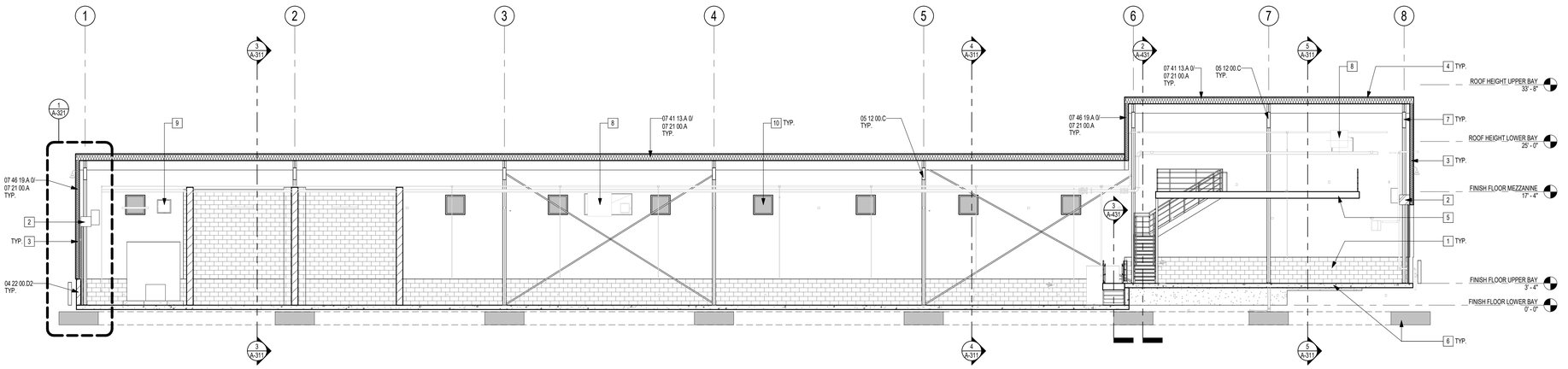
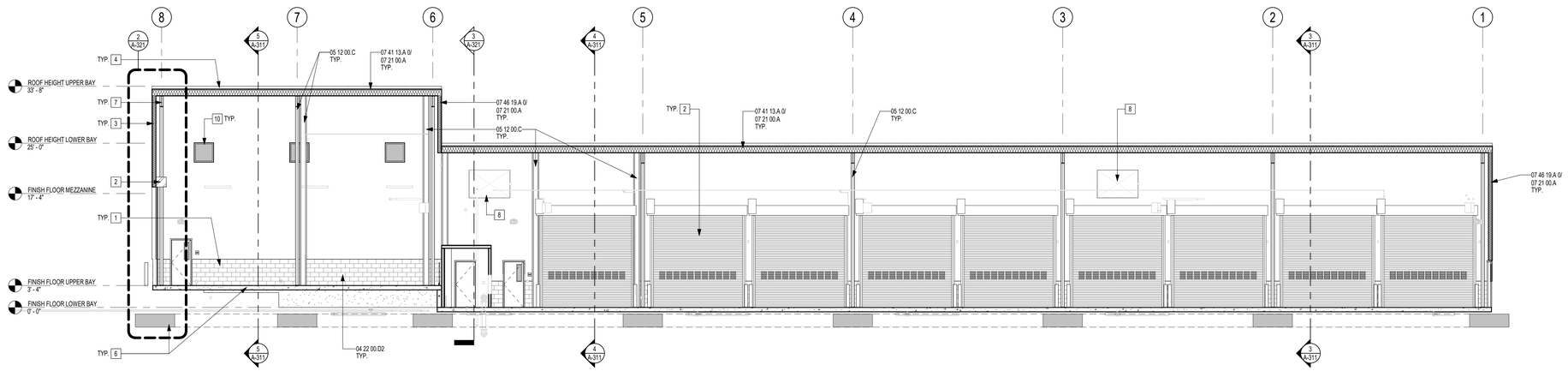
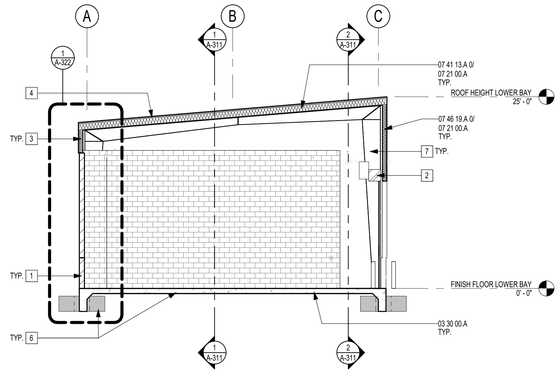


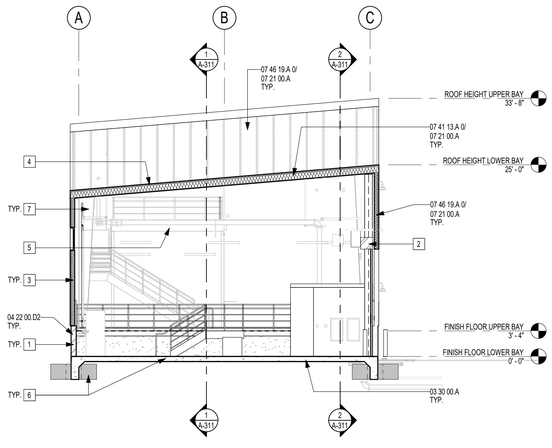
1 BUILDING SECTION 1
1/8" = 1'-0"



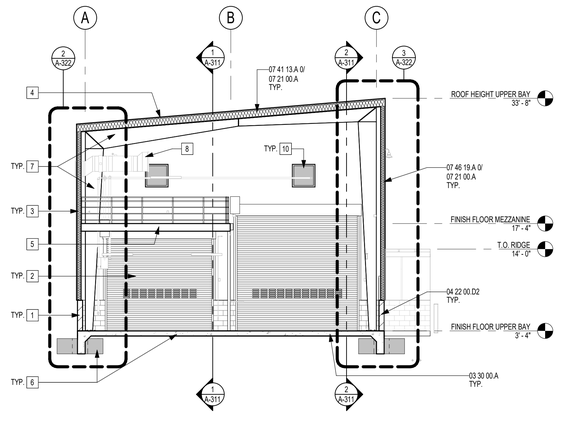
2 BUILDING SECTION 2
1/8" = 1'-0"



3 BUILDING SECTION 3
1/8" = 1'-0"



4 BUILDING SECTION 4
1/8" = 1'-0"



5 BUILDING SECTION 5
1/8" = 1'-0"

KEYNOTES

03 30 00.A	CAST IN PLACE CONCRETE
04 22 00.D2	CONCRETE MASONRY UNIT: SPLIT FACE FINISH
05 12 00.C	STEEL COLUMN
07 21 00.A	BATT INSULATION
07 41 13.A	METAL ROOF PANEL ASSEMBLY
07 46 19.A	METAL SIDING & SOFFIT ASSEMBLY

SHEET NOTES A-311

1	CMU WALL
2	OH INSULATED COILING DOOR
3	METAL WALL PANEL OVER BATT INSULATION
4	METAL ROOF PANEL OVER BATT INSULATION
5	MEZZANINE
6	SLAB AND FOOTING PER STRUCTURAL
7	STEEL COLUMN, PRE-ENGINEERED METAL BUILDING, TYP
8	MECHANICAL EQUIPMENT, REFER TO MECHANICAL
9	EXTERIOR LOUVER
10	WINDOW

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DEPARTMENT OF
TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	MA
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A-311
BUILDING SECTIONS

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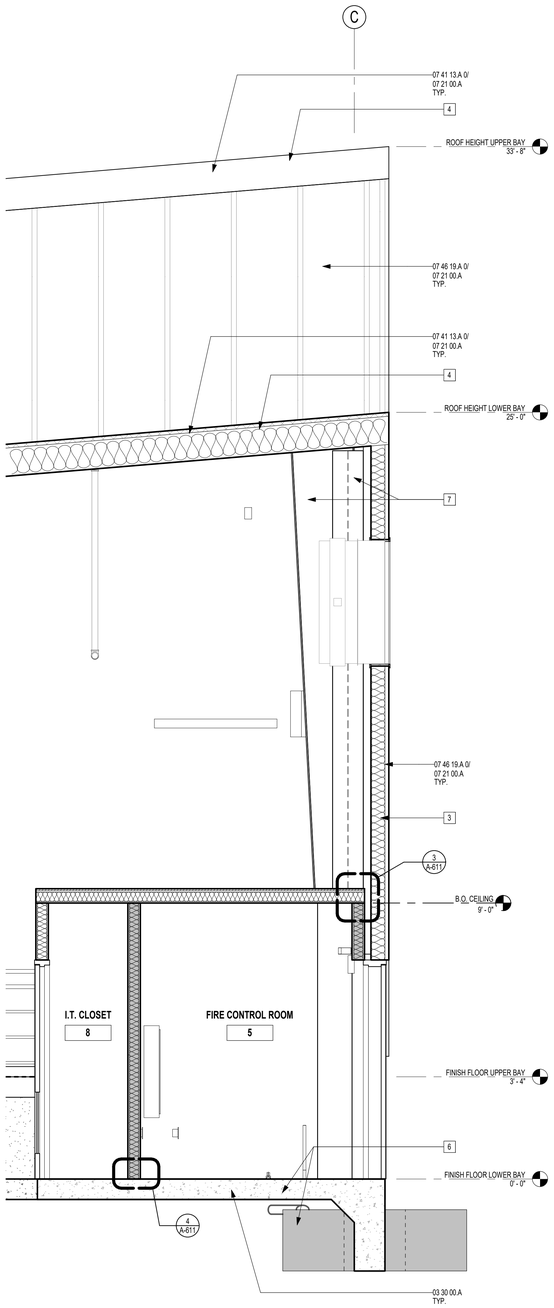
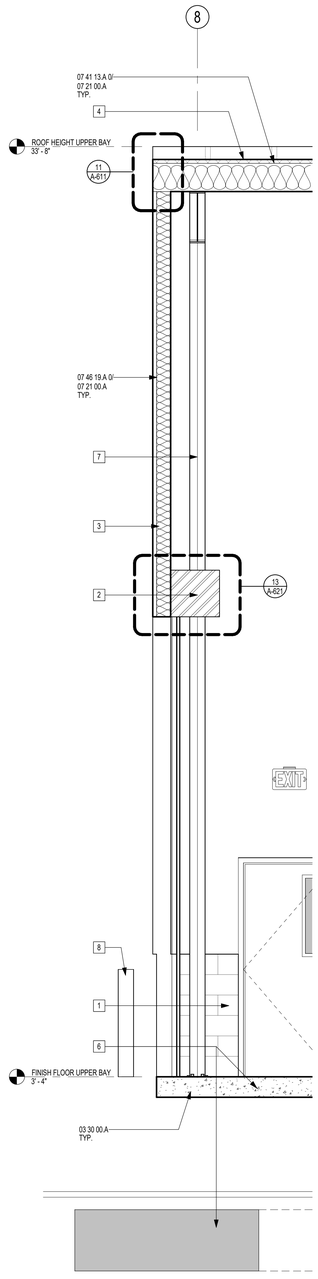
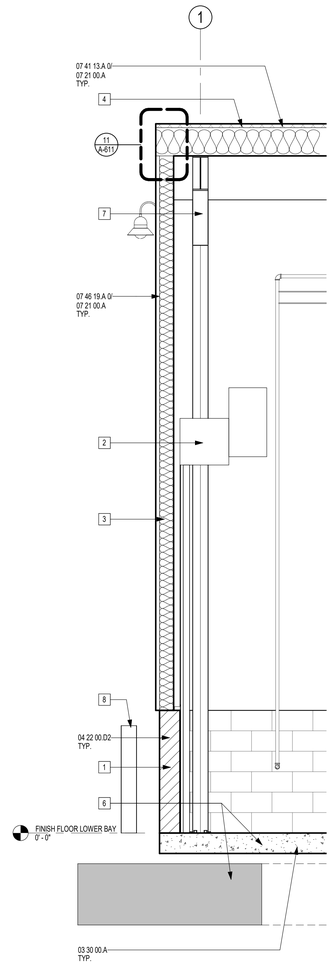


3 WALL SECTION 3
1/2" = 1'-0"



2 WALL SECTION 2
1/2" = 1'-0"



1 WALL SECTION 1
1/2" = 1'-0"

KEYNOTES

03 30 00.A	CAST IN PLACE CONCRETE
04 22 00.D2	CONCRETE MASONRY UNIT: SPLIT FACE FINISH
07 21 00.A	BATT INSULATION
07 41 13.A	METAL ROOF PANEL ASSEMBLY
07 46 19.A	METAL SIDING & SOFFIT ASSEMBLY

SHEET NOTES A-321

1	CMU WALL
2	OH INSULATED COILING DOOR
3	METAL WALL PANEL OVER BATT INSULATION
4	METAL ROOF PANEL OVER BATT INSULATION
6	SLAB AND FOOTING PER STRUCTURAL
7	STEEL COLUMN, PRE-ENGINEERED METAL BUILDING, TYP
8	BOLLARD, REFER TO DETAIL 4 / AS-601

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A-321
WALL SECTIONS

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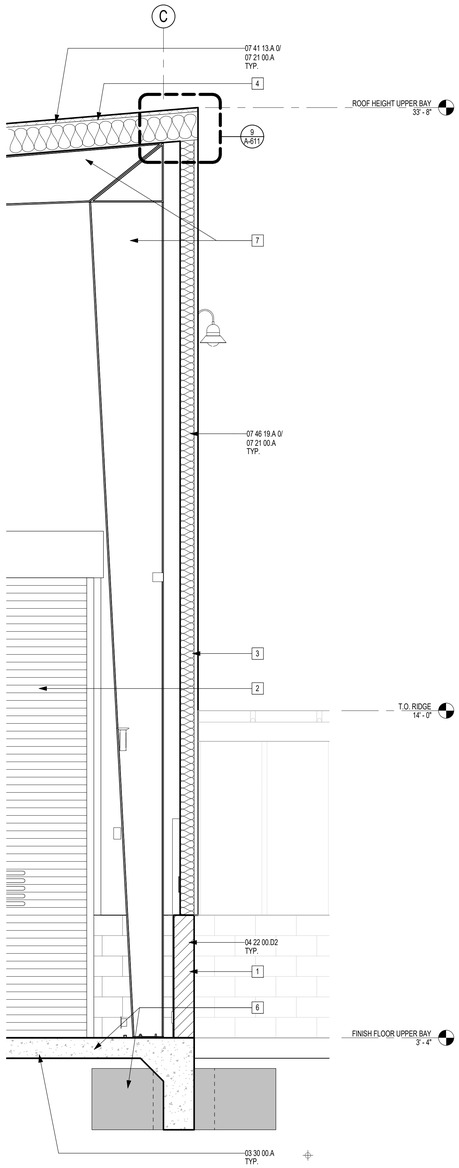
A-322 WALL SECTIONS



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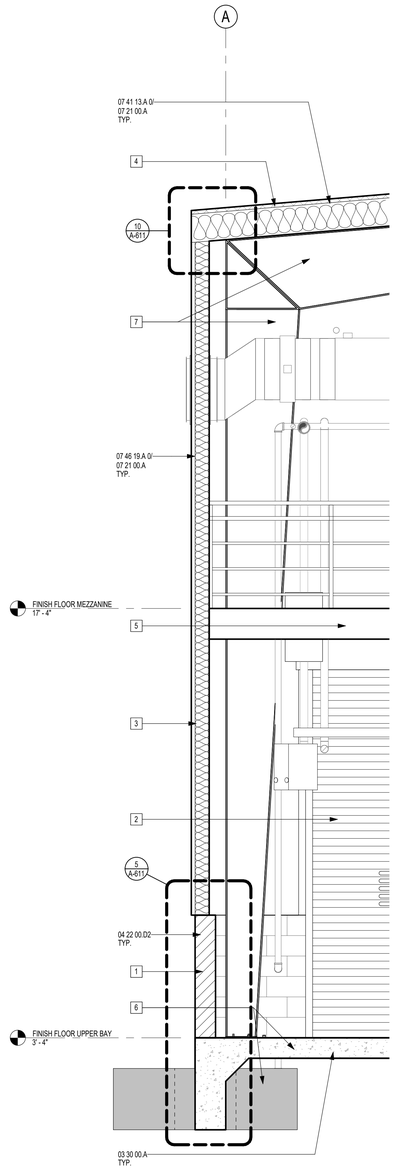
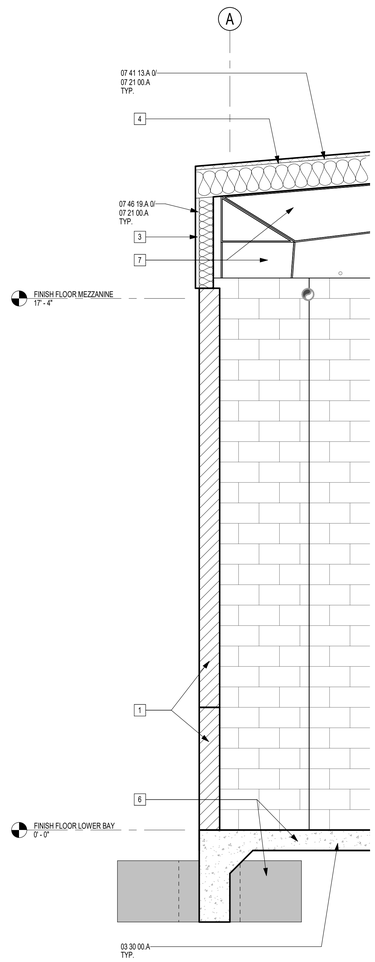


2 WALL SECTION 5
1/2" = 1'-0"



1 WALL SECTION 4
1/2" = 1'-0"

KEYNOTES

03 30 00.A	CAST IN PLACE CONCRETE
04 22 00.D2	CONCRETE MASONRY UNIT: SPLIT FACE FINISH
07 21 00.A	BATT INSULATION
07 41 13.A	METAL ROOF PANEL ASSEMBLY
07 46 19.A	METAL SIDING & SOFFIT ASSEMBLY

SHEET NOTES A-322

1	CMU WALL
2	OH INSULATED COILING DOOR
3	METAL WALL PANEL OVER BATT INSULATION
4	METAL ROOF PANEL OVER BATT INSULATION
5	MEZZANINE
6	SLAB AND FOOTING PER STRUCTURAL
7	STEEL COLUMN, PRE-ENGINEERED METAL BUILDING, TYP

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DRAWN	Author
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A-322
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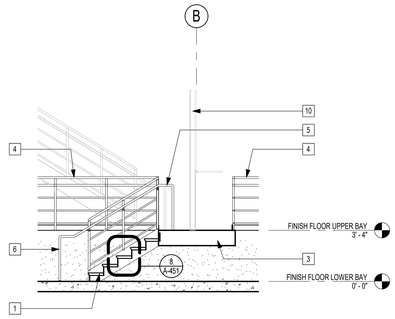
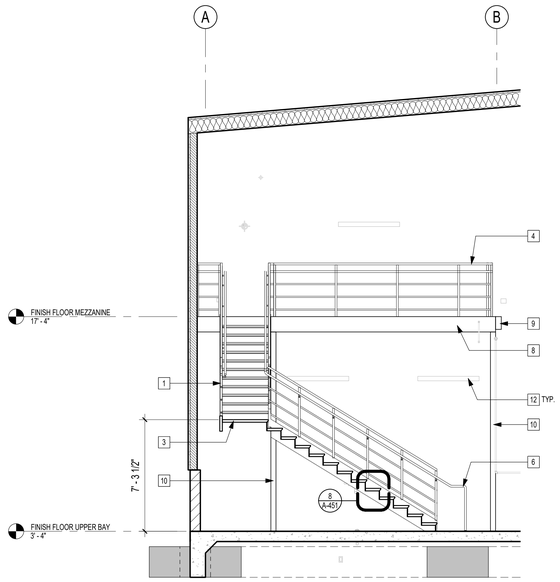
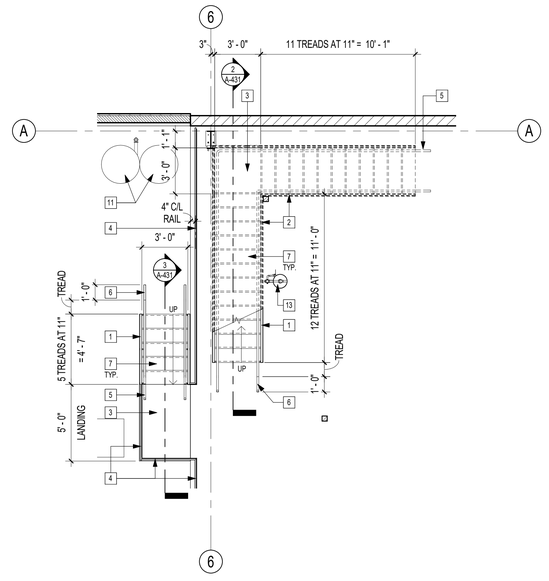


3 STAIR SECTION 2
1/4" = 1'-0"



2 STAIR SECTION 1
1/4" = 1'-0"



1 STAIR FLOOR PLAN
1/4" = 1'-0"

KEYNOTES

SHEET NOTES A-431

1 STEEL STAIR ASSEMBLY
2 DASHED LINES REPRESENT STAIR STRINGER AND TREADS ABOVE, REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS
3 STEEL STAIR LANDING
4 STEEL HANDRAIL / GUARDRAIL ASSEMBLY, SEE DETAIL 9 / A-451
5 HANDRAIL EXTENSION AT TOP OF STAIR, SEE DETAIL 2 / A-451
6 HANDRAIL EXTENSION AT BOTTOM OF STAIR, SEE DETAIL 1 / A-451
7 PLACE CONTRASTING STRIPE AT TOP AND BOTTOM TREAD
8 STEEL MEZZANINE
9 DOCK BUMPER
10 STEEL COLUMN, REFER TO STRUCTURAL
11 AIR COMPRESSOR, REFER TO MECHANICAL
12 LIGHT FIXTURE, REFER TO ELECTRICAL
13 EYE WASH STATION, REFER TO PLUMBING

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A-431

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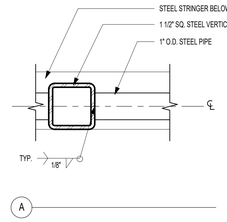
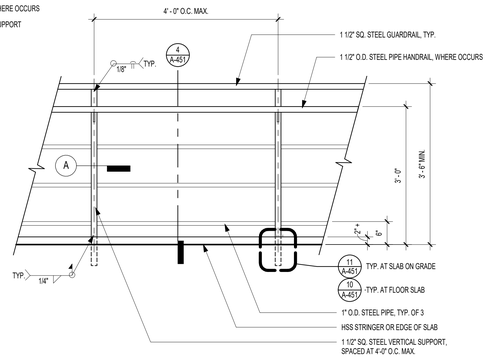
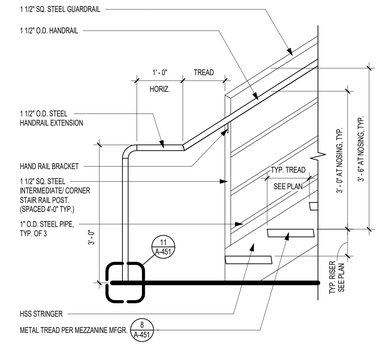
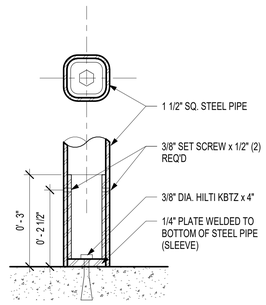




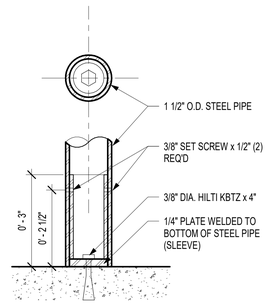
9 HANDRAIL / GUARDRAIL ELEVATION
TYPICAL — 3/4" = 1'-0"



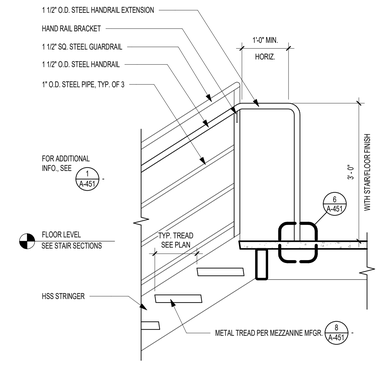
1 STAIR & RAIL
AT BOTTOM OF STAIR — 3/4" = 1'-0"



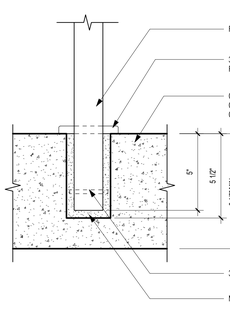
10 GUARDRAIL POST
AT FLOOR SLAB — 6" = 1'-0"



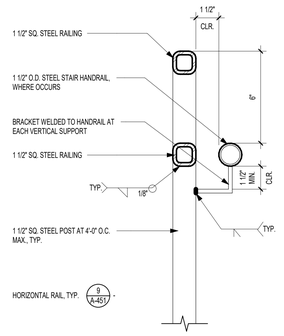
6 HANDRAIL POST
AT FLOOR SLAB — 6" = 1'-0"



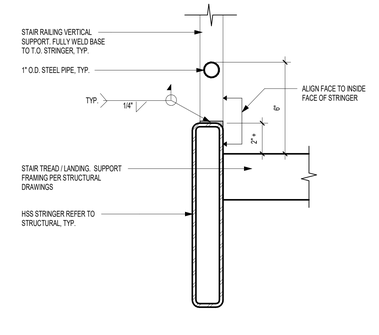
2 STAIR & RAIL
AT TOP OF STAIR — 3/4" = 1'-0"



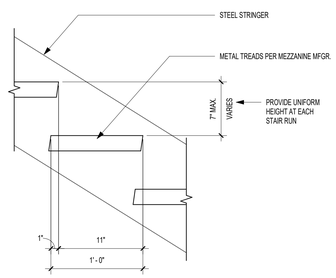
11 HANDRAIL / GUARDRAIL POST
AT CONCRETE SLAB ON GRADE — 3" = 1'-0"



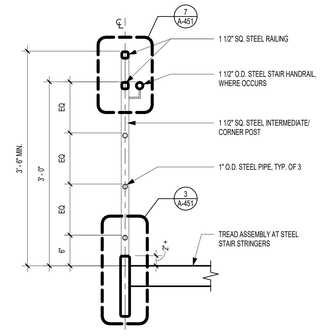
7 STAIR HANDRAIL
(SECTION VIEW) — 3" = 1'-0"



3 STAIR STRINGER AT HANDRAIL
(SECTION VIEW) — 3" = 1'-0"



8 TREAD AND RISER
(PROFILE) — 1 1/2" = 1'-0"



4 HANDRAIL AT STAIRS
(SECTION VIEW) — 1" = 1'-0"

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GREGORY M. TARDIFF
No. C18650
Ren. 2/28/23
STATE OF CALIFORNIA
AIA

SHAKORI GARAGE REPLACEMENT

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MEYERS, CA 96150
EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	W+P
DATE	04-18-2022
SCALE	As indicated
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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A-451
STAIR DETAILS

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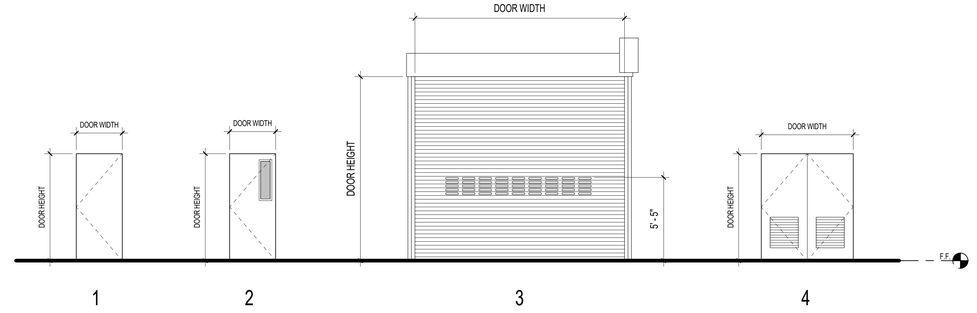
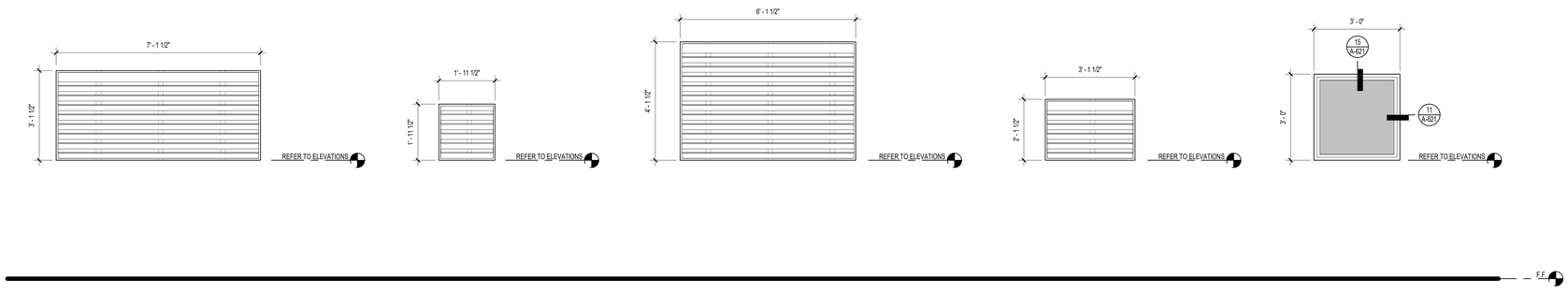
DOOR SCHEDULE

DOOR NUMBER	DOOR OPENING		DOOR ASSEMBLY				FRAME DETAILS				HARDWARE GROUP (SEE SPEC'S)	COMMENTS
	WIDTH	HEIGHT	DOOR TYPE	DOOR MATERIAL	FRAME MATERIAL	FIRE RATING (IN MINUTES)	HEAD	JAMB 1	JAMB 2	THRESHOLD		
101.1	3' - 0"	7' - 0"	2	STEEL	HOLLOW METAL		5 / A-621	2 / A-621	6 / A-621	3 / A-621	1	
101.2	3' - 0"	7' - 0"	2	STEEL	HOLLOW METAL		5 / A-621	2 / A-621	6 / A-621	4 / A-621	1	
101.3	3' - 0"	7' - 0"	1	STEEL	HOLLOW METAL		5 / A-621	2 / A-621	6 / A-621	4 / A-621	1	
101.4	3' - 0"	7' - 0"	2	STEEL	HOLLOW METAL		5 / A-621	2 / A-621	6 / A-621	3 / A-621	1	
101.5	11' - 8"	12' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.6	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.7	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.8	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.9	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.10	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.11	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.12	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.13	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.14	14' - 0"	14' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.15	16' - 0"	15' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.16	14' - 0"	12' - 0"	3			90 MIN.	13 / A-621	10 / A-621	14 / A-621	7 / A-621		
101.17	6' - 0"	7' - 0"	4	STEEL	HOLLOW METAL		20 / A-621	16 / A-621			2	



DOOR TYPES
1/4" = 1'-0"



LOUVER - A
1/2" = 1'-0"

LOUVER - B
1/2" = 1'-0"

LOUVER - C
1/2" = 1'-0"

LOUVER - D
1/2" = 1'-0"

WINDOW - A
1/2" = 1'-0"

DOOR NOTES

A. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
B. ALL DOORS AND HARDWARE SHALL BE INSTALLED IN STRICT COMPLIANCE WITH CALIFORNIA TITLE 24 ACCESSIBLE CODE OF REGULATIONS (ACCESS CODE) AND THE FEDERAL AMERICANS WITH DISABILITIES ACT GUIDELINES (2016 ADA STANDARDS).
C. PROVIDE SAFETY GLAZING IN ACCORDANCE WITH CALIFORNIA BUILDING CODE AND AS HEREIN LISTED.
D. EXIT DOORS SHALL BE ABLE TO BE OPENED FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT.
E. THE MAXIMUM EFFORT TO OPERATE DOORS SHALL NOT EXCEED 5 LBS. FOR EXTERIOR AND INTERIOR DOORS, EXCEPT FIRE DOORS WHICH MAY HAVE A MAXIMUM EFFORT OF 15 LBS. OF FORCE APPLIED AT RIGHT ANGLES TO THE DOOR.
F. ALL HARDWARE SHALL BE LEVER TYPE OR PANIC TYPE MOUNTED AT HEIGHT INDICATED IN THE SPECIFICATIONS AND SHALL BE MOUNTED NOT LESS THAN 30" NOR HIGHER THAN 44" ABOVE FINISH FLOOR.
G. DOOR CLOSERS SHALL BE ADJUSTED SUCH THAT FROM AN OPEN POSITION OF 70 DEGREES THE DOOR WILL TAKE A MINIMUM OF THREE SECONDS TO MOVE 3" FROM THE LATCH MEASURED FROM LEADING EDGE OF THE DOOR. FROM AN OPEN POSITION OF 90 DEGREES THE DOOR WILL TAKE A MINIMUM OF FIVE SECONDS TO MOVE 12" FROM THE LATCH MEASURED FROM LEADING EDGE OF THE DOOR.
H. WHEN ADDITIONAL DOORS ARE PROVIDED FOR EGRESS PURPOSES, THEY SHALL COMPLY WITH ALL PROVISIONS OF CBC 1004.12.
I. PROVIDE MIN. 10" SMOOTH UNINTERRUPTED SURFACE AT BOTTOM OF ALL DOORS PER CBC SECTION 1133B.2.6.
J. REFER TO WINDOW & DOOR FRAME SCHEDULE FOR EXACT LOCATIONS OF TEMPERED GLAZING @ SIDELIGHTS AND TRANSOMS.
K. OVERALL DOOR DIMENSIONS ARE SHOWN MEASURED TO FRAME OPENING.
L. REFER TO "WINDOW TYPE" FOR EXTERIOR AND INTERIOR STOREFRONT WINDOW CONFIGURATIONS AND APPLICABLE DETAILS.
M. KICK PLATE LOCATIONS, REFER TO SPECIFICATIONS SECTION 08710.

WINDOW NOTES

A. FIELD VERIFY ALL DIMENSIONS PRIOR TO SHOP DRAWINGS AND FABRICATION.
B. ALL OVERALL WINDOW DIMENSIONS SHOWN ARE MEASURED TO ROUGH OPENING, TYPICAL.
C. PROVIDE SAFETY GLAZING IN ACCORDANCE WITH CALIFORNIA BUILDING CODE AND AS HEREIN LISTED.
D. ALLOW FOR AND PROVIDE SHIM SPACE AT ALL STOREFRONT AND CURTAIN WALL WINDOW FRAMES, REFER TO DETAILS.
E. REFER TO WINDOW DETAILS FOR ROUGH OPENING REFERENCE POINTS.
F. FOR GENERAL WINDOW AND DOOR FLASHING NOTES, REFER TO 11/A7.3 AND 13/A7.3.
G. GLAZING IN DOORS, GLAZING WITHIN 18" OF FLOOR, OR GLAZING WITHIN 24" OF A DOOR AND LESS THAN 60" ABOVE WALKING SURFACE SHALL BE TEMPERED SAFETY GLAZING.

GLAZING LEGEND

1" LOW-E GLAZING: TYPICAL AT EXTERIOR WINDOWS & DOORS
1/4" CLEAR GLAZING: TYPICAL AT INTERIOR WINDOWS & DOORS

1" LOW-E SPANDREL: WHERE INDICATED ON DRAWINGS

T1 TEMPERED SAFETY GLAZING:
CATEGORY CLASS I PER CPSC 16 SFR 1201 PER CBC TABLE 2406
OR
CATEGORY CLASS B PER ANSI Z97.1 PER CBC TABLE 2406(2)

T2 TEMPERED SAFETY GLAZING:
CATEGORY CLASS II PER CPSC 16 SFR 1201 PER CBC TABLE 2406
OR
CATEGORY CLASS A PER ANSI Z97.1 PER CBC TABLE 2406(2)

HARDWARE GROUPS

HARDWARE GROUP 1

•	BUTTS	FULL MORTISE TA2714 NRP 4-1/2"X4-1/2"	US26D	MCKINNEY
•	CYLINDRICAL LOCK	ND53PD RHO	626	SCHLAGE
•	SURFACE CLOSER	4040 XP	689	LCN CLOSERS
•	DRIP STRIP P	NGP 16A	AL	NATIONAL GUARD
•	GASKET	S88W	GA-3 K	PEMKO (4)
•	FLOOR STOP	FS439/26D	626	IVES

HARDWARE GROUP 2

•	BUTTS	FULL MORTISE TA2714 NRP 4-1/2"X4-1/2"	US26D	MCKINNEY
•	CYLINDRICAL LOCK	ND53PD RHO	626	SCHLAGE
•	GASKET	S88W	GA-3 K	PEMKO (4)
•	FLOOR STOP	FS439/26D	626	IVES

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SHAKORI GARAGE REPLACEMENT

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EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

REVISIONS

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DRAWN	Author
DATE	04-18-2022
SCALE	As indicated
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT
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A-521
DOOR & WINDOW SCHEDULE

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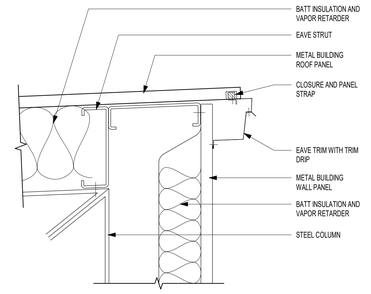
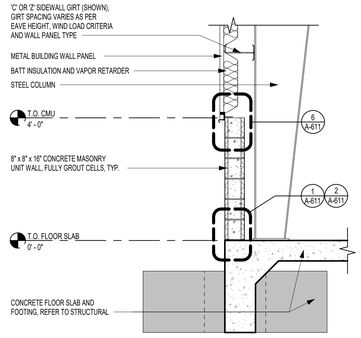
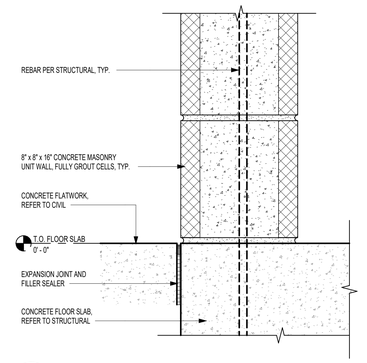


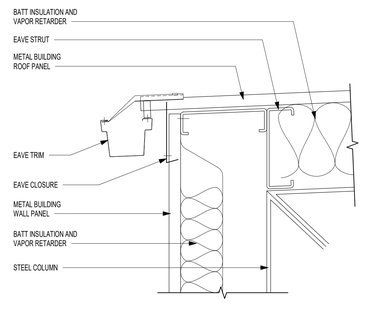
9 METAL ROOFING
HIGH EAVE CONDITION — 1 1/2" = 1'-0"



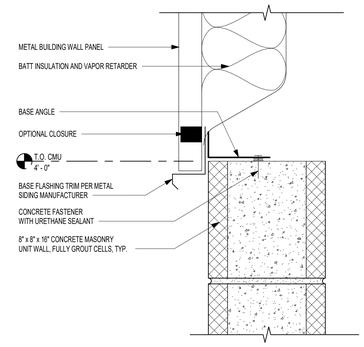
5 EXTERIOR WALL
CMU AT METAL SIDING — 1/2" = 1'-0"



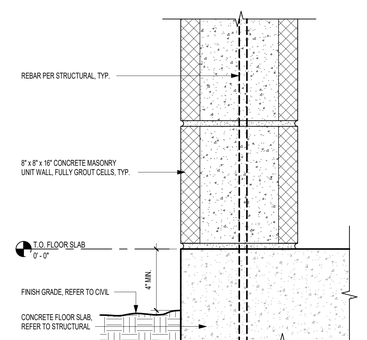
1 CMU WALL
BASE OF WALL AT CONCRETE FLATWORK — 3" = 1'-0"



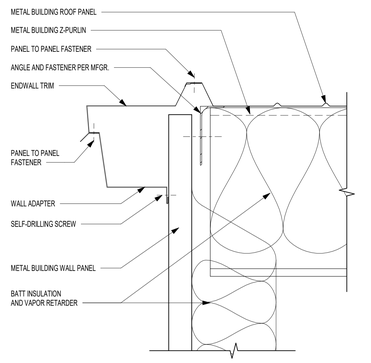
10 METAL ROOFING
LOW EAVE CONDITION — 1 1/2" = 1'-0"



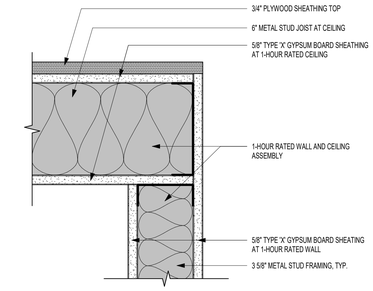
6 METAL PANEL SIDING
BASE AT CMU — 3" = 1'-0"



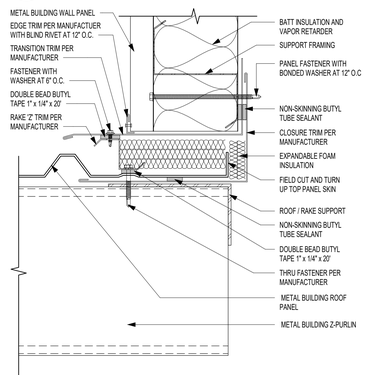
2 CMU WALL
BASE OF WALL AT FINISH GRADE — 3" = 1'-0"



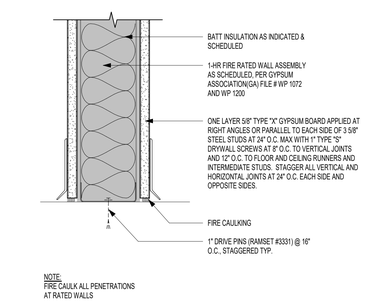
11 METAL ROOFING
RAKE CONDITION — 3" = 1'-0"



3 1-HOUR RATED WALL AND CEILING
ASSEMBLY — 3" = 1'-0"



12 METAL ROOFING
WALL TO ROOF RAKE — 3" = 1'-0"



4 1 HOUR RATED WALL (47 STC)
GA FILE NO. WP 1072 — 3" = 1'-0"

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REVISIONS

JOB NO.	00200035.00
DRAWN	Author
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FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

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A-611
ROOF AND WALL DETAILS

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NOTE:
INSTALL OVERHEAD DOOR IN STRICT ACCORDANCE PER WRITTEN INSTRUCTIONS

TOP HOOD BEAD
"D" HOOD
GUIDE RAIL
INSULATED SLATS

METAL BUILDING WALL ASSEMBLY; REFER TO METAL BUILDING DWGS.; METAL BUILDING MANUFACTURER TO PROVIDE APPROPRIATE STRUCTURE AT OVERHEAD DOOR HEAD TO ACCOMODATE OVERHEAD DOOR LOADS, AND OVERHEAD DOOR MANUFACTURER'S RECOMMENDED FASTENER TYPES & LOCATIONS
SHIM, TYP.
BATT INSULATION AND VAPOR RETARDER
FASTENER PER MANUFACTURER RECOMMENDATIONS AND IN COORDINATION WITH METAL BUILDING MFGR.
(COLD FORMED) STEEL COVER FLASHING TO BE PROVIDED BY METAL BUILDING MFGR., TYP.; PAINTED TO MATCH METAL BUILDING
PANEL CLOSURE, BY METAL BUILDING MFGR., TYP.
BACKER ROD AND SEALANT

PROVIDE THE FOLLOWING WITH THE INSULATED OVERHEAD DOOR:
1. WEATHER/SENSING EDGE OF NEOPRENE OR RUBBER ASTRAGAL EXTENDING THE FULL WIDTH OF THE DOOR BOTTOM BAR.
2. VINYL STRIP ON GUIDES TO SEAL AGAINST FASCIA SIDE OF CURTAIN.
3. NYLON BRUSH SEALS FITTED AT THE DOOR HEADER TO IMPEDE AIR FLOW.

13 OVERHEAD DOOR
HEAD AT METAL BUILDING WALL — 3"=1'-0"

METAL WALL PANEL, BY METAL BUILDING MFGR., TYP.
METAL BUILDING WALL FRAMING ASSEMBLY; REFER TO METAL BUILDING DWGS.
BATT INSULATION AND VAPOR RETARDER
METAL PANEL CLOSURE, BY METAL BUILDING MFGR., TYP.
BACKER ROD & SEALANT JOINT, TYP.
RAIN DRIP, TYP.
HOLLOW METAL DOOR FRAME (1 / A-621)
HOLLOW METAL DOOR; REFER TO DOOR SCHEDULE
INTERIOR
EXTERIOR

5 EXTERIOR HOLLOW METAL DOOR
HEAD AT METAL SIDING — 3" = 1'-0"

3/4" TYP.
1-1/2" AT METAL SIDING
1/2"
VARIES
COORD. WITH WALL ASSEMBLY
CONTINUOUS FLANGE, TYP. WHERE FLANGE IS EXPOSED AT F.O. CURB AT B.O. WALL, PAINT FLANGE TO MATCH DOOR FRAME. PROVIDE FULL BED OF SEALANT BETWEEN FLANGE AND F.O. CURB, TYP.
2"
2"
RAIN DRIP AT HEAD CONDITION, TYP.
3"
5/8"
VARIES
2"
16 GA. HOLLOW METAL FRAME, PAINTED
STUD ANCHOR, TYP.

NOTE: ALL HOLLOW METAL DOORS AND FRAMES SHALL BE PAINTED; COLOR TO MATCH ADJACENT WALL SURFACE, U.O.N.

1 EXTERIOR HOLLOW METAL FRAME
AT METAL STUD FRAMED WALLS — 3" = 1'-0"

HEAD BRACKET ABOVE
OVERHEAD DOOR, REFER TO DOOR SCHEDULE
OVERHEAD DOOR GUIDE: FASTEN PER MFGR'S RECOMMENDATIONS
METAL BUILDING WALL ASSEMBLY; REFER TO METAL BUILDING DWGS.; METAL BUILDING MANUFACTURER TO PROVIDE APPROPRIATE STRUCTURE AT OVERHEAD DOOR HEAD TO ACCOMODATE OVERHEAD DOOR LOADS, AND OVERHEAD DOOR MANUFACTURER'S RECOMMENDED FASTENER TYPES & LOCATIONS
3-3/8" TO 5"
VERIFY W/ MFGR.
INTERIOR
FASTENER PER MANUFACTURER RECOMMENDATIONS AND IN COORDINATION WITH METAL BUILDING MFGR.
BATT INSULATION AND VAPOR RETARDER
(COLD FORMED) STEEL COVER FLASHING TO BE PROVIDED BY METAL BUILDING MFGR., TYP.; PAINTED TO MATCH INSULATED PANELS.
NOTE:
INSTALL PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
METAL WALL PANEL BY METAL BUILDING MFGR., TYP.
EXTERIOR
PANEL END CLOSURE, BY METAL BUILDING MFGR., TYP.

14 OVERHEAD DOOR
JAMB AT METAL BUILDING WALL — 3" = 1'-0"

HEAD BRACKET ABOVE, TYP.
OVERHEAD COILING DOOR GUIDE; FASTEN PER MFGR'S RECOMMENDATIONS
OVERHEAD COILING DOOR; REFER TO DOOR SCHEDULE
INTERIOR
3 1/2" x 2 1/2" x 1/4" STEEL ANGLE; FASTEN INTO CMU 3/8" WITH DIA. EXPANSION ANCHOR AT 24" O.C.
CMU WALL, TYP.
3" x 8-1/8" x 1/4" THICK CONTINUOUS BENT PLATE WITH FULLY WELDED MITERED CORNERS
EXTERIOR

10 OVERHEAD DOOR
JAMB AT CMU — 3" = 1'-0"

BATT INSULATION AND VAPOR RETARDER
METAL BUILDING WALL FRAMING ASSEMBLY; REFER TO METAL BUILDING DWGS.
HOLLOW METAL DOOR FRAME
HOLLOW METAL DOOR; REFER TO DOOR SCHEDULE
INTERIOR
EXTERIOR
BACKER ROD & SEALANT JOINT, TYP.
METAL PANEL END CLOSURE, BY METAL BUILDING MFGR., TYP.
METAL WALL PANEL, BY METAL BUILDING MFGR., TYP.

6 EXTERIOR HOLLOW METAL DOOR
JAMB AT METAL SIDING — 3" = 1'-0"

CMU, TYP.; REFER TO STRUCT. DWGS.
DOOR FRAME ANCHOR
INTERIOR
EXTERIOR
CONTINUOUS FILLET BEAD OF SEALANT, TYP.
HOLLOW METAL DOOR FRAME
HOLLOW METAL DOOR

2 EXTERIOR HOLLOW METAL DOOR
JAMB AT CMU — 3" = 1'-0"

STUD ANCHORS, TYPICAL EACH SIDE AT METAL STUD WALLS
5/8"
3/8"
2"
5/8"
2"
VARIES
2"
COORD. WITH WALL FRAMING

HEAD / JAMB - DRYWALL

GENERAL NOTES:
1. FRAMES SHALL BE FULLY WELDED
2. PROVIDE RATED FRAME ASSEMBLY WITH FIRE SEAL WHERE NOTED ON DOOR SCHEDULE.
3. INSTALL DOOR FRAMES WITH FRAME MANUFACTURER'S CLOSER REINFORCING FOR SPECIFIED CLOSER TYPE

19 INTERIOR HOLLOW METAL FRAME
AT METAL STUD FRAMED WALLS — 3" = 1'-0"

BATT INSULATION AND VAPOR RETARDER
METAL BUILDING WALL PANEL
METAL BUILDING WALL FRAMING ASSEMBLY; REFER TO METAL BUILDING DWGS.
PANEL CLOSURE, BY METAL BUILDING MFGR., TYP.
ALUMINUM BREAK METAL FLASHING BY STOREFRONT MFGR; FINISH TO MATCH STOREFRONT.
BACKER ROD & SEALANT JOINT, TYP.
ALUMINUM STOREFRONT SYSTEM, TYP.
GLAZING; REFER TO WINDOW SCHEDULE, TYP.

15 STOREFRONT HEAD
AT METAL BUILDING PANEL (LOUVER SIM.) — 3"=1'-0"

METAL BUILDING WALL PANEL
BATT INSULATION AND VAPOR RETARDER
PANEL END CLOSURE, BY METAL BUILDING MFGR., TYP.
ALUMINUM BREAK METAL FLASHING BY STOREFRONT MFGR; FINISH TO MATCH STOREFRONT.
BACKER ROD & SEALANT JOINT, TYP.
GLAZING; REFER TO WINDOW SCHEDULE, TYP.
ALUMINUM STOREFRONT SYSTEM, TYP.
METAL BUILDING WALL FRAMING ASSEMBLY; REFER TO METAL BUILDING DWGS.

11 STOREFRONT JAMB
AT METAL BUILDING PANEL (LOUVER SIM.) — 3"=1'-0"

OVERHEAD DOOR GUIDE AT JAMB BEYOND
OVERHEAD DOOR, REFER TO DOOR SCHEDULE
CMU WALL BEYOND
BOTTOM SEAL, REFER TO SPECIFICATION
AC PAVING, TYP.
0'-0"
T.O. SLAB
0" - 0 1/4"
CONCRETE FLOOR SLAB

7 OVERHEAD DOOR
THRESHOLD AT AC PAVING — 3" = 1'-0"

HOLLOW METAL DOOR FRAME BEYOND, TYP.
HOLLOW METAL DOOR; REFER TO DOOR SCHEDULE
DOOR SWEEP, TYP.; REFER TO DOOR HARDWARE SPECIFICATIONS
OFFSET SADDLE THRESHOLD, TYP.; REFER TO DOOR HARDWARE SPECIFICATIONS
SLOPE: 1.8% MAX.
1/4" MAX.
1/4" MAX.
EXPANSION JOINT, REFER TO:
CONCRETE FLATWORK, TYP.
AGGREGATE BASE, TYP.
CONCRETE SLAB, TYP.

NOTE: ALL HOLLOW METAL DOORS AND FRAMES SHALL BE PAINTED; COLOR TO MATCH ADJACENT WALL SURFACE, U.O.N.

3 EXTERIOR HOLLOW METAL DOOR
THRESHOLD AT CONCRETE — 3" = 1'-0"

BOX HEADER AT 48" WIDE AND WIDER OPENING AND AT ALL FULL HEIGHT WALLS. (ALTERNATE HEADER AT ALL OTHER LOCATIONS)
FRICTION FIT BATT INSULATION, TYPICAL
GYPSUM BOARD, TYPICAL
METAL STUD FRAMING, TYPICAL
TRACK
STUD
DIM. PT. DR. OPNG.
ALTERNATE BUILT-UP HEADER @ OPENINGS >48" IN NON-RATED WALLS
FASTEN PER MANUFACTURER'S INSTRUCTIONS, TYPICAL
HOLLOW METAL FRAME (19 / A-621)
CEILING WHERE OCCURS
DOOR, REFER TO DOOR SCHEDULE

20 HOLLOW METAL DOOR
HEAD AT METAL STUD WALL — 3" = 1'-0"

DIM. PT. DR. OPNG.
3" MIN.
WALL, WHERE OCCURS
FRICTION FIT BATT INSULATION, TYP.
GYPSUM BOARD, TYP.
1"x3"x18 GA. PLATE @ 24" O.C. SECURED WITH (2) #10 SMS AT EA STUD SIDE OF WALL
METAL STUD FRAMING, TYP.
HOLLOW METAL FRAME (19 / A-621)
DOOR; REFER TO DOOR SCHEDULE
FILL SPACE WITH INSULATION AT DOORS LISTED W/ STC RATING
FASTEN PER MANUFACTURER'S INSTRUCTION, TYPICAL

16 HOLLOW METAL DOOR
JAMB AT METAL STUD WALL — 3" = 1'-0"

LAP JAMB FLASHINGS OVER VETICAL LEG OF SILL FLASHING AND SEAL WATER TIGHT
3/8" VERTICAL RISE AND REAR LEG
JAMB FLASHING
SILL FLASHING WITH FULLY SOLDERED SEAM
A - SILL FLASHING - PARTIAL ISOMETRIC

12 SILL FLASHING AT JAMB FLASHING
N.T.S.

END DAM FULLY SEALED AT SILL RECEPTOR
SILL FLASHING WITH FULLY SOLDERED SEAM (BELOW)
SILL RECEPTOR
B - SILL FLASHING WITH SILL RECEPTOR & END DAM - PARTIAL ISOMETRIC

HOLLOW METAL DOOR FRAME BEYOND, TYP.
HOLLOW METAL DOOR; REFER TO DOOR SCHEDULE
DOOR SWEEP, TYP.; REFER TO DOOR HARDWARE SPECIFICATIONS
OFFSET SADDLE THRESHOLD, TYP.; REFER TO DOOR HARDWARE SPECIFICATIONS
SLOPE: 1.8% MAX.
1/4" MAX.
1/4" MAX.
EXPANSION JOINT, REFER TO:
ASPHALT PAVING, TYP.
AGGREGATE BASE, TYP.
CONCRETE SLAB, TYP.

NOTE: ALL HOLLOW METAL DOORS AND FRAMES SHALL BE PAINTED; COLOR TO MATCH ADJACENT WALL SURFACE, U.O.N.

4 EXTERIOR HOLLOW METAL DOOR
THRESHOLD AT ASPHALT — 3" = 1'-0"

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SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA 96150
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

REVISIONS

JOB NO.	00200035.00
DRAWN	Author
DATE	04-18-2022
SCALE	As indicated
FILENAME	SHAKORI LOWER GARAGE REPLACEMENT

www.williamspluspaddon.com

A-621
EXTERIOR DOOR AND WINDOW DETAILS

MECHANICAL SPECIFICATIONS

1. Refer to Architect's Cover Sheet and Division 01 specifications for additional information about delivered submittals, codes, design-build details, seismic and wind criteria, submittals, closeout requirements, etc.
2. Fire Suppression and Fire Alarm designs shall be by design-build PE, or NICET 3 licensed technicians. Contractor shall submit to Building Department as DEFERRED SUBMITTALS. Contractor shall include all fees for designing and permitting of these systems. Any related information shown on the MEP plans is for general guidance only.
3. Controls, security, data, telecom, audio-visual, WiFi, access control, and similar low-voltage designs shall be by Contractor. Contractor shall submit to Building Department as DEFERRED SUBMITTALS if requested by building department or its designate. Contractor shall include all fees for designing and permitting of these systems. Any related information shown on the MEP plans is for general guidance only.
4. These notes accompany all the construction sections, manuals, and notes across all divisions. Subcontractors are bound with the general contractor to all parts of the construction contract. See specifications, plans and other divisions for additional information required for coordination. If a conflict is discovered, submit a request for interpretation.
5. These plans and their referenced specifications form together as engineering design intent and depend upon all other parts of the design documents from all other parties (architecture, structure, civil, fire protection, data, etc). These plans and specifications must therefore be used in whole, and in conjunction with all other plans and specifications. No sheet, page or part may be used individually.
6. Sugarpine Engineering shall have no responsibility for deviations from these plans and specifications, unless such deviations are authorized in advance, in writing, by Sugarpine Engineering. If deviations are made without authorization, then the party who authorized or made the deviations assumes all responsibility for the deviations. In the case of a Contractor making deviations, then that contractor shall be the Designer of Record and in responsible charge of those deviations, including for all effects, costs, or delays related to them.
7. Coordinate with general (prime) contractor (GC) for what items are to be provided and connected by which subcontractor.
8. Do not scale mechanical drawings. Verify and coordinate light fixtures, conduits, framing, structure, furnishings, etc., in field and across other divisions prior to procurement or commencement of work. Architectural and structural drawings shall govern all dimensions.
9. All contractors shall be licensed and experienced with the systems, performance levels, and construction types indicated in the plans and specifications prior to bidding.
10. All Contractors and Subcontractors shall be thoroughly knowledgeable in their part of the construction and shall perform in a responsible manner with customary construction sequence, shall recognize the priority of the construction documents, and shall notify the general contractor in writing of potential problems when the construction documents are unclear or inconsistent.
11. Subcontractors shall be responsible to notify the prime contractor of discrepancies or conflicts in the construction documents or as-built conditions discovered during bidding and/or prior to performing the work.
12. Items not indicated on the plans or specifications, including but not limited to some designs and details for fire suppression, plumbing, HVAC, hose bibbs, drains, bracing, hangers, attachments, controls, junctions, splices, and other items necessary for the proper, code compliant, and complete operation as an addendum. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguities, inconsistencies, or errors are not presented by the contractors in writing, contractor shall include in his bid, labor materials and methods of construction to provide the highest cost option in question. After award of contract, no allowance or extra compensation will be made on behalf of the contractor due to his failure to make the written requests described above.
    B. Failure to request clarification during the bid period of any inadequacy, omission, or conflict will not relieve the contractor of his responsibilities. The signing of the contract implicitly denotes that the contractor has a thorough comprehension of the full intent and scope of the construction contract drawings and specifications.
13. All equipment shall meet or exceed 2019 Title 24 Part 6 Prescriptive and Mandatory efficiencies and requirements. All other portions of the work shall be designed and installed to comply with all parts of the 2019 Title 24 code series.
14. All products shall be selected and capable of performance at project altitude: 6,400'.
15. All products shall be provided, braced, and installed to comply with CBC Chapter 16 seismic requirements.
16. Sugarpine Engineering (SPE) cannot, through its designs, specifications, observations, or by any other means, guarantee the prevention, reduction or elimination of microorganisms, legionella, chemicals, particles, molecules or debris (collectively substances) in air, water or other building systems, or control potential risk factors for human health. Additionally, SPE cannot guarantee security of the project, including but not limited to entry, forced entry, filtration, air quality, equipment reliability, frost protection, or other means of protection, explicit or implied.
17. Examination of bidding documents:
    A. GC shall make the entire set of bid documents available to every subcontractor and vendor during the bidding period. Every subcontractor shall examine the bidding documents carefully, and not later than seven (7) days prior to bid submission, GC shall make written request to the owner for interpretation or correction of any discrepancies, ambiguities, inconsistencies, or errors therein which he may discover. The owner or architect shall transmit corrections as an addendum. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguities, inconsistencies, or errors are not presented by the contractors in writing, contractor shall include in his bid, labor materials and methods of construction to provide the highest cost option in question.
    B. Failure to request clarification during the bid period of any inadequacy, omission, or conflict will not relieve the contractor of his responsibilities. The signing of the contract implicitly denotes that the contractor has a thorough comprehension of the full intent and scope of the construction contract drawings and specifications.
18. Provide base bid with basis-of-design or listed equivalent products. Make and model named on any schedule or note is the basis-of-design. Other manufacturers listed (if any) are considered equivalents subject to matching the features and specifications of the basis-of-design.
19. Manufacturers not listed by name are considered substitutions and must be submitted with a "substitution request" highlighting variances from the basis-of-design and indicating cost or schedule savings. Substitutions may require additional design fees to review and/or accommodate. Substitutions will be considered only after bid award and will be considered only if there is a proposed schedule or cost savings. Contractor assumes all responsibility for delays and costs incurred due to review and/or accommodation of substitutions.
20. Contractor is responsible for all coordination of equivalents and substitutions, in addition to review and/or redesign fees. Where contract documents permit selection from several equivalents, or where substitutions become authorized, coordinate clearance and interface requirements with all divisions.
    A. Provide necessary additional items so that selected or substituted item operates equivalent to the basis-of-design and properly fits in the space allocated for the basis-of-design.
    B. Provide all features which are standard on the basis-of-design, even if not listed in specified options.
    C. Be responsible for assuring that piping, conduit, duct, flue, and other service locations for equivalents or substitutions do not cause access, service, or operational difficulties any greater that would be encountered with the basis-of-design.
21. Work shall be performed in a workmanlike manner to the satisfaction of the architect, owner, and engineer.
22. Materials, minor details, and/or equipment not scheduled on plans shall be identified by the subcontractor with sufficient time to allow selection, purchase, and delivery to maintain construction schedule.
23. All work of all trades shall meet or exceed the minimum materials, means and methods requirements of the applicable Building Codes, Mechanical Code, Plumbing Code, Fire Code, Fuel Gas Code, National Electrical Code, most current NFPA, all manufacturer's and amendments and manufacturer's installation recommendations. Perform diligent review of all applicable codes. Secure and apply SSL, requirements prior to bidding. If a conflict between these publications and/or the construction documents exists, the most expensive requirement shall be included in base bid, and a written request for clarification shall be submitted.
24. Pay for and secure all required permits and inspections. Coordinate with GC. Provide all documentation to owner at project completion, prior to final pay application.
25. All materials and/or equipment shall be new and shall be handled and installed per manufacturer's specifications and recommendations.
26. Temporary heat/cool shall be furnished by the general contractor. Use of the permanent heating/cooling systems will not be allowed during construction.
27. See architectural reflected ceiling plans for all ceiling dimensions, device locations, ceiling types, penetrations, light fixtures, beams, and air device locations. Do not scale mechanical drawings. Align devices. Where dimensions do not exist, coordinate with architect and/or interior designer.
28. See architectural floor plans for flooring materials. Provide drains and penetrations compatible with floor assemblies and ratings. All drains must be installed so floors slope to drains. Coordinate finished floor and drain body elevations with GC prior to drain installation and floor finishing.
29. Coordinate and overlay civil, architectural, structural, mechanical, fire protection, electrical, landscaping, and interior design drawings prior to installation.
30. Provide equipment to match electrical voltages, phase, breakers, controls, and capacities scheduled and/or available. Any deviation is considered a substitution subject to fees and terms above.
31. Field-verify exact locations of existing and new aboveground and underground utilities, piping, and raceway systems prior to trenching. Notify engineer immediately upon discovery of any discrepancy from the plans.
32. Provide necessary trenching, backfill, excavation, supports, sawcutting and patching, concrete/paving, etc., as required. Backfill trenches in 6" layers and to 90% compaction and patch to match grade.
33. Submittals:
    A. Number of copies: per Division 01, or 5 copies if not specified. Alternate: PDF.
    B. Submit all mechanical shop drawings and product data at one time. Submittals shall each be bound and indexed according to major system/type: dry HVAC, wet HVAC, plumbing, controls, fire protection, etc. Partial submittals will be rejected. Submittals shall include, but not be limited to: boilers, furnaces, pumps, fans, fixtures, insulation, diffusers, piping, valves, controls, and fire protection.
    C. Failure to submit, order, or release order for materials and/or equipment will not be accepted as a reason to substitute materials, equipment, or installation methods.
    D. Submit record documents (as-builts) to architect. Documents shall include all addenda, instructions, directives, specified changes, change orders, alterations, re-routings, etc.
34. Warranties:
    A. Guarantee the installation against defects in materials and workmanship. Labor warranty shall be for a period of one year, superseded by Division 01, if any. Equipment and material warranties shall be the full duration of each mfr's factory warranty. Provide all documentation to owner at project completion, prior to final pay application.
    B. All warranties shall commence on the day of owner's acceptance. Defects shall be promptly remedied without cost to the owner.
35. Field observations may be periodically conducted by SPE, for the sole purpose of reviewing progress and quality of work completed by the Contractor which falls within SPE's scope of design services. Observation is not intended to be an exhaustive check or a detailed inspection of the Contractor's work but rather to allow SPE to become generally familiar with the work in progress and to determine, in general, if the work is proceeding in accordance with the Contract Documents. SPE assumes no responsibility for construction means, methods, techniques, quality, sequences or procedures utilized by the Contractor, nor for the Contractor's safety precautions or programs, nor for acts or omissions of the Contractor, nor for the Contractor's failure to perform work in accordance with the Contract Documents or any applicable laws, codes, rules or regulations.
36. Systems shall be complete, operable, and ready for continuous operation prior to acceptance by the owner.
37. Offset piping, ductwork, etc, as necessary to accommodate structure, beams, columns and equipment. Record and submit all field changes.
38. Mount all operator controls (stats, dials, etc) on top of wall boxes at 48" AFF in "accessible" areas, 54" AFF in other areas. Provide boxes for all devices, mounting to drywall not allowed. Coordinate location and type/trim with wall finish. Avoid casework, moldings, trim, furniture, heat sources, sunlit and exterior walls. Notify engineer of any conflicts prior to beginning box rough-in.
39. Provide 4" high concrete equipment pads beneath floor mounted mechanical equipment, in addition to any base assemblies required or recommended by the manufacturer.
40. Fire stopping requirement. Penetrations through rated walls and floors shall be sealed with material capable of preventing the passage of flames and hot gasses when subjected to the requirements of the test standard specific for fire stops ASTM-E-814. Acceptable materials include: Dow Corning RTV fire stop foam for bare pipe, metal conduit, and electrical cable; 3M fire dam 150 caulk for bare pipe, metal conduit, and building construction gaps; 3M CP-25 caulk and FS-195 intumescent strips for insulated pipes, plastic pipe or conduit, and electrical cable. Submit UL Listed application data for each type of penetration encountered. Select and apply all fire-stopping materials in strict accordance with the mfr's written instructions and UL listings.
41. Roof Penetrations:
    A. Ducts, piping, and conduits penetrating through roof shall have roof flashing compatible with the roofing system. See architectural drawings.
    B. In the absence of roof information for base bids: Provide sheet lead type welded flashing for plumbing vents in built-up roofs, sealed tall cone with EPDM boot for pipe and conduit in EPDM membrane roofs, and curbed roof penetrations for all ducts. Installation shall be sealed with silicone or other engineered to be watertight.
    C. Provide min 20-gauge steel snow splitter for any roof penetration more than 3' from the roof peak. Provide engineered curb with cricket system for any roof penetration more than 6' from the roof peak.
42. Refer to all other drawings across all divisions for exact locations and additional requirements. Coordinate with Owner's Equipment (FF&E). Provide hot water, cold water, ductwork, gas, power, interlocks, controls, etc., as required by other suppliers.
43. Make final connections to all equipment. Pipe indirect waste from equipment to floor drains and floor sinks.
44. Support each air or refrigeration compressor, base mounted pump, air handling unit and fan by Mason Industries or equivalent spring type seismically restrained vibration isolators.
45. Systems shall be tested for proper operation. Perform at a minimum all code required tests or systems. If tests of work are defective, contractor shall make corrections necessary at no additional cost to owner.
46. Test-Adjust-Balance (TAB):
    A. Provide certified AABC TAB as part of base bid. Contractor shall be accredited by AABC. Balancing procedures shall be in accordance with AABC guidelines for proportional balance. Submit TAB report on standard AABC forms or equivalent forms with same data.
    B. Initiate TAB only after systems are installed, operational, and controlled.
    C. Measure after initial adjustment, and after final adjustment, in the following conditions:
        1. Exhaust fans all on.
        2. Only occupancy ventilation fan on.
        3. Occupancy ventilation and all exhaust fans on.
    D. Measurements shall include: all motor amperage and voltage readings; motor and fan RPM; static pressure at inlet and outlet of all packaged equipment, fans, coils, and filters; pitot tube measurement of supply, exhaust, return, and outside air main ducts, at minimum outside air (OA), and at 100% (economizer) OA; velocity distribution across the face of filters; air inlet and outlets; water flow at all flow measurement stations; inlet and outlet pressure at pumps with flow calculated from the pump curve; water flow, temperature drop, and pressure drop at all coils.
    E. Adjust VFDs, ECMs, controls, valves, and programming as necessary. Fully coordinate with controls contractors.
    F. Provide belts and sheaves as required for drive changes to adjust fan speed.
    G. Adjust flows to within 10% of listed quantity. If any flow is more than 10% low, investigate cause, attempt to rectify and notify engineer of cause. Submittal of balance report with less than required flows without explanation is cause for rejection.
47. Pipe materials:
    A. All pipes, fittings, and plumbing fixtures in contact with the potable water system shall be listed as NSF-61 lead-free.
    B. Gas pipe within building, above grade: Schedule 40 black steel pipe, 150 lb. malleable iron threaded fittings. Welded fitting on all pipes larger than 4".
    C. Gas pipe below grade outdoors: SDR11 or higher, ASTM-D2513 PE gas pipe with heat-fusion or mechanical fittings listed for the application. Include 12-gauge tracer wire (HMWPE or HDPE jacket) listed for direct-burial, OR detectable marking tape listed and labeled for the application. THHN not allowed. Join all fittings per pipe mfr's instructions. Min. 18" cover.
    D. Gas pipe below grade outdoors (short lengths): PVC or epoxy-bonded, UPC Listed, Schedule 40 steel listed for direct burial. Completely wrapped and sealed with PVC outdoor-listed pipe protection tape at joints and wherever coating is damaged. Min. 18" cover.
    E. Gas pipe below building or under outdoor concrete slabs: Same gas carrier pipe, but add: PVC or epoxy-bonded, UPC Listed, Schedule 40 steel containment conduit vented at building exterior. Completely wrapped and sealed with PVC outdoor-listed pipe protection tape at joints and wherever coating is damaged. Comply with NFPA 54.
    F. Gas valves: Non-lubricated ball or plug valve with resilient seats, AGA and UL listed for natural gas service.
    G. Domestic hot and cold piping inside building: Buried lines, Type "K" soft annealed copper water tube, single length to avoid fittings, (wrought copper fittings where unavoidable) and 1100°F solder. Non-buried lines, Type "L" hard copper water tube, wrought copper fittings and no lead 95-5 solder.
    H. Drain, Waste, and Vent piping inside building:
        1. Gravity waste and vent piping below ground or slab: Schedule 40 solid-core PVC DWV pipe with solvent welded DWV fittings.
        2. Gravity Waste and Vent piping above ground: Standard weight cast iron soil pipe, no hub with standard clamps, Husky or equivalent. Where gauge weight, galvanized steel pipe with black, wrought iron fittings, or DWV copper tube with DWV fittings and 95-5 no lead solder.
        3. Transitions between dissimilar pipe materials: No hub fittings with standard clamps, Husky or equivalent.
    I. Copper pipe valves and specialties:
        1. Gate valves: bronze, class 125, 200 lb. WOG
        2. Ball valves: bronze, class 125, 600 lb. WOG
        3. Check valves: bronze, class 125, 200 lb. WOG
        4. Balancing valves: 125 psi w.p. for 250-degree Fahrenheit service tight shutoff, tour and Anderson, Armstrong, Gerand, or Flowset, Bell and Gossett circuit setter.
        5. Dielectric unions and flanges: Designed for connection of steel to copper piping, with plastic nonconductive insulator or flange preventing copper to steel contact.
        6. Domestic water components to be NSF 61 "low lead" compliant.
    J. Drain and condensate piping:
        1. Combustion Condensate (Concealed or Buried): Schedule 40 solid-wall PVC pipe with solvent welded DWV fittings. Provide neutralization systems as recommended by combustion appliance manufacturer. Connect to plastic waste system, or for cast iron downstream of nearest regularly used fixture.
        2. Combustion Condensate (Exposed): Type L copper tube with DWV wrot copper fittings and 95-5 no lead solder. Provide neutralization systems as recommended by combustion appliance manufacturer. Connect to plastic waste system, or for cast iron downstream of nearest regularly used fixture.
        3. Non-combustion Condensate (Concealed or Buried): Schedule 40 solid-wall PVC pipe with solvent welded DWV fittings. Connect to nearest sink tailpiece or use trapped air gap fitting.
        4. Non-combustion Drains (Exposed): Type L copper tube with DWV wrot copper fittings and 95-5 no lead solder. Connect to nearest sink tailpiece or use trapped air gap fitting.
    K. Pipe Insulation and Jacketing:
        1. Domestic Pipe insulation thermal conductivity shall be k=0.22-0.5, 1" thickness for pipe size 1" and smaller, 1.5" thickness for pipe sizes 1¼" and larger per Title 24, Part 6, Section 120.3. Fiberglass, preformed pipe insulation with factory-applied white, all service jacket (ASJ) and SSL.
        2. All materials shall have a composite fire and smoke hazard rating of 50 or less per ASTM E84 or UL 723 test method.
    L. Water Hammer Arresters: Constructed with a piston in a sealed copper tube chamber and approved for installation within walls without access panels. Sioux chief or equivalent. Bellows type not acceptable.
48. Piping execution:
    A. Support pipe with rod and clevis, ring hangers, trapeze, or clamps. No "plumber's tape" or strapping allowed for pipes larger than ¾". All hangers shall be sized for O.D. of insulation, if any.
    B. Pipe insulation shall pass uninterrupted through hangers. 2" and larger: install cellular glass or calcium silicate inserts where pipes pass through hangers. 1.5" or smaller: 20ga galvanized steel saddles.
    C. Vapor barriers shall be continuous and sealed with non-breathing mastic on cold piping. All raw edges of insulation shall be neatly trimmed and sealed with mastic.
    D. Isolate bare copper pipes from galvanized steel. Copper coated hangers are not sufficient, wrapping pipe with tape not allowed.
    E. Provide a dielectric union at each connection between dissimilar metals. Do not directly connect steel to copper, brass, or bronze in any wet system.
    F. Refer to plumbing fixture connections schedule for pipe sizes to individual plumbing fixtures.
    G. Provide expansion joints or loops on all chilled, condenser, and heating water piping runs in excess of 50 feet and in accordance with the manufacturer's recommendations.
    H. Provide plastic grommets on all piping passing through beams, joists and studs.
    I. All floor drains and floor sinks connected to the sewer system shall be equipped with trap primers.
        1. Provide trap primers with ASSE listed backflow preventers and connect to the nearest cold water piping adjacent to a flushing fixture.
        2. Provide electronic trap primers for any areas where the nearest adjacent flushing fixtures are not within a reasonable distance or structural obstructions prevent gravity sloping of trap primer lines. Added cost of electric power for electronic trap primers shall be borne by plumbing contractor.
        3. Install all trap primer valves and associated systems in accordance with manufacturer's instructions.
    J. Provide water hammer arrestors at all domestic hot and cold-water supplies to fixtures and equipment with quick closing valves. Such fixtures and equipment include ice machines and clothes washers.
    K. Insulate all domestic cold water, domestic hot water, domestic hot water recirculation piping with preformed fiberglass (mineral fiber) pipe insulation. Secure and apply SSL, sealants, and jackets per manufacturer's instructions.
    L. Insulate all fittings with one piece fiberglass or glass fiber blanket insulation and factory-formed PVC covers.
49. Duct materials:
    A. Rectangular duct: G60 galvanized sheet steel; lock forming quality; constructed to the latest edition of SMACNA "HVAC duct construction standards"; +/- 1" w.c. pressure classification, seal class "B"; with galvanized steel fasteners, anchors, angles, straps, etc.
    B. Round duct: spiral seam, G60 galvanized steel. Die stamped or 5 gore elbows. "snap-lock", longitudinal seam duct, or adjustable fittings are acceptable on individual grille/diffuser runouts only.
    C. Flexible connection: equivalent to Ventfab, fireproof glass cloth, 10" w.c. rated. Install at every fan or air handling device 0.5hp or larger.
    D. Provide diffuser neck size same as duct size.
    E. Unless plans indicate otherwise, all changes in direction shall be made with radius elbows with radius to centerline equal to 1.5 duct width.
        1. Where required for space constraints, provide square throat elbows with single width (non-airfoil) turning vanes.
        2. For duct depths of 36" or less, provide manufactured single width (non-airfoil) turning vanes, with spacing in accordance with SMACNA duct construction standards for "standard spacing". Use double thickness blades for duct depths greater than 36". Use no trailing edges.
50. Duct insulation:
    A. No insulation required on exposed, spiral ductwork in directly conditioned areas.
    B. Externally wrap all round supply air ducts with flexible glass fiber, ANSI/ASTM C612; 0.002-inch foil scrim facing. Min R-value of 8 in unconditioned areas and min R-value of 4.2 in all other areas. For duct wrap, installed thickness shall be assumed to be 75 percent (25 percent compression) of nominal thickness.
    C. Line all supply, outside air, return air ducts, and exhaust air in unconditioned areas with 2", 1.5 pcf, black matte coated insulating duct liner, min. R-value = 8. Line all other ductwork with 1", 1.5 pcf, black matte coated insulating duct liner, min R-value = 4.2. Material shall meet all requirements of NFPA-90. Install with adhesive and welded pins in accordance with SMACNA "HVAC duct construction standards".
    D. Indoor Duct Liner:
        1. Listings: California Title 24, ASTM C1071, NFPA 90A, NFPA 90B, UL 723, ASTM E84, NFPA 255.
        2. Max. Flame Spread Index: 25. Max Smoke Developed Index: 50.
        3. Limited Combustible: NFPA 259; < 3,500 Btu/lb. Temperature: ASTM C411; Max. 250°F.
        4. Air Velocity: ASTM C1071, UL181; Max. 6,000 fpm.
        5. Water Vapor Absorption: ASTM C1104; < 3% by weight
        6. Corrosiveness: ASTM C665; Pass.
        7. Bacteria Resistance: ASTM G22; No Growth.
        8. Fungi Resistance: ASTM C1338, ASTM G21; Pass, No Growth
        9. Erosion: Velocity Rating = 4.4 (ISO/IST BP 6.9).
        10. Manufacturing: ISO 9001-2000, ISO 14001:2004 or higher.
        11. Minimum R-Value of 4.2 and 1" thick (NRC of .70).
        12. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed ToughGard T Textile Duct Liner, Type 200, 1" thick, or comparable product by one of the following: Johns Manville, Owens Corning.
    E. Duct Liner Execution:
        1. Apply duct liner instead of mineral fiber blanket for all insulated rectangular ducts in areas exposed to public view.
        2. Apply duct liner to inside of round ducts in areas sensitive to sound transmission. Use liner material designed for round ducts.
        3. Use adhesive conforming to ASTM C 916, with liner adhered to the duct with 90 percent minimum coverage.
        4. Use metal weld-pins in addition to adhesive. Pin placement per manufacturer's data sheet.
        5. Shop or field cuts shall be liberally coated with manufacturer's edge seal product.
        6. When velocity exceeds 4000 fpm, use metal nosing on every leading edge.
51. Ductwork execution:
    A. Seal all duct seams (non-gasketed flanges, fittings, longitudinal and transverse seams, etc.) airtight with United McGill "Uni-Grip" UL Listed, water based, non-hardening, elastic sealant or equivalent. Tape not allowed.
    B. Provide 1/4" galvanized mesh screen on all combustion air ducts or openings, and all open-end return, transfer, and exhaust ducts. 1/8" mesh for all exterior WUI penetrations.
    C. Ductwork dimensions on plans are sheet metal dimensions. Duct liner has been accounted for.
    D. No flexible ducts allowed.
52. Equipment labels: label all piping and equipment. Provide full band or strip type markers and flow arrows on piping. Provide engraved plastic valve tags with description or valve number and attach with standard chain or s-hooks. Provide flagging tape or labels with zone listed on air balance dampers. Provide engraved plastic sign on or near specified equipment. Glue, rivet, or screw tags to equipment, but do not damage equipment.
53. All products and systems shall be UL Listed, and installed to comply with their UL listings.
54. All wiring shall be in listed, metallic (EMT) raceways.
    A. Controls under 50 Volts: Raceways by EC, wiring by MC. MC responsible to coordinate this requirement to the EC and GC for base bid.
    B. All systems over 50 Volts: Raceways and wiring by EC.
55. Refer to the submitted and approved Title 24 Part 6 Certificates of Compliance, hereby incorporated by reference.
56. Prior to rough mechanical inspections, Contractor shall complete and provide all applicable Title 24 Certificates of Installation (NRCI).
57. Prior to final mechanical inspections and/or final payment application, Contractor shall complete and provide all applicable Title 24 Certificates of Acceptance (NRCA). Provide Acceptance Test Technician services in base bid.

DOCUMENT OWNERSHIP AND USE

1. These plans and specifications are professional Instruments of Service (Original Work) and shall remain the Intellectual Property of Sugarpine Engineering, Inc. (SPE) whether or not the project is executed.
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MECHANICAL INSTALLATION NOTES

1. Provide duct balancing damper at every takeoff. OBDs on grilles are not sufficient.
2. All potable water piping shall be Type L hard copper tube with no-lead solder joints. See specifications.
3. All exposed pipes, ducts and materials shall be metallic or shall be suitably wrapped to meet applicable flame spread requirements. No exposed plastic pipe, insulation, duct or wiring is allowed.
4. All ducts shall be sealed with mastic. Tape not suitable.
5. Floor-mounted equipment shall be on concrete housekeeping pads.
6. Coordinate with GC and all other trades prior to all installations.
7. If equipment connection is smaller than duct or pipe size indicated, then duct or pipe shall be full size to within 6" of equipment connection. All elbows and fittings shall be the full size.
8. Not all expansion loops, guides and anchors are shown on drawings. Contractor shall be responsible to provide all expansion piping loops not shown on isometric drawings per specifications and standard documentation.
9. At the time of rough installation all duct and other related air distribution component openings shall be covered to reduce the amount of dust or debris which may enter the system.
10. Provide a cleanout under each lavatory, WCO at base of each waste stack. Round paintable wall cover for each WCO.

GENERAL NOTES

1. See specifications for additional information.
2. These plans intend to describe only Mechanical parts of the work, shown as thick lines, and as noted. They do not intend to describe or convey information about any other work or parts of the project. Other work is shown for reference only as thin & light lines. Refer to applicable civil, architectural, structural, electrical, etc (Other Divisions) for designs and information related to those other items or systems.
3. All control wiring shall be in metallic (EMT) raceways. Raceways by EC, wiring by MC. MC responsible to coordinate this requirement to the EC and GC for base bid.
4. All standalone, factory, and equipment-provided controls are considered part of the controls system for the project. Each device shall have its programming and settings adjusted by the Controls Contractor, and shall be integrated with the building's overall controls, if applicable. See control sequences for more information.
5. Sugarpine Engineering is available (for additional fees) to assist with the contractor's production of controls wiring and component diagrams, controls configurations, sequences of operation, shop drawings, or similar detailing.
6. Contractor shall be responsible for unauthorized deviations from the designs and information indicated in these plans and specifications, and shall request approval from SPE in writing before any deviation is made. Lack of SPE's approval shall result in the contractor assuming responsibility as the designer-of-record for the deviation and its related impacts.
7. Contractor shall include Acceptance Test Technician services in base bid.
8. Project Altitude: 6,400'

PENETRATION COORDINATION

1. Each pipe or duct penetration of the building or structure shall be coordinated and blocked-out in advance, otherwise drilled, cut, and reinforced by the Contractor with approval of the structural engineer. Not all penetrations are shown on plans, and the contractor has reasonable and customary authority to perform minor routing adjustments in the field to avoid penetrations.
2. Contractor may elect to oversize blockouts if necessary to accommodate field adjustments. Maintain all fire rated assemblies if oversized penetrations are used.
3. These plans are not shop or coordination drawings. Submit dimensioned Coordination Drawings indicating all proposed penetrations after GC has overlaid the work of all trades. GC shall coordinate and overlay all trades before design team review.
4. See Specification sections for more information on Shop and Coordination Drawings.
5. These plans intend that concrete is not post- or pre-tensioned and can be drilled. Refer to Structural and Architectural plans for assemblies and additional requirements.

PLUMBING FIXTURES

1. All domestic fixtures used on this project shall be low-flow EPA WaterSense compliant. All domestic fixtures and devices in contact with potable water shall be NSF 61 lead-free.Each plumbing fixture on this project shall comply with the applicable ASSE, UPC, USC FCCCHR and similar requirements to provide air gaps and devices to prevent backflow and backsiphonage. GC shall ensure fixtures meet listings prior to submitting shop drawings or product data.
2. After performing final water piping flush, clean every strainer on every showerhead and lavatory sink faucet immediately prior to building turnover.

ABBREVIATIONS & ACRONYMS

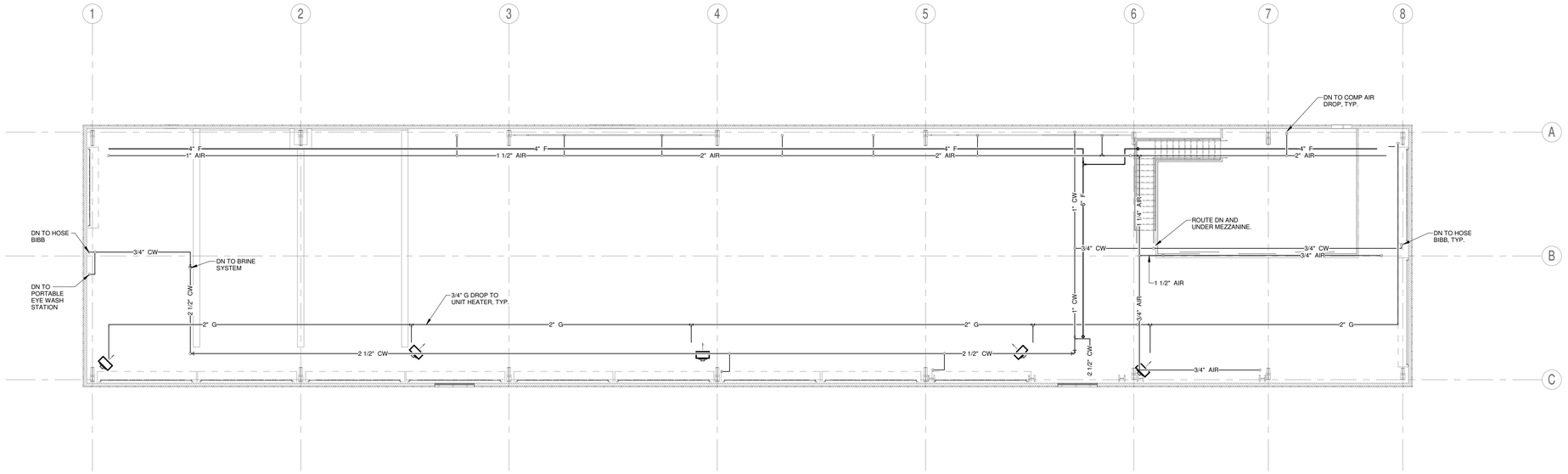
(E)	Existing	DFU	Drainage Fixture Unit	IE	Invert Elevation (Bottom of Pipe)	RP	Reduced Pressure
(N)	New	DHW	Domestic Hot Water	IWC	Inches Water Column	RPBFP	Reduced Pressure Backflow Preventer
A	Amperes, Amps	DIAG	Diagram	ISO	Isolation, Isolator	RPM	Revolutions per Minute
ABS	Acrylonitrile Butadiene Styrene	DN	Down	JT	Joint Trench	RTN	Return
ADA	Americans with Disabilities Act	DT	Differential Temperature	KBTU	1,000 Btu	SP	Supply Air
ADJ	Adjustable	DX	Direct Expansion Refrigerant	LAT	Leaving Air Temperature	SEER	Seasonal Energy Efficiency Ratio
AFF	Above Finished Floor	EA	Exhaust Air	LAV	Lavatory	SF	Square Feet
AFG	Above Finished Grade	EAT	Entering Air Temperature	LPG	Liquified Petroleum Gas (Propane)	SL	Sea Level
AFUE	Annual Fuel Utilization Efficiency	EC	Electrical Contractor	LRA	Locked Rotor Amps	SS	Sanitary Sewer
AGF	Air Gap Fitting	ECM	Electrically Commutated Motor	LWT	Leaving Water Temperature	SUP	Supply
ALT	Altitude	ED	Electrical Division	MAT	Mixed Air Temperature	T24	Title 24 (California)
APD	Air Pressure Drop	EER	Energy Efficiency Ratio	MBH	1,000 Btu per Hour	TEMP	Temporary, Temperature
ASSE	American Society of Sanitary Engineering	EF	Efficiency	MC	Mechanical Contractor	TFR	Transfer
ATD	Air Temperature Differential	EPA	Environmental Protection Agency, US	MCA	Minimum Circuit Ampacity	THERM	100,000 Btu
BAS	Building Automation System	EWT	Entering Water Temperature	MD	Mechanical Division	TPV	Trap Primer Valve
BDD	Backdraft Damper	EXH	Exhaust	MFG	Manufacturing	TYP	Typical
BFF	Below Finished Floor	FBO	Furnished By Others/Owner	MFR	Manufacturer	UL	Underwriters Laboratory
BFG	Below Finished Grade	FC	Fan Coil	MG	Medium Pressure (2psi) Gas	UNO	Unless Noted Otherwise
BFP	Backflow Preventer	FCO	Floor Cleanout	MGT	Management	UPC	Uniform Plumbing Code
BHP	Brake Horsepower	FD	Floor Drain	MOCP	Max Overcurrent Protection	V	Volts
BMS	Building Management System	FIXT	Fixture	NA	Not Applicable	VAR	Variable
BMS	Building Management/Automation System	FLA	Full Load Amps	NG	Natural Gas (Methane)	VFD	Variable Frequency Drive
BTUH	Btu/Hour	FREQ	Frequency	NIC	Not In Contract	VIB	Vibration
CA	Combustion Air	FS	Floor Sink, Fire/Smoke	OBD	Opposed Blad Damper	VOC	Volatile Organic Compound
CFH	Cubic Feet per Hour	FT	Feet	OC	On Center	VSD	Variable Speed Drive
CFM	Cubic Feet per Minute	GA	Gauge	OCC	Occupancy	VTR	Vent Through Roof
CKT	Circuit	GC	General/Prime Contractor	OSA	Outside Air / Ventilation Air	W	Waste, Watts
CLG	Ceiling	GEO	Geological, Geoexchange, Earth	PE	Polyethylene	W/	With
CO	Cleanout	GPH	Gallons Per Hour	PEX	Cross-linked Polyethylene	WCO	Wall Cleanout
COMB	Combustion, Combination	GPM	Gallons Per Minute	PH	Phase	WSFU	Water Supply Fixture Unit
CONC	Concentric, Concentric	GSHP	Ground Source Heat Pump	PRV	Pressure Reducing Valve	WTD	Water Temperature Differential
COP	Coefficient of Performance	HOA	Hand-Off-Auto	PSI	Pounds per Square Inch	WWHP	Water to Water Heat Pump
COTG	Cleantout To/At Grade	HP	Heat Pump, Horsepower	PVC	Polyvinyl Chloride		IN THIS VIEW
CW	Cold Water	HW	Domestic Hot Water	RA	Return Air		BELOW OR BEHIND
DDC	Direct Digital Control	HWC	Domestic Hot Water Recirculation	RLA	Running Load Amps		SECTION CUT
		Hz	Hertz				

PIPE SYMBOLS, DEVICES & PLAN TAGS

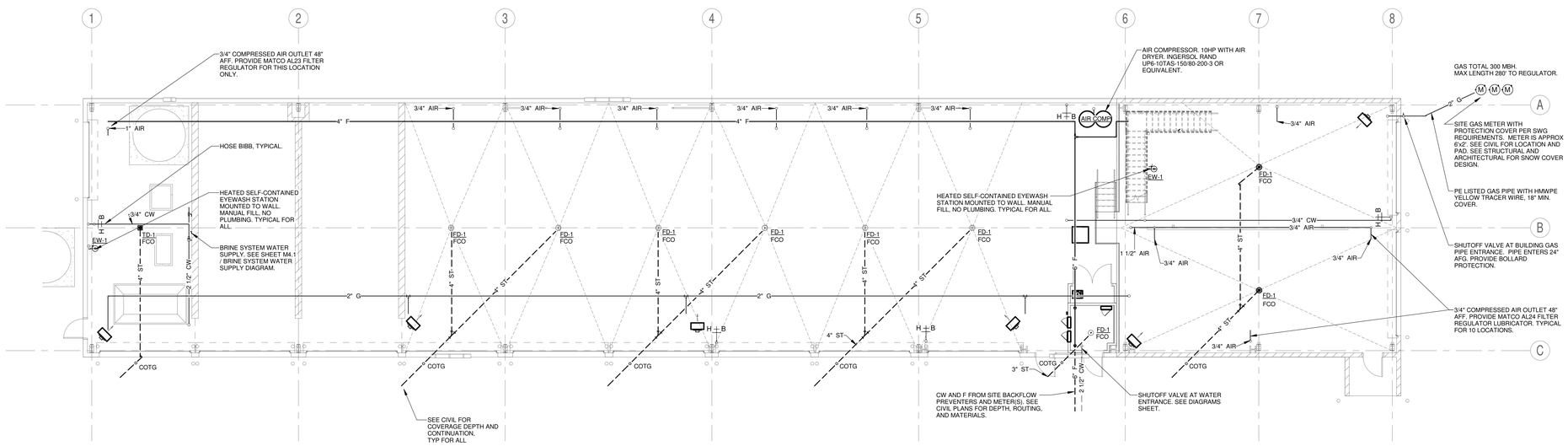
SMS	SNOWMELT SUPPLY	PW	PRESSURIZED WASTE
SMR	SNOWMELT RETURN	ST	STORM DRAIN
HWS	HEATING WATER SUPPLY	ST(OF)	STORM DRAIN OVERFLOW
HWR	HEATING WATER RETURN	SO	SAND AND OIL WASTE
SHS	SOLAR HEATING WATER SUPPLY		BUTTERFLY VALVE
SHR	SOLAR HEATING WATER RETURN		SHUT OFF VALVE (BALL, BUTTERFLY)
G	STD PRESSURE GAS		GLOBE VALVE
MG	MEDIUM PRESSURE 2 PSI GAS		CHECK VALVE
D	DRAIN (NON SEWER)		FLOW CONTROL VALVE
PC	PUMPED CONDENSATE		BALL VALVE
GF	GLYCOL FEED		PLUG OR BALANCING VALVE
RFS	RADIANT FLOOR SUPPLY		FLOW BALANCING VALVE
RFR	RADIANT FLOOR RETURN		PLUG VALVE IN RISER
RS	REFRIGERANT SUCTION		BALL OR GLOBE VALVE IN RISER
RL	REFRIGERANT LIQUID		BALL DRAIN VALVE W/ HOSE END
CW	DOMESTIC COLD WATER		TEMPERATURE CONTROL VALVE
HW	DOMESTIC HOT WATER		PRESSURE REDUCING VALVE
HWC	DOMESTIC HOT WATER CIRCULATION		VENTURI/FLOW INDICATOR
F	FIRE LINE		SOLENOID VALVE
W	WASTE PIPE		PUMP & EQUIPMENT CONNECTOR
V	PLUMBING VENT PIPE		PIPE UNION

	REDUCED PRESSURE BACKFLOW PREVENTER
	PIPE ANCHOR
	PIPE EXPANSION JOINT
	FLEXIBLE CONNECTOR
	SAFETY RELIEF VALVE
	AIR VENT
	PRESSURE - TEMP. TAP
	PRESSURE GAUGE W/ EXTENSION & COCK
	THERMOMETER
	VACUUM BREAKER
	FLOOR/GRADE CLEANOUT
	CLEANOUT CAP
	FLOOR DRAIN
	FLOOR SINK, FULL/HALF GRATE
	ROOF DRAIN
	STRAINER W/ BLOW-OFF VALVE
	SHOCK ARRESTOR
	FLOW SWITCH
	HOSE BIBB
	WALL HYDRANT
	RADIANT MANIFOLD

CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
VOC GAS	VOC AND/OR COMBUSTIBLE GAS SENSOR
T TSTAT	THERMOSTAT OR ROOM SENSOR
S	SLAB TEMPERATURE SENSOR
H	HUMIDISTAT OR ROOM SENSOR
	SOLENOID VALVE
	3



2 UPPER LEVEL PLUMBING PLAN
1/8" = 1'-0"



1 MAIN LEVEL PLUMBING PLAN
1/8" = 1'-0"

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SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MYERS, CA
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

SEAL

PRELIMINARY - NOT FOR CONSTRUCTION
MECHANICAL
STATE OF CALIFORNIA
04/18/2022

REVISIONS

NUMBER	DESCRIPTION	DATE
	FOR PERMIT	-

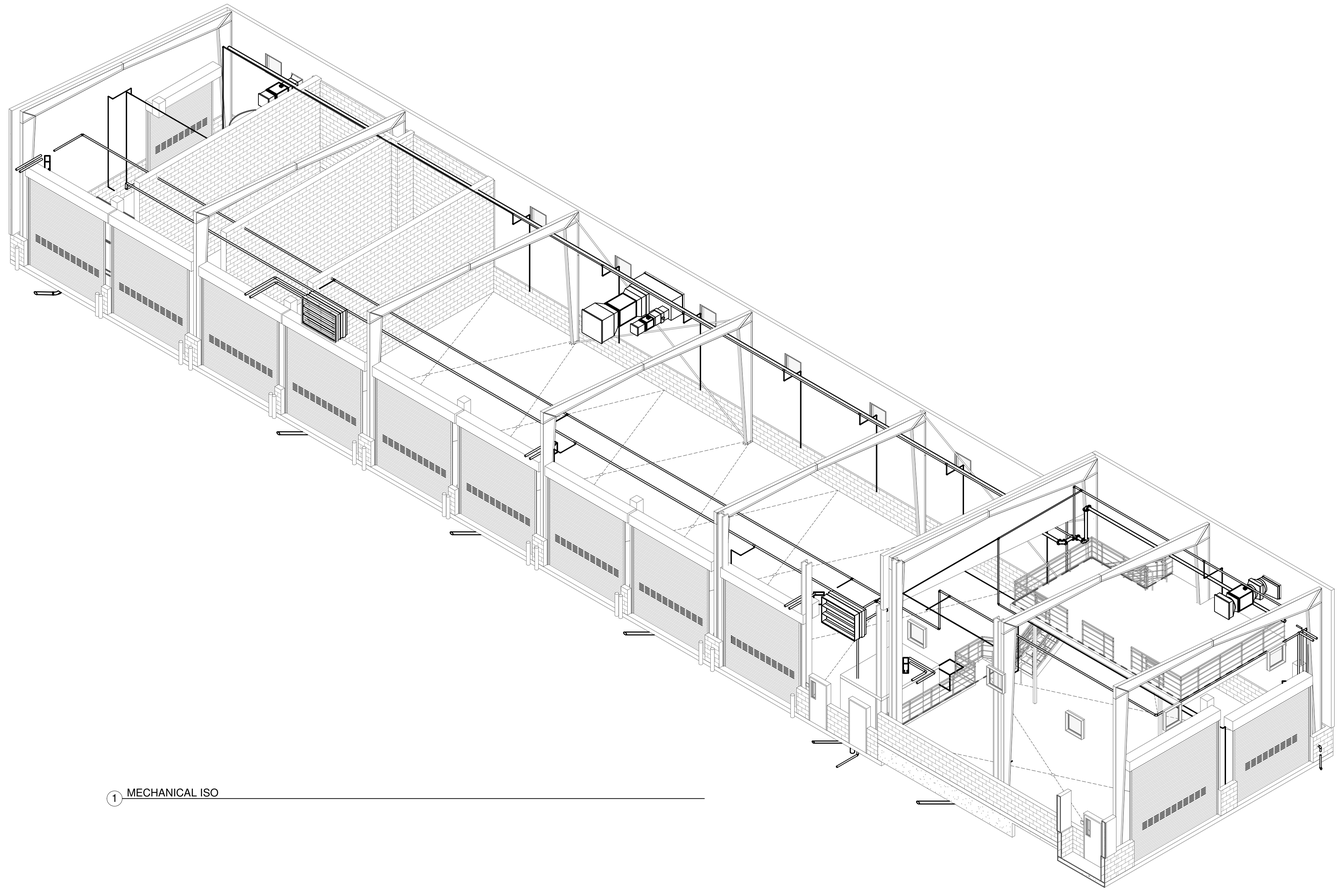
DATE: 04/18/2022

ISSUE: BID SET

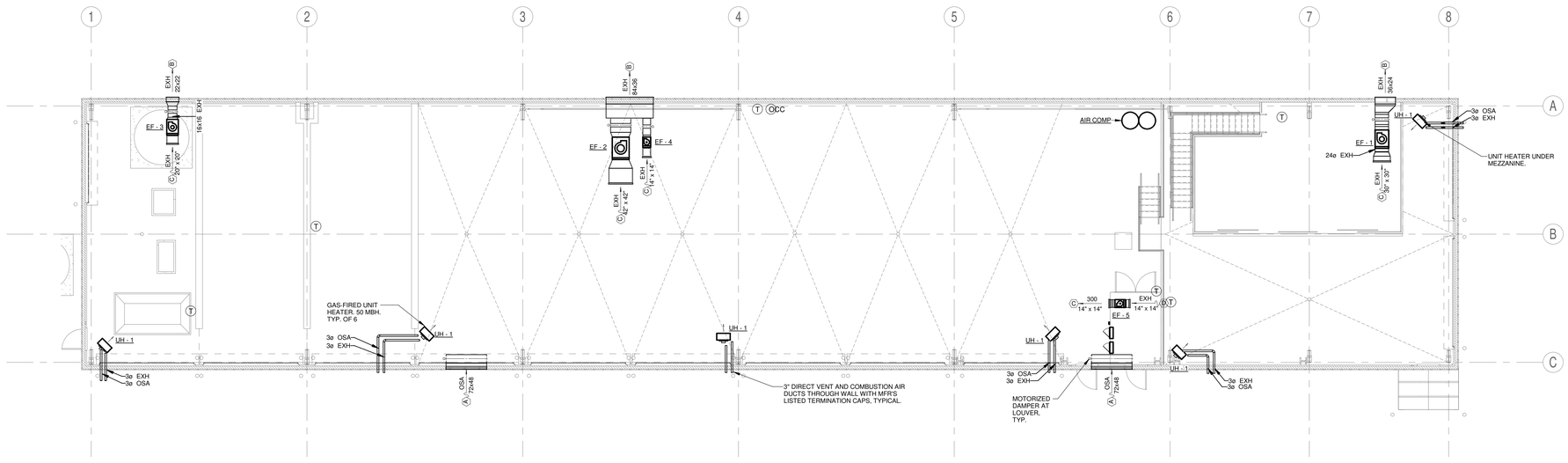
SCALE: See Plan

SHEET NAME: PLUMBING PLANS

SHEET NO.: M2.1



1 MECHANICAL ISO



2 HVAC PLAN
1/8" = 1'-0"

N

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SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
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04/18/2022

REVISIONS

NUMBER	DESCRIPTION	DATE
	FOR PERMIT	-

DATE:
04/18/2022

ISSUE
BID SET

SCALE
See Plan

SHEET NAME
HVAC PLANS

SHEET NO.
M3.1

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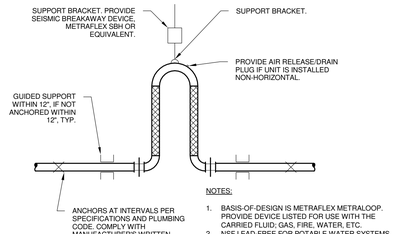

NOTES:

1. BASIS-OF-DESIGN IS METRAFLEX METRALOOP. PROVIDE DEVICE LISTED FOR USE WITH THE CARRIED FLUID: GAS, FIRE, WATER, ETC.
2. NSF LEAD-FREE FOR POTABLE WATER SYSTEMS.
3. 160 PSI MINIMUM RATING.
4. PROVIDE MIN. 4" SLACK IN ALL DIRECTIONS.
5. ANCHOR BOTH SIDES IF USED AT BUILDING EXPANSION JOINT.
6. SEISMIC ATTACHMENT IS A DELEGATED DESIGN, OTHERWISE PROVIDE OSHPD PRE-APPROVED SYSTEMS.

PIPE EXPANSION LOOP DIAGRAM

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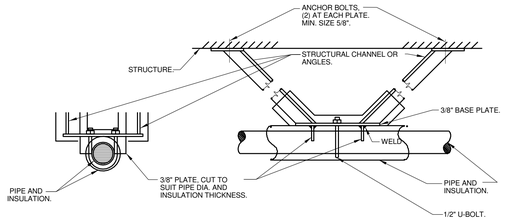

HORIZONTAL PIPE ANCHOR DIAGRAM

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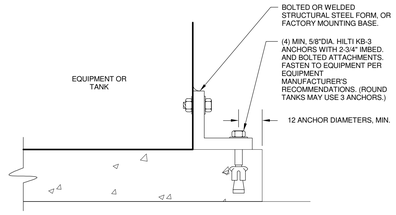

PAD-MOUNTED STATIONARY EQUIPMENT SEISMIC RESTRAINT DIAGRAM

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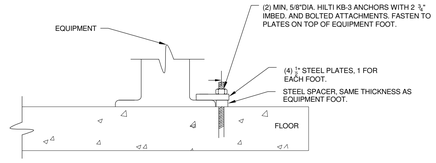

FLOOR-MOUNTNG EQUIPMENT SEISMIC RESTRAINT DIAGRAM FOR EQUIPMENT WITHOUT MOUNTING HOLES IN FEET

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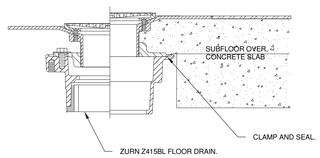
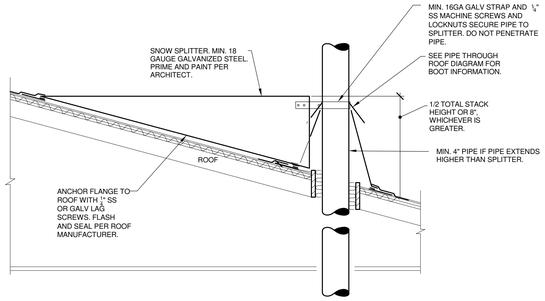


NOTE: SAME BOTH SIDES.



SNOW SPLITTER DIAGRAM

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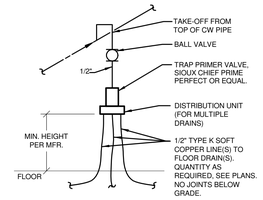

TRAP PRIMER CONNECTION DIAGRAM

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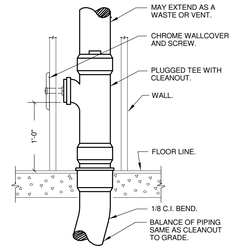
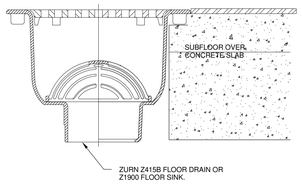


WALL CLEANOUT DIAGRAM

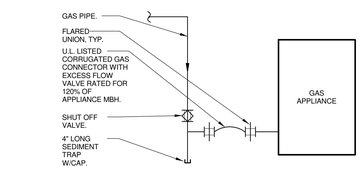
NO SCALE



NOTE: SAME BOTH SIDES.

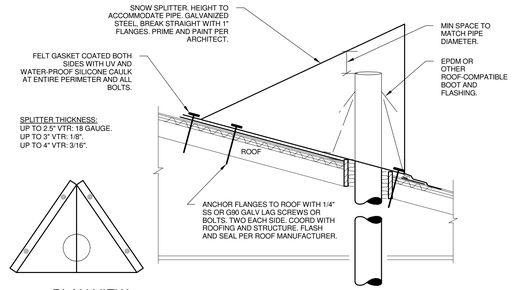
FLOOR DRAIN INSTALLATION DIAGRAMS

NO SCALE



TYPICAL GAS APPLIANCE CONNECTION DIAGRAM

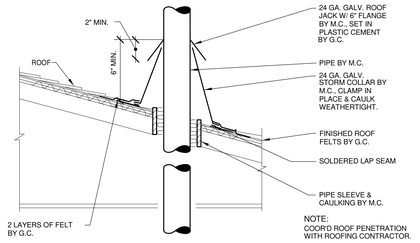
NO SCALE



PLAN VIEW

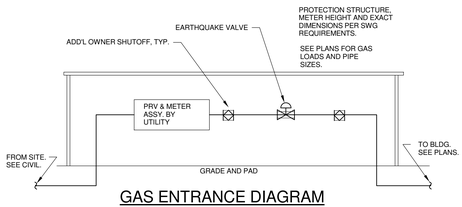
SNOW SPLITTER DIAGRAM

NO SCALE FOR VTR UP TO 3".



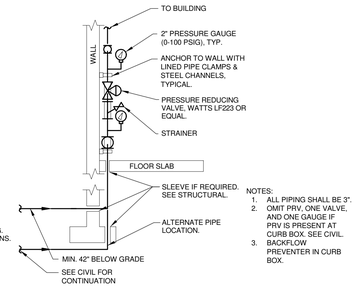
PIPE THRU ROOF DIAGRAM

NO SCALE



GAS ENTRANCE DIAGRAM

NO SCALE

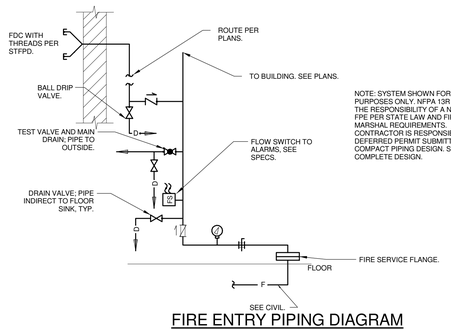


NOTES:

1. ALL PIPING SHALL BE 3".
2. OMIT PRV, ONE VALVE, AND ONE GAUGE IF PRV IS PRESENT AT CURB BOX. SEE CIVIL.
3. BACKFLOW PREVENTER IN CURB BOX.

DOMESTIC WATER ENTRANCE DIAGRAM

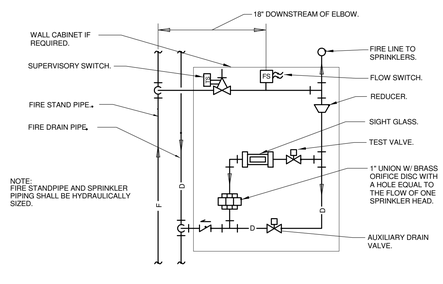
NO SCALE



NOTE: SYSTEM SHOWN FOR COORD PURPOSES ONLY. NFPA 13R DESIGN IS THE RESPONSIBILITY OF A NICET3 OR FPE PER STATE LAW AND FIRE MARSHAL REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR DEFERRED PERMIT SUBMITTAL AND COMPACT PIPING DESIGN. SUBMIT COMPLETE DESIGN.

FIRE ENTRY PIPING DIAGRAM

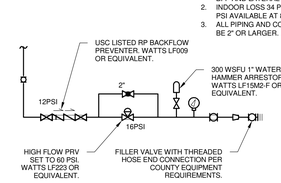
NO SCALE



NOTE:
FIRE STANDPIPE AND SPRINKLER PIPING SHALL BE HYDRAULICALLY SIZED.

FIRE SPRINKLER CONTROL STATION DIAGRAM

NO SCALE



FLOW NOTES:

1. WORST CASE STREET 80 PSI. SITE BFP AND LATERAL LOSS 16 PSI.
2. INDOOR LOSS 34 PSI RESIDUAL 40 PSI AVAILABLE AT 80 GPM.
3. ALL PIPING AND COMPONENTS TO BE 2" OR LARGER.

BRINE SYSTEM WATER SUPPLY DIAGRAM

NO SCALE

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SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MYERS, CA
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

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PROFESSIONAL ENGINEER — CIVIL — PRELIMINARY — NOT FOR CONSTRUCTION — MECHANICAL — STATE OF CALIFORNIA

04/18/2022

REVISIONS

NUMBER	DESCRIPTION	DATE
	FOR PERMIT	-

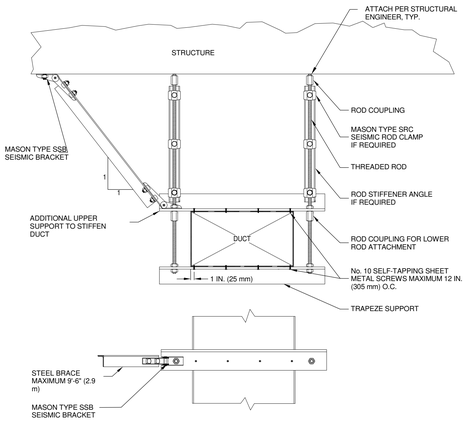
DATE: 04/18/2022

ISSUE: BID SET

SCALE: See Plan

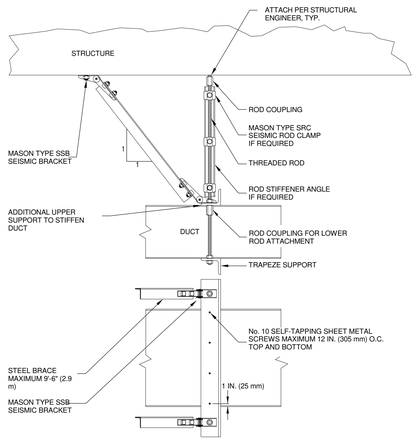
SHEET NAME: MECHANICAL DIAGRAMS

SHEET NO.: M4.1



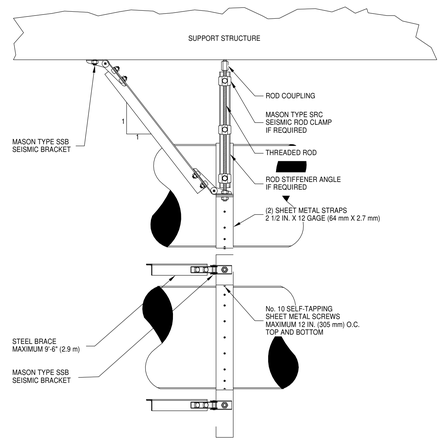
TRANSVERSE SEISMIC SOLID BRACE FOR RECTANGULAR DUCT OVER 20"

NO SCALE



LONGITUDINAL SEISMIC SOLID BRACE FOR RECTANGULAR DUCT OVER 20"

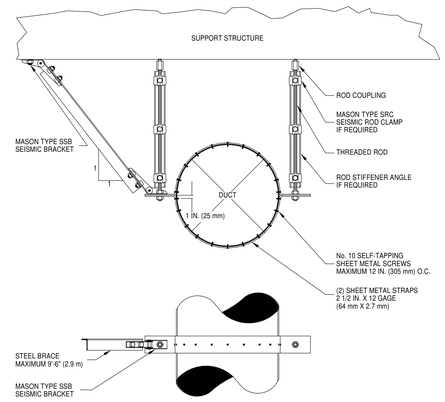
NO SCALE



LONGITUDINAL SEISMIC SOLID BRACE FOR ROUND DUCT

15" DIA OR LARGER.

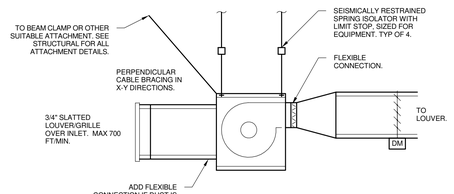
NO SCALE



TRANSVERSE SEISMIC SOLID BRACE FOR ROUND DUCT

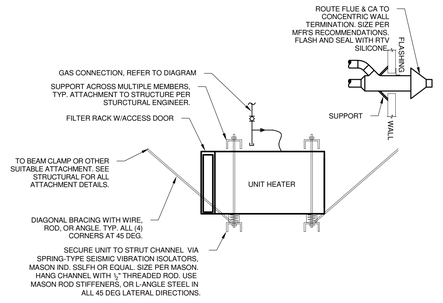
15" DIA OR LARGER.

NO SCALE



EXHAUST/RELIEF FAN DIAGRAM

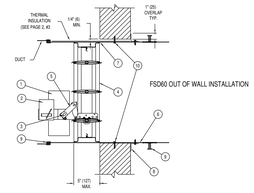
NO SCALE

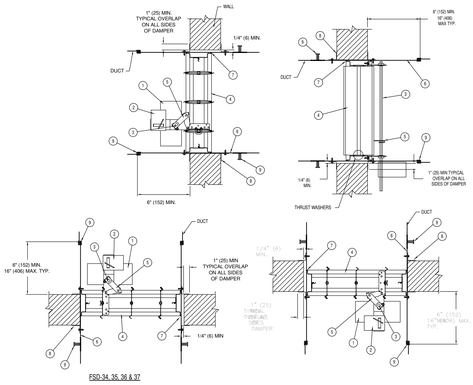


HORIZONTAL UNIT HEATER DIAGRAM

NO SCALE

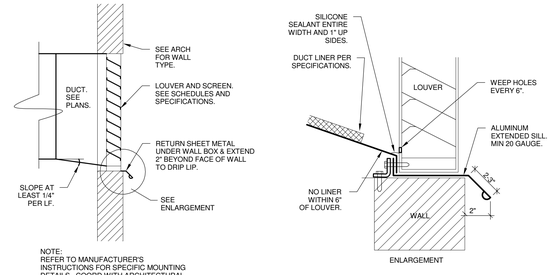
ITEM.	DESCRIPTION
1.	ACTUATOR (LOCATION MAY VARY). DAMPER MAY BE SUPPLIED WITHOUT ACTUATOR INSTALLED. RUSKIN'S UL LISTED FIRE DAMPER ACTUATORS MAY BE FIELD INSTALLED IF PROPERLY LABELED. SEE ACTUATOR INSTALLATION INSTRUCTIONS FOR FIELD MOUNTING OF DAMPER ACTUATORS.
2.	OPTIONAL FIRESTAT OR SP100
3.	AUXILLARY OPERATING JACK SHAFT
4.	DAMPER
5.	OVER CENTER LOCK
6.	SLEEVE
7.	CAULKING MATERIAL (MAY BE ON EITHER SIDE OF DAMPER FRAME
8.	PFMA OR CONVENTIONAL MOUNTING ANGLES
9.	S-JOINT/DUCT MATE, SLEEVE TO DUCT





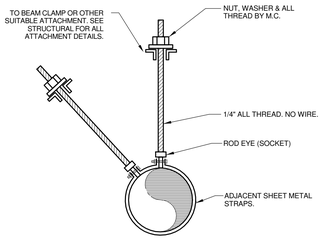
FIRE DAMPER AND FIRE/SMOKE DAMPER ASSEMBLY DIAGRAM (RUSKIN)

NO SCALE



INTAKE LOUVER DIAGRAM (SLOPED DUCT)

NO SCALE



DUCT HANGER DIAGRAM

NO SCALE

48" O.C., UP TO 16" DIA.

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-NOT FOR CONSTRUCTION-
BRENNA HASSELL
STATE OF CALIFORNIA
CIVIL
04/18/2022

REVISIONS

NUMBER	DESCRIPTION	DATE
	FOR PERMIT	

DATE: 04/18/2022

ISSUE: BID SET

SCALE: See Plan

SHEET NAME: MECHANICAL DIAGRAMS

SHEET NO.: M4.2

ELECTRICAL SPECIFICATIONS

1. Refer to Architect's Cover Sheet and Division 01 specifications for additional information about deferred submittals, codes, design-build details, seismic and wind criteria, submittals, closeout requirements, etc.
2. Fire Suppression and Fire Alarm designs shall be by design-build FPE or NICET- 3 licensed technicians. Contractor shall submit to Building Department as DEFERRED SUBMITTALS. Contractor shall include all fees for designing and permitting of these systems. Any related information shown on the MEP plans is for general guidance only.
3. Controls, security, data, telecom, audio-visual, WiFi, access control, and similar low-voltage designs shall be by the Contractor. Contractor shall submit to Building Department as DEFERRED SUBMITTALS if requested by building department or its designate. Contractor shall include all fees for designing and permitting of these systems. Any related information shown on the MEP plans is for general guidance only.
4. These notes accompany all other specification sections, manuals, and notes across all divisions. Subcontractors are bound with the general contractor to all parts of the construction contract. See specifications, plans and other divisions for additional information required for coordination. If a conflict is discovered, submit a request for interpretation.
5. These plans and their referenced specifications function together as engineering design intent, and depend upon all other parts of the design documents from all other parties (architecture, structure, civil, fire protection, data, etc). These plans and specifications must therefore be used in whole, and in conjunction with all other plans and specifications. No sheet, page or part may be used individually.
6. Sugarpine Engineering shall have no responsibility for deviations from these plans and specifications, unless such deviations are authorized in advance, in writing, by Sugarpine Engineering. If deviations are made without authorization, then the party who authorized or made the deviations assumes all responsibility for the deviations. In the case of a Contractor making deviations, then that contractor shall be the Designer of Record and in responsible charge of those deviations, including for all effects, costs, or delays related to them.
7. This project is a remodel or renovation of an existing building. The electrical plans indicate existing items to the extent that information and prior plans were available. Verify all field conditions, and notify engineer of any necessary deviations or issues.
8. Coordinate with general (prime) contractor (GC) for what items are to be provided and connected by which subcontractor.
9. Do not scale electrical drawings. Verify and coordinate light fixtures, conduits, framing, structure, furnishings, etc., in field and across other divisions prior to procurement or commencement of work. Architectural and structural drawings shall govern all dimensions.
10. All contractors shall be licensed and experienced with the systems, performance levels, and construction types indicated in the plans and specifications prior to bidding.
11. All Contractors and Subcontractors shall be licensed, experienced, and thoroughly knowledgeable in their part of the construction and shall perform in a responsible manner with customary construction sequence, shall recognize the priority of the construction documents, and shall notify the general contractor in writing of potential problems when the construction documents are unclear or inconsistent.
12. Subcontractors shall be responsible to notify the prime contractor of discrepancies or conflicts in the construction documents or as-built conditions discovered during bidding and/or prior to performing the work.
13. Items not indicated on the plans or specifications, including but not limited to some designs and details for alarms, controls, bracing, hangers, attachments, power, lighting, data, splices, junctions, and other items necessary for the project, shall be designed and provided by the licensed contractors installing their own work per State laws.
14. All equipment shall meet or exceed 2019 Title 24 Part 6 Prescriptive and Mandatory efficiencies and requirements. All other portions of the work shall be designed and installed to comply with the 2019 Title 24 code series.
15. All products shall be selected and capable of performance at project altitude: 6,400'.
16. All products shall be provided, braced and installed to comply with CBC Chapter 16 seismic requirements.
17. Sugarpine Engineering (SPE) cannot, through its designs, specifications, observations, or by any other means, guarantee the prevention, reduction or elimination of microorganisms, legionella, chemicals, particles, molecules or debris (collectively substances) in air, water or other building systems, or potential risk factors for human health. Additionally, SPE cannot guarantee security of the project, including but not limited to entry, forced entry, filtration, air quality, equipment reliability, frost protection, or other means of protection, explicit or implied.
18. Examination of bidding documents:
    a. GC shall make the entire set of bid documents available to every subcontractor and vendor during the bidding period. Every subcontractor shall examine the bidding documents carefully, and not later than seven (7) days prior to bid submission, GC shall make written request to the owner for interpretation or correction of any discrepancies, ambiguities, inconsistencies, or errors therein which he may discover. The owner or architect will issue any interpretation or correction as an addendum. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguities, inconsistencies, or errors are not presented by the contractors in writing, contractor shall include in his bid, labor materials and methods of construction to provide the highest cost option in question. After award of contract, no allowance or extra compensation will be made on behalf of the contractor due to his failure to make the written requests described above.
    b. Failure to request clarification during the bid period of any inadequacy, omission, or conflict will not relieve the contractor of his responsibilities. The signing of the contract implicitly denotes that the contractor has a thorough comprehension of the full intent and scope of the construction contract drawings and specifications.
21. Provide base bid with basis-of-design or listed equivalent products. Make and model named on any schedule or note is the basis-of-design. Other manufacturers listed (if any) are considered equivalents subject to matching the features and specifications of the basis-of-design.
22. Manufacturers not listed by name are considered substitutions, and must be submitted with a "substitution request" highlighting variances from the basis-of-design, and indicating cost or schedule savings. Substitutions may require additional design fees to review and/or accommodate. Substitutions will be considered only after bid award, and will be considered only if there is a proposed schedule or cost savings. Contractor assumes all responsibility for delays and costs incurred due to review and/or accommodation of substitutions.
23. Contractor is responsible for all coordination of equivalents and substitutions, in addition to review and/or redesign fees. Where contract documents permit selection from several equivalents, or where substitutions become authorized, coordinate clearance and interface requirements with all divisions.
    a. Provide necessary additional items so that selected or substituted item operates equivalent to the basis-of-design and properly fits in the space allocated for the basis-of-design.
    b. Provide all features which are standard on the basis-of-design plus any specified options.
    c. Be responsible for assuring that piping, conduit, duct, flue, and other service locations for equivalents or substitutions do not cause access, service, or operational difficulties any greater that would be encountered with the basis-of-design.
24. Work shall be performed in a workmanlike manner to the satisfaction of the architect, owner, and engineer.
25. Materials and/or equipment not scheduled on plans shall be identified by the subcontractor with sufficient time to allow selection, purchase, and delivery to maintain construction schedule.
26. All work of all trades shall meet or exceed the minimum materials, means and methods requirements of the 2019 Title 24 California Building Code Series, National Electrical Code, most current NFPA, all local ordinances and amendments and manufacturer's installation recommendations. Perform diligent review of these requirements prior to bidding. If a conflict between these publications and/or the construction documents exists, the most expensive requirement shall be included in base bid, and a written request for clarification shall be submitted.
27. Pay for and secure all required permits and inspections. Coordinate with GC. Provide all documentation to owner at project completion, prior to final pay application.
28. Provide Arc Flash and Shock Hazard, and Appropriate PPE Required labeling per NFPA 70E on all switchboards, panelboards, industrial control panels, motor control centers, production line equipment, and disconnect switches. Electrical contractor shall provide all required calculations needed to properly label the equipment. All labeling shall be permanently affixed to the equipment.
29. All materials and/or equipment shall be new, and shall be handled and installed per manufacturer's specifications and recommendations.
30. Temporary heat/cool shall be furnished by the general contractor. Use of the permanent heating/cooling systems will not be allowed during construction.
31. See architectural reflected ceiling plans for all ceiling penetrations, light fixtures and air device locations. Do not scale electrical drawings. Where dimensions do not exist, coordinate with architect and/or interior designer.
32. See architectural floor plans for flooring materials; provide penetrations compatible with floor assemblies.
33. Coordinate and overlay civil, architectural, structural, mechanical, fire protection, electrical, landscaping, and interior design drawings prior to installation.
34. Provide equipment to match electrical voltages, phase, breakers, controls, and capacities scheduled and/or available, prior to procurement. Any deviation is considered a substitution subject to fees and terms above.
35. Field-verify exact locations of existing and new aboveground and underground utilities, piping, and raceway systems prior to trenching. Notify engineer immediately upon discovery of any discrepancy from the plans.
36. Provide necessary trenching, backfill, excavation, supports, sawcutting and patching, concrete/paving, etc., as required. Backfill trenches in 6" layers and to 90% compaction and patch to match grade.
37. Submittals:
    a. Number of copies: per Division 01, or 5 copies if not specified. Alternate: PDF.
    b. Submit all mechanical shop drawings and product data at one time. Submittals shall each be bound and indexed according to major system/type: Power, lighting, controls, communications, data, fire alarm, etc. Partial submittals will be rejected. Submittals shall include, but not be limited to: raceways, boxes, fittings, pull strings, conductors, transformers, panels, switchgear, metering, controls, communications, and fire alarm.
    c. Failure to submit, order, or release order for materials and/or equipment will not be accepted as a reason to substitute materials, equipment, or installation methods.
    d. Submit record documents (as-builts) to architect. Documents shall include all addenda, instructions, directives, approved change orders, alterations, re-routings, etc.
38. Warranties:
    a. Guarantee the installation against defects in materials and workmanship. Labor warranty shall be for a period of one year, superseded by Division 01, if any. Equipment and material warranties shall be the full duration of each mfr's factory warranty. Provide all documentation to owner at project completion, prior to final pay application.
    b. All warranties shall commence on the day of owner's acceptance. Defects shall be promptly remedied without cost to the owner.
39. Field observations may be periodically conducted by SPE, for the sole purpose of reviewing progress and quality of work completed by the Contractor which falls within SPE's scope of design services. Observation is not intended to be an exhaustive check or a detailed inspection of the Contractor's work but rather to allow SPE to become generally familiar with the work in progress and to determine, in general, if the work is proceeding in accordance with the Contract Documents. SPE assumes no responsibility for concealed work, construction means, methods, techniques, quality, sequences or procedures utilized by the Contractor, nor for the Contractor's safety precautions or programs, nor for acts or omissions of the Contractor, nor for the Contractor's failure to perform work in accordance with the Contract Documents or any applicable laws, codes, rules or regulations.
40. Systems shall be complete, operable, and ready for continuous operation prior to acceptance by the owner.
41. Offset raceways, panels, etc., as necessary to accommodate structure, beams, columns and equipment. Record and submit all field changes.
42. Mount all operator controls (stats, dials, etc) so top-of-box is 48" AFF in "accessible" areas, 54" AFF in other areas. Provide boxes for all devices, mounting to drywall not allowed. Coordinate location and type/trim with wall finish. Avoid casework, moldings, trim, furniture, heat sources, sunlit and exterior walls. Notify engineer of any conflicts prior to beginning box rough-in.
43. Provide 4" high concrete equipment pads beneath floor mounted electrical equipment, in addition to any base assemblies required or recommended by the manufacturer. Where a 4" high equipment pad causes the equipment to violate utility or CEC maximum height requirements, provide the maximum pad height that will allow the equipment to stay within acceptable height constraints. Pad height shall not be less than 2". Contractor shall provide equipment that is compatible with a 2" - 4" equipment pad.
44. Smoke and Carbon Monoxide detectors shall be interconnected. Devices shown in this plan shall be combination smoke/co detectors. Primary power by building electrical system, refer to panel schedule for circuiting. Secondary power by integrated battery backup. Install per manufacturer requirements. Detectors shall be located at least 3 ft away from any air current source, including but not limited to supply/return duct terminations, fan coils, and ceiling fans.
45. In multifamily dwelling unit separation walls, provide 1/4-inch acoustic sealant around outlet boxes and seal to the drywall. This shall apply to all outlet boxes in separation walls, including but not limited to electrical, antenna, phone, data/telecom, and switch outlet boxes.
46. Fire stopping requirement. Penetrations through rated walls and floors shall be sealed with a material capable of preventing the passage of flames and hot gasses when subjected to the requirements of the test standard specific for fire stops ASTM-E-814. Acceptable materials include: Dow Corning RTV fire stop foam for bare pipe, metal conduit, and electrical cable; 3M fire dam 150 caulk for bare pipe, metal conduit, and building construction gaps; 3M CP-25 caulk and FS-195 intumescent strips for insulated pipes, plastic pipe or conduit, and electrical cable. Submit UL Listed application data for each type of penetration encountered. Select and apply all fire-stopping materials in strict accordance with the mfr's written instructions and UL listings.
47. Electrical boxes installed in fire rated assemblies shall be UL listed steel boxes with 16 square inches max. cross sectional area per box. Total electrical box cross sectional area shall not exceed 100 square inches per 100 square feet of wall. Electrical boxes shall be separated by a minimum horizontal distance of 24 inches when on opposite sides of the wall.
48. Conduits penetrating through roof shall have roof flashing compatible with the roofing system. See architectural drawings. In the absence of any other requirements, provide tall cone with EPDM boot for conduit in single ply membrane roofs, and curbed roof penetrations in all types of roof. Installation shall be watertight.
49. Refer to food service and other drawings for exact locations and additional electrical requirements. Provide power, interlocks, controls, etc., as required by food service equipment and other suppliers.
50. Refer to all other drawings across all divisions for exact locations and additional electrical requirements. Provide power, interlocks, controls, etc., as required by other suppliers.
51. Make final connections to all kitchen equipment. Refer to kitchen plans for exact location of rough-ins.
52. Support each transformer on Mason Industries or equivalent neoprene restrained vibration isolators.
53. Systems shall be tested for proper operation. Perform at a minimum all code required tests or systems. If tests of work are defective, contractor shall make corrections necessary at no additional cost to owner.
54. Visit site prior to bid and verify that conditions are as indicated. Contractor shall include in his bid costs required to make his work meet existing conditions.
55. System outages shall be permitted only at times approved by owner - in writing. Work which could result in an accidental outage (beyond branch circuits) shall be performed with the owner's maintenance personnel advised of such work.
56. Provide electrical acceptance testing as indicated on T24 forms.
57. Contractor's failure to order or release order for materials and/or equipment will not be accepted as a reason to substitute alternate materials, equipment, or installation methods.
58. Field verify existing equipment or circuits that are remaining to be reconnected to new or existing switchboards, panels, or panel boards. Provide switches, receptacles, conduit, wire, etc. As required, to restore continuity of circuit(s).
59. Existing systems and conditions shown on drawings are for guidance only. The electrical contractor shall field check all existing conditions prior to bidding and to include in his bid an allowance for removal and/or relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as required to coordinate and adapt new and existing electrical system to all other work as required.
60. Verify exact location of equipment to be furnished by others prior to rough-in.
61. Review architectural and mechanical drawings and provide lights, switches, controls, receptacles, telecomm outlets, equipment connections, etc. And associated circuiting in new and remodeled areas.
62. Install all materials in accordance with the manufacturer's recommendations. Any deviations shall be brought to the architect/engineer's attention prior to installation.
63. Final connections to equipment shall be in accordance with manufacturer's approved wiring diagrams, details, and instructions. It shall be the contractor's responsibility to provide materials and equipment compatible with equipment actually supplied.
64. Contractor shall be responsible for replacing equipment which is damaged due to incorrect field wiring provided under this section, or factory wiring in equipment provided under this section.
65. All electrical systems components shall be listed or labeled by UL or other recognized testing facility.
66. Wiring devices shall be specification grade and rated at 20 amperes for light switches, and 20 amperes for duplex receptacles. The color of the devices and cover plates shall be as directed by architect.
67. All wiring shall be installed in listed metallic raceways. EMT fittings shall be malleable iron or steel. Connectors shall be insulated throat type. Minimum conduit size is ¾". Follow CEC/NEC for maximum number of conductors per conduit. Conduit shall be of sufficient size and conductor quantity shall be limited to eliminate the need to de-rate conductors. Metal clad cable is permitted in concealed locations.
68. All empty raceway systems shall have a 200lb nylon pull string or equal, and shall be identified at all junction, pull and termination points, using permanent metallic tags. Tag shall indicate intended use of conduit origination, and termination points of each individual conduit.
69. Wire shall be copper, 75-degree Celsius rated for general use. Wiring within 3 inches of fluorescent ballasts wire shall be copper, minimum 90 degree Celsius rated. Size indicated are for installation in a maximum 30 degree Celsius ambient. Conductor ampacity shall be de-rated for higher ambient installations.
70. Provide new updated panelboard directories for existing and new circuits being utilized for completion of project.
71. Final connections to motors and other vibrating equipment shall be Seal Tite Flex and approved fittings. Do not secure conduits, disconnects, or devices to ductwork or mechanical equipment.
72. All outlets to be labeled (with clear tape and black text) with panel and pole designation.
73. Lighting ballasts for fluorescent lamps shall be electronic, programmed start type with less than 10% total harmonic distortion rating, minimum 0.88 ballast factor and minimum 0.95 power factor.
74. All lighting sources (unless only for decorative use) shall have a color rendering index (CRI) of 80 or higher.
75. SPE shall have no responsibility for the photometrics, color rendering, appearance, quality, lifetime, reliability, or performance of lighting fixtures selected by others.
76. Systems shall be tested for proper operation. If tests show that work is defective, contractor shall make corrections necessary at no cost to owner.
77. Guarantee the installation against defects in materials and workmanship which may occur under normal usage for a period of one year after owner's acceptance. Defects shall be promptly remedied without cost to the owner.
78. Systems shall be complete, operable, and ready for continuous operation. Lights, switches, receptacles, motors, etc. Shall be connected and operable.
79. Maintain a current set of as-built record drawings which shall be available for review during engineer's site observations. Upon completion, provide record drawings to architect. Drawings shall include all addendum items, change orders, alterations, re-routings, etc.
80. Provide Heat Trace cable and outdoor thermostat controls for every pipe subject to freezing and as indicated or noted on Mechanical plans and specifications.
81. Provide Heat Trace cable and outdoor thermostat controls for all roof valleys, parapet overflows, roof drains, gutters, and downspouts. See Architectural plans and specifications.
82. All buried conductors shall be in raceways.
83. All buried electrical raceways and components shall be Schedule 80 PVC NMC, solvent welded fittings and sweeps.
84. All exposed outdoor raceways shall be RMC with metallic weathertight boxes, mechanical fittings and sweeps.
85. All buried raceways shall be at least 18" below grade. Comply with NEC Table 300.5 for trench depth requirements.
86. Comply with serving utility requirements for clearances between buried items, joint trench limitations, and undisturbed soil requirements. Notify engineer of any conflicts prior to starting trenching.
87. Coordinate with Site Contractor and GC for delineations of all work.
88. Prior to rough electrical inspections, Contractor shall complete and provide all applicable Title 24 Certificates of Installation (NRCI).
89. Prior to final electrical inspections and/or final payment application, Contractor shall complete and provide all applicable Title 24 Certificates of Acceptance (NRCA). Provide Acceptance Test Technician services in base bid.

COMMUNICATIONS SYMBOLS

	TELEPHONE WALL OUTLET
	DOUBLE TELEPHONE WALL OUTLET
	TELEPHONE FLOOR OUTLET
	DATA WALL OUTLET
	DOUBLE DATA WALL OUTLET
	DATA FLOOR OUTLET
	COMBO PHONE/DATA OUTLET
	DOUBLE COMBO PHONE/DATA OUTLET
	COMBO PHONE/DATA FLOOR OUTLET
OF	VOICE/DATA/FIBER OUTLET
POS	POINT OF SALE (POS) OUTLET
ATM	AUTOMATED TELLER MACHINE (ATM) STATION
PP	PUBLIC PAYPHONE OUTLET
E	ELEVATION PHONE OUTLET
	POWER/TELECOM POLE
	CLOCK WALL OUTLET
	CLOCK CEIING OUTLET
TT	TIME TONE GENERATOR
	CALL IN SWITCH
M	MASTER INTERCOM STATION
	INTERCOM STATION
A	AMPLIFIER
CH	CHIME
B	BUZZER
B	BELL
	GROUND BUSBAR
	WIRELESS LAN (WI-FI) ACCESS POINT

ABBREVIATIONS

AFC -	ABOVE FINISHED CEILING
AFF -	ABOVE FINISHED FLOOR
AFG -	ABOVE FINISHED GRADE
AHJ -	AUTHORITY HAVING JURISDICTION
AL -	ALUMINUM
AP -	ACCESS POINT
AWG -	AMERICAN WIRE GUIDE
BFG -	BELOW FINISHED GRADE
BMS -	BUILDING MANAGEMENT SYSTEM
C -	CONDUIT
CATV -	COMMUNITY (CABLE) ANTENNA TELEVISION SYSTEM
CCTV -	CLOSED CIRCUIT TELEVISION
CKT -	CIRCUIT
CPU -	CENTRAL PROCESSING UNIT
CT -	CURRENT TRANSFORMER
DISP -	GARBAGE DISPOSAL
DW -	DISHWASHER
EM -	EMERGENCY
EWC -	ELECTRIC WATER COOLER
(E) -	EXISTING
FA -	FIRE ALARM
FACP -	FIRE ALARM CONTROL PANEL
FBO -	FURNISHED BY OTHERS
GC -	GENERAL CONTRACTOR
GFI -	GROUND FAULT CIRCUIT INTERRUPTER
GRD -	GROUND
IAW -	IN ACCORDANCE WITH
IC -	INTERMEDIATE CROSS-CONNECT
IDF -	INTERMEDIATE DISTRIBUTION FRAME
IG -	ISOLATED GROUND
IR -	INFARED
LAN -	LOCAL AREA NETWORK
MDF -	MAIN DISTRIBUTION FRAME
NIC -	NOT IN CONTRACT
NL -	NIGHT LIGHT
NTS -	NOT TO SCALE
PA -	PUBLIC ADDRESS
OC -	ON CENTER
REF -	REFRIGERATOR
TTB -	TELEVISION TERMINAL BOARD
TVSS -	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UG -	UNDERGROUND
UNO -	UNLESS NOTED OTHERWISE
V -	VOLT
W -	WATT
WAN -	WIDE AREA NETWORK
WLAN -	WIRELESS LOCAL AREA NETWORK
WP -	WEATHER PROOF
XP -	EXPLOSION PROOF
+18" -	MOUNTING HEIGHT TO CENTERLINE OF DEVICE ABOVE FINISHED FLOOR

IN THIS VIEW
BELOW OR BEHIND
SECTION CUT

LIGHTING FIXTURE SYMBOLS

	RECESSED LIGHTING FIXTURE
	DIRECTIONAL/ADJUSTABLE RECESSED LIGHTING FIXTURE
	SURFACE MOUNTED LIGHT
	PENDANT MOUNTED LIGHT
	WALL MOUNTED LIGHT
	WALL MOUNTED UP-LIGHT
	MONO-POINT LIGHTING FIXTURE
	RECESSED STEP LIGHT
	FLUORESCENT OR LED STRIP LIGHT
	WALL MOUNTED LINEAR FLUORESCENT OR LED LIGHT
	RECESSED OR SURFACE FLUORESCENT OR LED TROFFER
	FIXTURE WITH EMERGENCY BACKUP OR ON EM CIRCUIT
	CEILING MOUNTED EXIT SIGN WITH FACES & ARROWS AS SHOWN
	WALL MOUNTED EXIT SIGN WITH FACES & ARROWS AS SHOWN
	EMERGENCY LIGHTS
	EXTERIOR POLE MOUNTED LIGHT
	EXTERIOR POST (BOLLARD) MOUNTED LIGHT

LIGHTING CONTROL SYMBOLS

S	SWITCH
S_3	THREE-WAY SWITCH
S_4	FOUR WAY SWITCH
S_J	DOOR JAMB SWITCH
S_T	THERMAL OVERLOAD SWITCH
S_V	VARIABLE SPEED SWITCH
S_K	KEY SWITCH SWITCH
D	DIMMER
D 3	THREE-WAY DIMMER
LV	LOW VOLTAGE
S^C	WALL OCCUPANCY SENSOR/SWITCH
OC	SMALL ROOM OCCUPANCY SENSOR
OC	LARGE ROOM OCCUPANCY SENSOR
OC	CORRIDOR OCCUPANCY SENSOR
DL	DAYLIGHT PHOTO SENSOR

ELECTRICAL INSTALLATION NOTES

1. All cabling shall be EMT or MC. See specifications.
2. All exposed pipes, ducts and materials shall be metallic or shall be suitably wrapped to meet applicable flame spread requirements. No exposed plastic pipe, insulation, duct or wiring is allowed.
3. All materials shall be UL Listed for the application.
4. All transformers and devices that connect to any system with more than 50 Volts shall be UL Listed.
5. Floor-mounted equipment shall be on concrete housekeeping pads.
6. Conduits and boxes shall be located and adjusted to accommodate structure, piping, and duct systems. Coordinate with GC and all other trades prior to all installations.

DOCUMENT OWNERSHIP AND USE

1. These plans and specifications are professional Instruments of Service (Original Work) and shall remain the Intellectual Property of Sugarpine Engineering, Inc. (SPE) whether or not the project is executed, subject to SPE's contract.
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4. Submission or distribution to meet regulatory requirements, or for other purposes in connection with this project, shall not to be construed as publication in derogation of the rights of Sugarpine Engineering, Inc.

GENERAL NOTES

1. See specifications for additional information.
2. These plans intend to describe only Electrical parts of the work, shown as thick lines, and as noted. They do not intend to describe or convey information about any other work or parts of the project. Other work is shown for reference only as thin & light lines. Refer to applicable civil, architectural, structural, mechanical, etc (Other Divisions) for designs and information related to those other items or systems.
3. All products and systems shall be installed to comply with their UL listings.
4. All control wiring shall be in metallic (EMT) raceways. Raceways by EC, wiring by MC. EC responsible to coordinate this requirement to the MC and GC for base bid.
5. All empty conduits shall be provided with a pull string listed for the application.
6. All standalone, factory, and equipment-provided controls are considered part of the controls system for the project. Each device shall have its programming and settings adjusted by the Controls Contractor, and shall be integrated with the building's overall controls, if applicable. See control sequences for more information.
7. Contractor shall be responsible for unauthorized deviations from the designs and information indicated in these plans and specifications, and shall request approval from SPE in writing before any deviation is made. Lack of SPE's approval shall result in the Contractor assuming responsibility as the designer-of-record for the deviation and its related impacts.
8. Contractor shall include Acceptance Test Technician services in base bid.
9. Project Altitude: 6,400'.

POWER SYMBOLS

	SINGLE RECEPTACLE
	DUPLEX RECEPTACLE
C	DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
	DOUBLE DUPLEX RECEPTACLE
	GFCI DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE; HALF SWITCHED
	ISOLATED GROUND DUPLEX RECEPTACLE
	MULTI-OUTLET PLUG STRIP
	FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE
	FLUSH FLOOR MOUNTED DOUBLE DUPLEX RECEPTACLE
	FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE; HALF SWITCHED
	FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE & TELECOM
	WALL MOUNTED SPECIAL OUTLET AS NOTED
	SPECIAL OUTLET AS NOTED
	JUNCTION BOX
	WALL MOUNTED JUNCTION BOX
	FLOOR MOUNTED JUNCTION BOX
	MECHANICAL EQUIPMENT POWER CONNECTION
TS	TIMER SWITCH
	FUSED DISCONNECT
N	NON-FUSED DISCONNECT
	MOTOR STARTER
CB	ENCLOSED CIRCUIT BREAKER
PB	PULL BOX
	PUSH BUTTON
TC	TIME CLOCK
PC	PHOTO-CELL
T	TRANSFORMER
	PANELBOARD OR LOAD CENTER
C	CONTRACTOR
	ELECTRIC MOTOR
	METER
T	THERMOSTAT
ATS	AUTOMATIC TRANSFER SWITCH
	CIRCUIT HOMERUN
	CONDUIT RUN
	CONDUIT RUN BELOW GRADE
	CONDUIT UP
	CONDUIT DOWN
S	SWITCH
S_T	THERMAL OVERLOAD SWITCH
S_V	VARIABLE SPEED SWITCH
S_K	KEY SWITCH

ONE-LINE DIAGRAM

	DISCONNECT SWITCH
	FUSE
	CIRCUIT BREAKER
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
M	METER
V	VOLT-METER
A	AMP-METER
SS	SURGE SUPPRESION DEVICE
	SELECTOR SWITCH
	GROUND FAULT PROTECTION
	SHUNT TRIP
	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT
	GROUND
	COLD WATER GROUND CONNECTION
	BUILDING STEEL GROUND CONNECTION

FIRE ALARM SYMBOLS

FACP	FIRE ALARM CONTROL PANEL
ANN	REMOTE ANNUNCIATOR PANEL
SD	SMOKE DETECTOR
HD	HEAT DETECTOR
SH	COMBO SMOKE/HEAT DETECTOR
DD	DUCT SMOKE DETECTOR
F	FIRE ALARM PULL STATION
H	FIRE ALARM HORN
	FIRE ALARM STROBE
H	FIRE ALARM COMBO HORN/STROBE
F	FIRE ALARM SPEAKER
UL	FIRE ALARM COMBO SPEAKER/STROBE
F	FIREMAN'S PHONE JACK
FF	SPRINKLER SYSTEM FLOW SWITCH
FT	SPRINKLER SYSTEM TAMPER SWITCH
FSD	FIRE/SMOKE DAMPER

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SHAKORI GARAGE REPLACEMENT

1121 SHAKORI DRIVE
MEYERS, CA
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

SEAL

LICENSED PROFESSIONAL ENGINEER
-PRELIMINARY-
-NOT FOR CONSTRUCTION-
ELECTRICAL
STATE OF CALIFORNIA

04/18/2022

REVISIONS

NUMBER	DESCRIPTION	DATE
	FOR PERMIT	-

DATE: 04/18/2022

ISSUE: BID SET

SCALE: See Plan

SHEET NAME: ELECTRICAL COVER SHEET

SHEET NO.: E1.1

El Dorado Shakori Garage
NEC Load Calculation
8/23/2021

Lighting Demand	qty	VA/ea	VA
General Lighting Demand	9921	3	29763
Building Mounted Lighting	10	79	790
Lighting Subtotal			**30553**
Continuous @ 125%			1.25
Lighting Demand			**38191**

Mechanical Demand	qty	VA/ea	VA
Unit Heater	6	500	3000
Exhaust Fans	5	100	500
Heat Trace (Water Entry)	1	1920	1920
Garage Door Motors (1HP) (2x Simultaneous)	2	1920	3840
Mechanical Demand			**9260**

Other Loads	qty	VA/ea	VA
Brine Maker	1	8640	8640
Brine Truck Loader/Blender	1	8640	8540
Welder	1	11764	11764
Plasma Cutter	1	10080	10080
Truck Regen. Units	2	3328	6656
Landa Steam Cleaner	1	3000	3000
Ice Maker	1	1296	1296
Receptacles	32	180	5760
Other Loads Demand			**55836**

Demand Summary		VA
Lighting Demand		38191
Mechanical Demand		9260
Other Loads Demand		55836
Subtotal Demand (VA)		**103287**
Spare Capacity (%)	20 %	20657
Total Demand (VA)		**123945**
Current Demand @ 208V 3Ph (A)		**344**
Current Demand @ 240V 3Ph (A)		**298**
Recommended Feeder Size @ 240V 3Ph (A)		**300**

PANEL S1 208 Y/ 120 **VOLT 3PH 4 WIRE** 400 **AMPERE MAIN** CB : 400 **AMPERE BUS**
LOCATION Garage **MOUNTING** Recessed **A.I.C.** 22kA Min.

CIRCUIT NUMBER	LOAD LINE A	LOAD LINE B	LOAD LINE C	CIRCUIT TYPE (VRM/ LMS/AS)	LOAD DESCRIPTION	CIRCUIT BREAKER POLE	CIRCUIT BREAKER TRIP	BUS A	BUS B	BUS C	CIRCUIT BREAKER TRIP	CIRCUIT BREAKER POLE	CIRCUIT TYPE (VRM/ LMS/AS)	LOAD DESCRIPTION	LOAD LINE A	LOAD LINE B	LOAD LINE C	CIRCUIT NUMBER
1	14325			S	Panel S2	3	200	*			40	3	E	Air Compressor (G)	3362			2
3		15215			*	-	200		*		40	-		*		3362		4
5			13716		*	-	200			*	40	-		*			3362	6
7	4083			E	Welder (G)	3	50	*			50	3	E	Plasma Cutter (G)	3362			8
9		4083			*	-	50		*		50	-		*		3362		10
11			4083		*	-	50			*	50	-		*			3362	12
13	2882			E	Brine Maker (G)	3	30	*			30	3	E	Truck Loader (G)	2882			14
15		2882			*	-	30		*		30	-		*		2882		16
17			2882		*	-	30			*	30	-		*			2882	18
19	1664			E	Regen 1 (G)	2	20	*			20	1	E	Eye Wash (G)	1920			20
21		1664			*	-	20		*		30	1	E	Hot Pot (G)		2880		22
23			1664	E	Regen 2 (G)	2	20	*			20	1	R	Recs near Xfmr (G)			360	24
25	1664				*	-	20	*			70	2	E	Steam Cleaner (G)	5760			26
27					Space				*		70	-		*		5760		28
29					Space			*						Space				30
31					Space				*					Space				32
33					Space			*						Space				34
35					Space				*					Space				36
37					Space			*						Space				38
39					Space					*				Space				40
41					Space			*						Space				42
	24618	23844	22345		SUB TOTALS										17286	18246	9966	

CIRCUIT TYPE: L=LIGHTING, R=RECEPTACLE, M=MOTOR, LM=LARGEST MOTOR
DESCRIPTION: E=EQUIPMENT, A=APPLIANCE, S=SUBFEED PANEL
NOTES:
NEMA 4X
Provide a GFCI breaker for all circuits marked with 'GI'

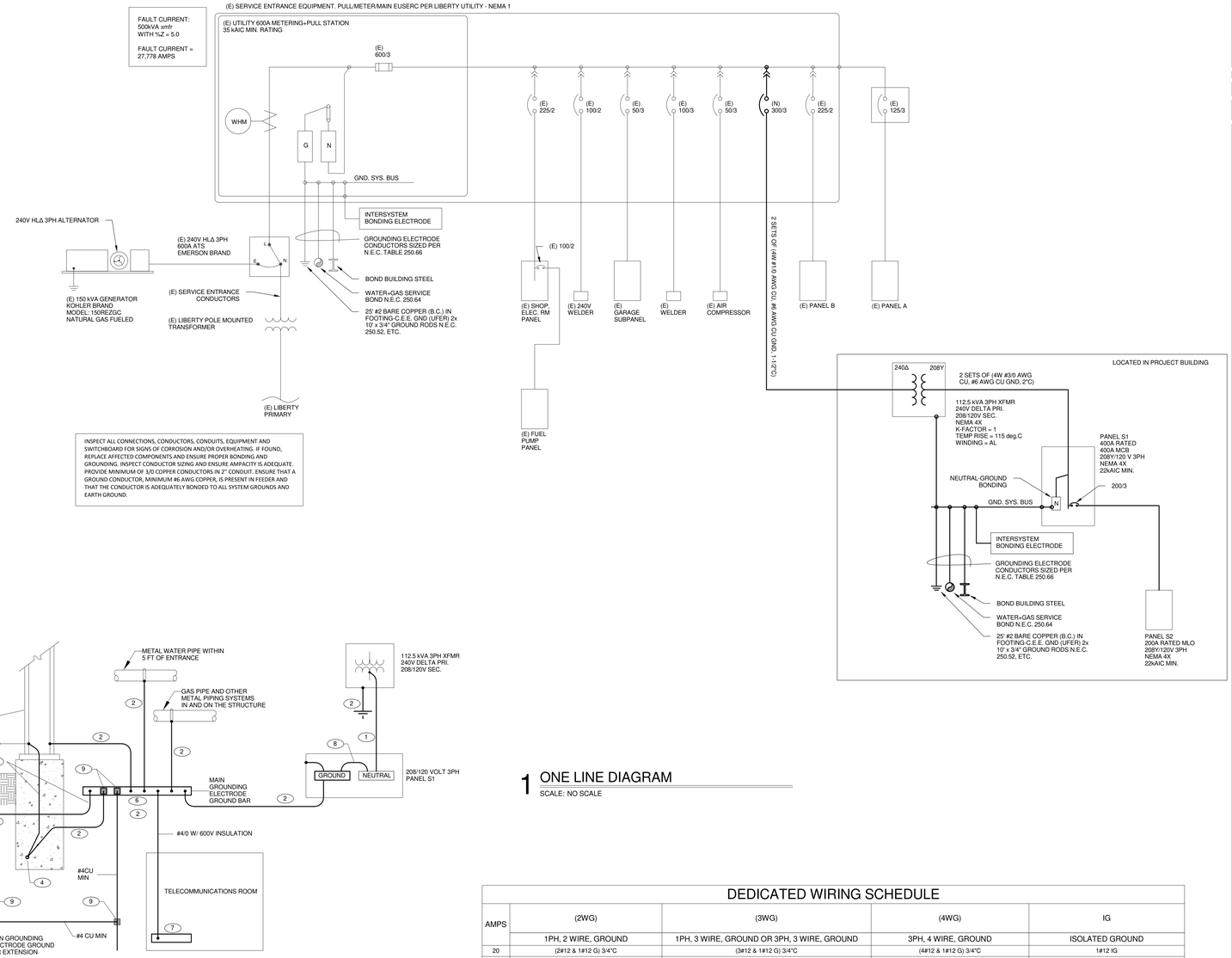
PANEL LINE VA	41804	42080	32311
NEC ADDER			
FEED THRU LOAD			
TOTAL LINE KVA	42	42	32
LINE AMPS	116	117	90
TOTAL KVA LOAD	116.3		
FEEDER AMPS	322.8		

PANEL S2 208 Y/ 120 **VOLT 3PH 4 WIRE** 200 **AMPERE MAIN** LO : 200 **AMPERE BUS**
LOCATION Garage **MOUNTING** Recessed **A.I.C.** 22kA Min.

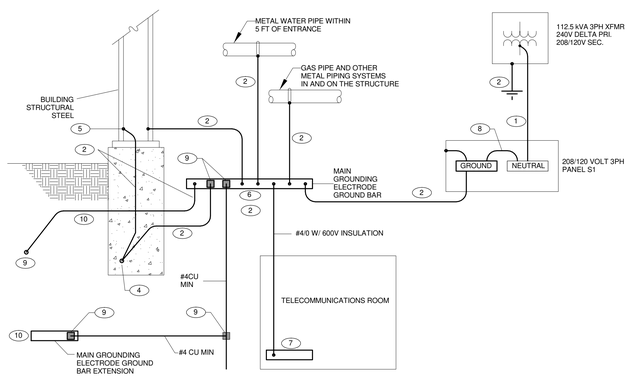
CIRCUIT NUMBER	LOAD LINE A	LOAD LINE B	LOAD LINE C	CIRCUIT TYPE (VRM/ LMS/AS)	LOAD DESCRIPTION	CIRCUIT BREAKER POLE	CIRCUIT BREAKER TRIP	BUS A	BUS B	BUS C	CIRCUIT BREAKER TRIP	CIRCUIT BREAKER POLE	CIRCUIT TYPE (VRM/ LMS/AS)	LOAD DESCRIPTION	LOAD LINE A	LOAD LINE B	LOAD LINE C	CIRCUIT NUMBER
1	2163			E	Exhaust Fan EF-2, EF-3	2	30	*			20	1	E	Unit Heaters East	1332			2
3		2163			*	-	30		*		20	1	E	Unit Heaters West		1332		4
5			600	E	Exhaust Fan EF-1, EF-4	1	20			*	20	1	L/R	Fire Riser Room (G)			386	6
7					Space			*			20	1	L	Indoor Lighting 1 (G)	810			8
9	1920			E	Bay Door Motors 1	1	20		*		20	1	L	Indoor Lighting 2 (G)		1890		10
11			1920	E	Bay Door Motors 2	1	20			*	20	1	L	Indoor Lighting 3 (G)			1350	12
13	1920			E	Bay Door Motors 3	1	20	*			20	1	R	Under Mezzanine Recs (G)	540			14
15		1920		E	Bay Door Motors 4	1	20		*		20	1	R	SE Bay Recs (G)		540		16
17			1920	E	Bay Door Motors 5	1	20			*	20	1	R	Mezzanine Recs (G)			540	18
19	1920			E	Bay Door Motors 6	1	20	*			20	1	R	Outdoor Recs (G)	1080			20
21		1920		E	Bay Door Motors 7	1	20		*		20	1	L	Outdoor Lighting (G)		890		22
23			1920	E	Bay Door Motors 8	1	20			*	20	1	E	Water Meter Hot Box Heater (G)			1920	24
25	1920			E	Bay Door Motors 9	1	20	*			20	1	R	Bay Receptacles 1 (G)	720			26
27		1920		E	Bay Door Motors 10	1	20		*		20	1	R	Bay Receptacles 2 (G)		720		28
29			1920	E	Bay Door Motors 11	1	20			*	20	1	E	Bay Receptacles 3 (G)			540	30
31	1920			E	Bay Door Motors 12	1	20	*						Space				32
33					Space				*					Space				34
35					Space					*				Space				36
37					Space			*						Space				38
39					Space				*					Space				40
41					Space					*	20	1	E	Fire Alarm (RED)			700	42
	9843	9843	8280		SUB TOTALS										4482	5372	5436	

CIRCUIT TYPE: L=LIGHTING, R=RECEPTACLE, M=MOTOR, LM=LARGEST MOTOR
DESCRIPTION: E=EQUIPMENT, A=APPLIANCE, S=SUBFEED PANEL
NOTES:
NEMA 4X
Provide a GFCI breaker for all circuits marked with 'GI'

PANEL LINE VA	14325	15215	13716
NEC ADDER			
FEED THRU LOAD			
TOTAL LINE KVA	14	15	14
LINE AMPS	40	42	38
TOTAL KVA LOAD	43.3		
FEEDER AMPS	120.1		



1 ONE LINE DIAGRAM
SCALE: NO SCALE



KEYED NOTES

1. INSTALL GROUNDED (NEUTRAL) CONDUCTOR SAME SIZE AS THE LARGEST PHASE CONDUCTOR.
2. INSTALL GROUNDING ELECTRODE CONDUCTOR, SIZED BASED ON NEC TABLE 250-66 USING THE SERVICE PHASE CONDUCTOR SIZE, BUT NOT SMALLER THAN NO 4.
3. INSTALL EQUIPMENT GROUNDING CONDUCTOR SIZED BASED ON NEC TABLE 250-122 USING THE FEEDER OVERCURRENT DEVICE SIZE.
4. INSTALL A CONCRETE-ENCASED HIM GROUNDING ELECTRODE IN THE BUILDING FOUNDATION AROUND THE PERIMETER OF THE BUILDING EMBEDD AT LEAST 20' OF ELECTRODE IN THE BOTTOM 1/3 OF THE FOUNDATION WITH AT LEAST 3 INCHES OF CONCRETE COVER. USE EITHER OF THE FOLLOWING MATERIALS FOR THE ELECTRODE:
   BARE COPPER CABLE NOT SMALLER THAN THE GROUNDING ELECTRODE CONDUCTOR REQUIRED BY THE NEC AND NOT SMALLER THAN NO 4.
   BARE OR GALVANIZED REBARS THAT ARE MADE ELECTRICALLY CONTINUOUS USING COPPER JUMPERS NOT SMALLER THAN THE NEC REQUIRED GROUNDING ELECTRODE CONDUCTOR AND NOT SMALLER THAN NO 4. USE REINFORCING BARS NOT SMALLER THAN THE FOLLOWING BASED ON THE TOTAL LENGTH OF THE INTERCONNECTED AND PARALLELED REBARS:

TOTAL LENGTH	MINIMUM REBAR SIZE
112 FT	1-3/8" (#11 BAR)
150 FT	1" (#8 BAR)
192 FT	3/4" (#6 BAR)
223 FT	5/8" (#5 BAR)
268 FT	1/2" (#4 BAR)

5. BOND EACH PERIMETER STRUCTURAL STEEL COLUMN TO THE CONCRETE-ENCASED MAIN GROUNDING ELECTRODE. USE COMPRESSION CONNECTORS THAT MEET IEEE 837 REQUIREMENTS OR USE EXOTHERMIC WELDS.
6. INSTALL A "MAIN GROUND ELECTRODE GROUND BAR" FOR SINGLE POINT GROUNDING. LOCATE AT AN ACCESSIBLE POINT NEAR THE SERVICE ENTRANCE EQUIPMENT. MAKE CONNECTIONS TO THE GROUND ELECTRODE CONDUCTOR USING IRREVERSIBLE CONNECTORS OR EXOTHERMIC WELDS. MAKE OTHER CONNECTIONS TO THE GROUND BAR USING TWO-HOLE COMPRESSION SPADE LUGS THAT MEET IEEE 837 REQUIREMENTS. LABEL EACH CONNECTION TO THE GROUND BAR.
7. INSTALL A COPPER GROUNDING BAR IN EACH TELECOMMUNICATIONS ROOM. CONNECT TO THE "MAIN GROUNDING ELECTRODE GROUND BAR" USING 600V INSULATED #4/0 COPPER CABLE AND COMPRESSION SPADE LUGS.
8. INSTALL BONDING JUMPER WIRE THAT IS SIZED BASED ON NEC TABLE 250-66 USING THE SERVICE OR SEPARATELY-DERIVED SYSTEM PHASE CONDUCTOR SIZE.
9. INSTALL IRREVERSIBLE COMPRESSION CONNECTOR WITH TAMPER-PROOF HARDWARE OR INSTALL EXOTHERMIC WELD.
10. AUXILIARY GND BUSES IN PANELS, GENSET, ETC. SIZE CONDUCTOR PER NEC 250.122, #4 CU MINIMUM.

GENERAL NOTES

1. CONDUCTOR SIZES SHOWN ARE MINIMUM AND MAY BE LARGER THAN THE MINIMUM SIZES REQUIRED BY NEC.
2. INSTALL GROUNDING CONNECTIONS TO BUILDING STRUCTURE AND WATER PIPES AT LOCATIONS THAT ARE VISIBLE AND ACCESSIBLE FOR INSPECTION, MAINTENANCE, AND TESTING.
3. INSTALL AN INSULATED THROAT GROUNDING BUSHING ON EACH METALLIC SERVICE ENTRANCE CONDUIT. BOND TO GROUND BUS USING CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250-66 USING THE SERVICE PHASE CONDUCTOR SIZE.
4. INSTALL AN INSULATED THROAT GROUNDING BUSHING ON EACH METALLIC FEEDER CONDUIT. BOND TO GROUND BUS USING CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250-122 USING THE FEEDER CIRCUIT OVERCURRENT DEVICE SIZE OR THE SEPARATELY DERIVED SYSTEM OVERCURRENT DEVICE SIZE.
5. BOND HOT AND COLD WATER PIPING SYSTEMS.

2 GROUNDING AND BONDING DIAGRAM
SCALE: NO SCALE

DEDICATED WIRING SCHEDULE

AMPS	(2WG)	(3WG)	(4WG)	IG
	1PH, 2 WIRE, GROUND	1PH, 3 WIRE, GROUND OR 3PH, 3 WIRE, GROUND	3PH, 4 WIRE, GROUND	ISOLATED GROUND
20	(2#12 & 1#12 G) 3/4"C	(3#12 & 1#12 G) 3/4"C	(4#12 & 1#12 G) 3/4"C	1#12 IG
30	(2#10 & 1#10 G) 3/4"C	(3#10 & 1#10 G) 3/4"C	(4#10 & 1#10 G) 3/4"C	1#10 IG
40	(2#8 & 1#10 G) 3/4"C	(3#8 & 1#10 G) 3/4"C	(4#8 & 1#10 G) 1"C	1#10 IG
50	(2#6 & 1#10 G) 3/4"C	(3#6 & 1#10 G) 1"C	(4#6 & 1#10 G) 1"C	1#10 IG
60	(2#4 & 1#10 G) 1"C	(3#4 & 1#10 G) 1"C	(4#4 & 1#10 G) 1 1/4"C	1#10 IG
70	(2#4 & 1#8 G) 1"C	(3#4 & 1#8 G) 1 1/4"C	(4#4 & 1#8 G) 1 1/4"C	1#8 IG
80	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C	1#8 IG
90	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C	1#8 IG
100	(2#1 & 1#8 G) 1 1/4"C	(3#1 & 1#8 G) 1 1/2"C	(4#1 & 1#8 G) 1 1/2"C	1#8 IG
NOTES	CONDUCTOR SIZES ARE BASED ON 60° TERMINATIONS LESS THAN 100A AND 75° TERMINATIONS GREATER THAN 100A. CONDUIT SIZES ARE BASED ON NEC TABLE 4 (RNC) AND TABLE 5 (THWN INSULATION). THIS SCHEDULE DOES NOT CONSIDER VOLTAGE DROP. CONDUCTOR SIZE SHALL BE INCREASED AS NEEDED TO MAINTAIN LESS THAN 3% VOLTAGE DROP ON BRANCH CIRCUITS OR FEEDERS. VOLTAGE DROP AT THE LOAD OR UTILIZATION EQUIPMENT SHALL NOT EXCEED 5%.			

LIGHTING FIXTURE SCHEDULE

MARK	TYPE	MFR	MODEL	MOUNTING	LAMP TYPE	ACCESSORIES	REMARKS	VOLT AMPS	VOLTS
L1 / L1E	LINEAR	LITHONIA	FEX L48 14000LM FPCL WD MVOLT GZ10 40K 80CRI SBGR10 D 3V DWHXD	SUSPENDED / SURFACE	HIGH EFFICACY LED	INTEGRATED MOTION SENSOR, E = EMERGENCY BATTERY BACKUP (E10WLCP), MOUNTING HARDWARE AS REQUIRED FOR INSTALLATION	SURFACE MOUNT AS NOTED, SUSPEND ELSEWHERE, MH=AS NOTED	90	120
L2 / L2E	LINEAR	LITHONIA	FEX L48 14000LM FPCL WD MVOLT GZ10 40K 80CRI RMBA SBGR10 D 3V DWHXD	SURFACE	HIGH EFFICACY LED	INTEGRATED MOTION SENSOR, E = EMERGENCY BATTERY BACKUP (E10WLCP); MOUNTING HARDWARE AS REQUIRED FOR INSTALLATION	ANGLED WALL BRACKET, MH=AS NOTED	90	120
L3	LINEAR	LITHONIA	LBL4 3000LM 80CRI 40K MIN10 GZT MVOLT LSXRHL	SURFACE	HIGH EFFICACY LED			26	120
W1	WALLPACK	LITHONIA	KAXW P3 30K R3 MVOLT PIRH BSW DBLXD	WALL	HIGH EFFICACY LED	INTEGRATED MOTION SENSOR, BIRD DETERRENT SPIKES, PHOTOCELL	MH=AS NOTED	79	120
W2	WALLPACK	LITHONIA	WPX1 LED P1 30K MVOLT E14WC DBLXD	WALL	HIGH EFFICACY LED	INTEGRATED BATTERY BACKUP		11	120
E1	EGRESS	LITHONIA	ELM6L UVOLT LTP SDRT	WALL	HIGH EFFICACY LED		INTEGRATED 90 MIN. BATTERY BACKUP FOR EGRESS	3	120
X1	EXIT	LITHONIA	LQC 1 G EL N	SURFACE / WALL	HIGH EFFICACY LED	AS REQ'D FOR INSTALLATION	INTEGRATED 90 MIN. BATTERY BACKUP FOR EGRESS	3	120
MANUFACTURERS: LITHONIA, JUNO, COOPER, PHILIPS, RAB, WAC									
GENERAL NOTES:									
A:	PROVIDE BID BASED ON THE BASIS-OF-DESIGN PRODUCTS. SUBMIT ALTERNATES FOR REVIEW; MAY REQUIRE ARCHITECT APPROVAL IN ADVANCE.								
B:									

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1121 SHAKORI DRIVE
MEYERS, CA
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

SEAL
REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY — NOT FOR CONSTRUCTION — ELECTRICAL — STATE OF CALIFORNIA
04/18/2022

REVISIONS

NUMBER	DESCRIPTION FOR PERMIT	DATE -

DATE: 04/18/2022
ISSUE: BID SET
SCALE: See Plan
SHEET NAME: ELECTRICAL DIAGRAMS & CALCULATIONS
SHEET NO.: E1.2

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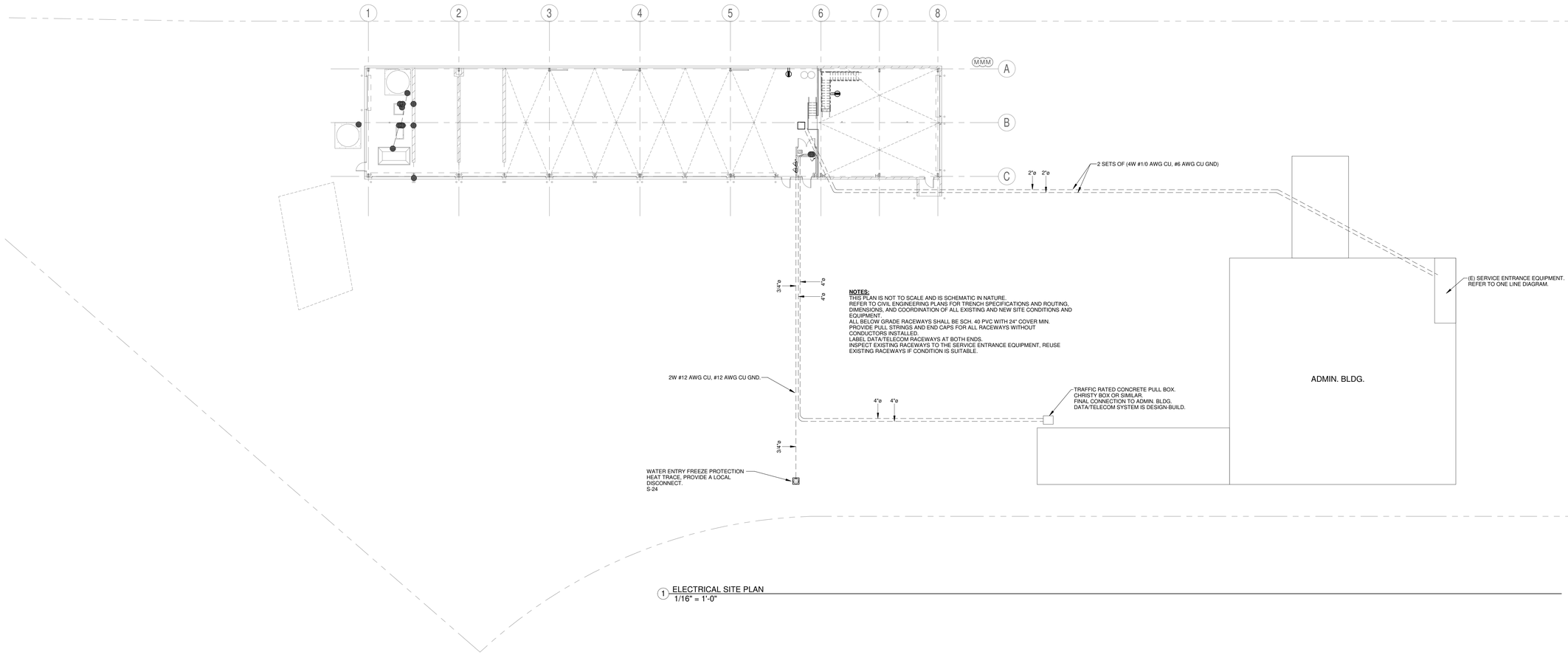

1 ELECTRICAL SITE PLAN
1/16" = 1'-0"

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REVISIONS

NUMBER	DESCRIPTION	DATE

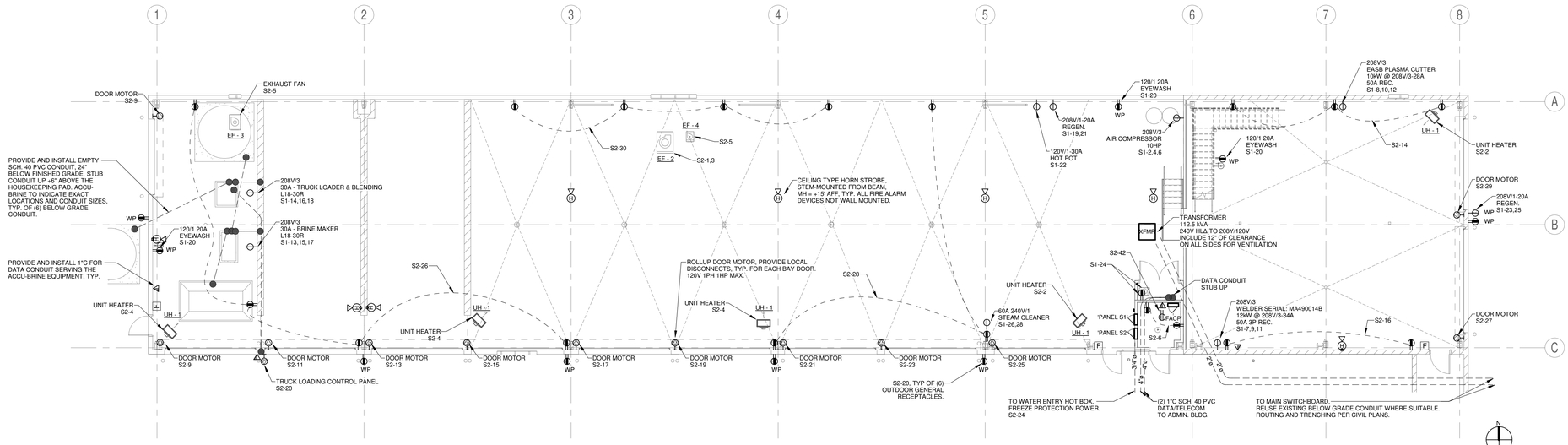
DATE: 04/18/2022

ISSUE: BID SET

SCALE: See Plan

SHEET NAME: ELECTRICAL SITE PLAN

SHEET NO.: E2.0



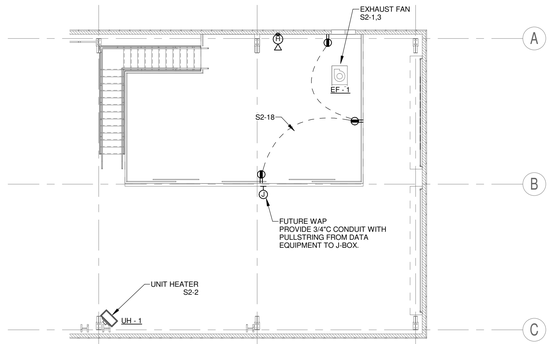
1 POWER PLAN - LOWER LEVEL
1/8" = 1'-0"

POWER NOTES

1. THIS PROJECT TIES INTO AN EXISTING ELECTRICAL SYSTEM. THESE PLANS ARE BASED UPON SITE OBSERVATIONS AND INFORMATION RECEIVED FROM COUNTY STAFF. PRIOR TO BID, CONTRACTOR SHALL VISIT SITE AND VERIFY ALL FIELD CONDITIONS.
2. THERE ARE EXISTING RACEWAYS BELOW GRADE RUNNING TO THE MAIN BUILDING. CLEAN, INSPECT, AND REUSE IF SUITABLE. EXTEND RACEWAYS FROM LAST PULL BOX TO NEW TRANSFORMER LOCATION. COORDINATE WITH GC FOR UNDERGROUND WORK PRIOR TO FOUNDATION.
3. DO NOT SCALE ELECTRICAL DRAWINGS. REFER TO ARCHITECTURAL FLOORPLANS AND ELEVATIONS FOR DEVICE, FIXTURE, AND RECEPTACLE LOCATIONS.
4. REFER TO COMPLETE PLAN SET, INCLUDING BUT NOT LIMITED TO, ARCHITECTURAL, CIVIL, MECHANICAL, AND STRUCTURAL PLANS. ADDITIONAL INFORMATION IS PROVIDED IN OTHER DISCIPLINE PLANS.
5. PROVIDE ALL GFCI PROTECTIONS BY LISTED CIRCUIT BREAKERS IN THE PANELBOARDS, UNLESS OTHERWISE NOTED. REFER TO THE PANEL SCHEDULES ON E1.2.
6. GFCI PROTECTION SHOWN IN THE PANEL SCHEDULES MAY BE OMITTED WHERE A DEDICATED CIRCUIT SERVES POWER TO A HARDWIRED PIECE OF EQUIPMENT AND NO RECEPTACLE CONNECTIONS EXIST ANYWHERE IN THE CIRCUIT.
7. PROVIDE RECEPTACLES TO MATCH COUNTY EQUIPMENT REQUIREMENTS.
8. LABEL EACH RECEPTACLE WITH PANEL AND BRANCH CIRCUIT DESIGNATION (E.G.: S2-14).
9. PROVIDE FULLY RATED LOCAL DISCONNECTS FOR ALL HARDWIRED EQUIPMENT. PROVIDE FUSED DISCONNECTS WHERE RECOMMENDED BY THE PRODUCT MANUFACTURER.
10. PROVIDE BOOST TRANSFORMERS (14.4KVA MIN. SINGLE PHASE 208V PRIMARY TO 240V SECONDARY) FOR THE STEAM CLEANER IF THE EQUIPMENT IS NOT RATED FOR OPERATION AT 208V SINGLE PHASE. VERIFY STEAM CLEANER RATINGS WITH COUNTY STAFF.
11. PROVIDE GFCI CIRCUIT TO WATER ENTRY HOT BOX HEATER. REFER TO CIVIL PLANS, NOTIFY ENGINEER IF HEATER EXCEEDS 1900 WATTS AT 120 VOLTS.
12. ALL INDOOR EQUIPMENT, EXCLUDING WITHIN THE FIRE RISER ROOM, SHALL BE CORROSION RESISTANT AND NEMA 4X RATED OR BETTER.
13. ALL EXTERIOR RECEPTACLES SHALL HAVE WEATHERPROOF IN-USE COVERS.
14. PROVIDE NEUTRAL-GROUND BONDING IN PANEL S1. REFER TO GROUNDING AND BONDING DETAIL ON SHEET E1.2.
15. ALL INDOOR WIRING (LOW VOLTAGE, CONTROL, FIRE ALARM, AND DATA WIRING INCLUDED) SHALL BE INSTALLED IN CORROSION RESISTANT EMT, IMC, RMC, OR LFMC (6' MAX.) RACEWAYS ABOVE GRADE. SCH. 40 PVC IS PERMITTED BELOW GRADE WITH 24" OF COVER MIN. MC CABLE SHALL BE MINIMIZED AND LIMITED TO THE WIRING BETWEEN SUSPENDED LIGHT FIXTURES AND THE JUNCTION BOXES DIRECTLY ABOVE THE RESPECTIVE LIGHT FIXTURES. MC CABLE SHALL HAVE CORROSION RESISTANT COATING AND SHALL NOT BE USED FOR HORIZONTAL RUNS. ALL OUTDOOR WIRING SHALL BE INSTALLED IN GALVANIZED RMC.
16. LOCATE BRINE EQUIPMENT POWER CONNECTIONS PER MANUFACTURER INSTALLATION INSTRUCTIONS, WHERE POSSIBLE MINIMIZE CORD DISTANCE AND DO NOT OBSTRUCT ACCESS. VERIFY OUTLET LOCATIONS WITH OWNER AND MANUFACTURER.

FIRE ALARM, DATA, TELECOM NOTES

1. FIRE ALARM DESIGNS SHALL BE BY DESIGN-BUILD FPE OR NICET-3 LICENSED TECHNICIANS. CONTRACTOR SHALL SUBMIT TO BUILDING DEPARTMENT AS A DEFERRED SUBMITTAL. CONTRACTOR SHALL INCLUDE ALL FEES FOR DESIGNING AND PERMITTING OF THESE SYSTEMS. ANY RELATED INFORMATION SHOWN ON THE MEP PLANS IS FOR GENERAL GUIDANCE ONLY.
2. CONTROLS, DATA, TELECOM, AUDIO-VISUAL, WIFI, AND SIMILAR LOW-VOLTAGE DESIGNS SHALL BE DESIGN-BUILD BY THE CONTRACTOR. CONTRACTOR SHALL SUBMIT TO BUILDING DEPARTMENT AS DEFERRED SUBMITTALS IF REQUESTED BY BUILDING DEPARTMENT OR ITS DESIGNATE. CONTRACTOR SHALL INCLUDE ALL FEES FOR DESIGNING AND PERMITTING OF THESE SYSTEMS. ANY RELATED INFORMATION SHOWN ON THE MEP PLANS IS FOR GENERAL GUIDANCE ONLY.
3. CONTRACTOR SHALL MATCH SYSTEM BRANDS AND COMPONENTS TO OTHER SYSTEMS EXISTING ON THE PROPERTY.
4. COORDINATE WITH THE COUNTY FOR THE FOLLOWING:
   a. SPECIFIC DATA / TELECOMMUNICATIONS / TELEVISION EQUIPMENT, LOCATIONS, QUANTITIES, AND FUNCTIONALITY.
   b. SPECIFIC AUDIO-VISUAL EQUIPMENT LOCATIONS, QUANTITIES, AND FUNCTIONALITY.



2 POWER PLAN - UPPER LEVEL
1/8" = 1'-0"

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NUMBER	DESCRIPTION	DATE
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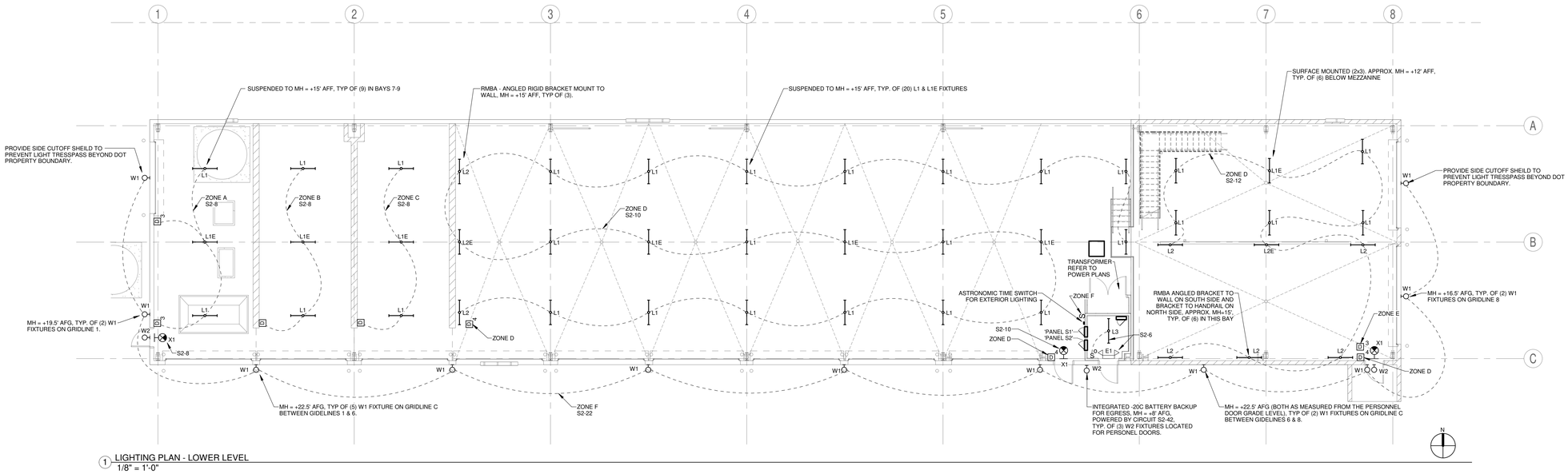
DATE: 04/18/2022

ISSUE: BID SET

SCALE: See Plan

SHEET NAME: POWER PLANS

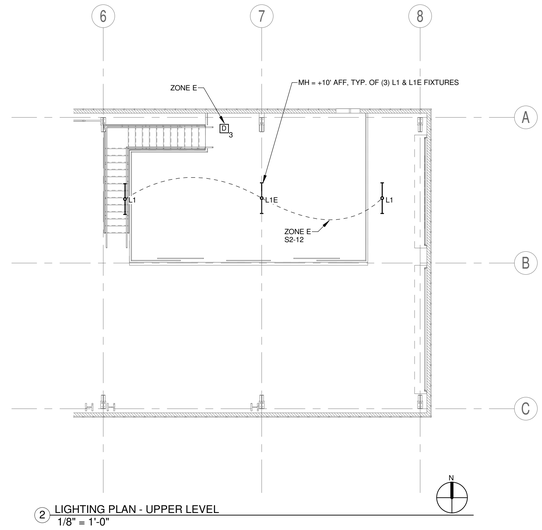
SHEET NO.: E2.1



1 LIGHTING PLAN - LOWER LEVEL
1/8" = 1'-0"

LIGHTING NOTES

1. ALL LIGHTING FIXTURES SHOWN IN THIS PLAN WERE SELECTED AND LOCATED BY SUGARPINE ENGINEERING.
2. THE ENGINEER HAS MADE A REASONABLE ATTEMPT TO INDICATE PRIMARY CONTROLS COMPONENTS ON PLANS, BUT IT IS NOT POSSIBLE TO SHOW EVERY DEVICE. WIRING SHOWN IN THE ELECTRICAL PLANS ARE DRAWN SCHEMATICALLY TO CONVEY THE DESIGN INTENT. THE PLANS AND SPECIFICATIONS ARE NOT INTENDED TO BE 'SHOP DRAWINGS' OR A 'WIRING DIAGRAM'. PROVIDE ALL DEVICES NECESSARY TO ACHIEVE THESE CONTROL SEQUENCES, WHETHER DEVICES ARE SHOWN OR NOT.
3. SENSOR AND CONTROL DEVICES VARY BY PRODUCT. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROCURING THE APPROPRIATE CONTROL DEVICES AND SENSORS SUCH THAT THE LIGHTING CONTROLS OPERATE IN ACCORDANCE WITH ALL RELEVANT CODES. PROVIDE ADDITIONAL OCCUPANCY SENSORS AS REQUIRED TO COVER 90% MIN. OF THE AREA SERVED BY THE LIGHTING IN A ROOM OR SPACE.
4. PROVIDE AN ASTRONOMIC TIME CLOCK TO CONTROL THE OUTDOOR LIGHTING PER T24. PROVIDE ADDITIONAL RELAYS AND CONTROL DEVICES AS NECESSARY. COORDINATE WITH COUNTY TO SET BOUNDARIES OF OPERATION.
5. ALL CONTROL AND POWER WIRING SHALL BE INSTALLED IN LISTED METALLIC RACEWAYS, REFER TO POWER NOTE 16 FOR ADDITIONAL INFORMATION.
6. PROVIDE ALL CONTROLS PROGRAMMING, WHETHER ANALOG OR DIGITAL, TO ACHIEVE THE CONTROLS DESCRIBED HEREIN. CONTROLS PROGRAMMING INCLUDES, BUT IS NOT LIMITED TO, LIGHTING CONTROL PANEL PROGRAMMING, RELAY LOGIC, CONTACTOR/RELAY PANEL CONFIGURATION, DEVICE AND SENSOR CONFIGURATION, AND SWITCHING CONFIGURATION.
7. SUGARPINE ENGINEERING IS AVAILABLE (FOR A FEE) TO ASSIST WITH THE CONTRACTOR'S PRODUCTION OF CONTROLS WIRING AND COMPONENT DIAGRAMS. CONTROLS CONFIGURATIONS, SELECTION OF COMPONENTS, SHOP DRAWINGS, OR SIMILAR DETAILING.
8. ACCEPTANCE TESTING: FOR PROJECTS LOCATED IN THE STATE OF CALIFORNIA THAT ARE SUBJECT TO THE REQUIREMENTS OF THE CA ENERGY CODE, TITLE 24, THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING THE LIGHTING CONTROLS TESTED AND APPROVED BY A STATE CERTIFIED ACCEPTANCE TEST TECHNICIAN. CONTRACTOR SHALL INCLUDE PROVISIONS FOR THE COST OF ACCEPTANCE TESTING IN THEIR BID.
9. SUBMIT WITHIN 30 DAYS OF BID AWARD:
   - SHOP DRAWINGS INDICATING ALL ITEMS, WIRING AND CONFIGURATIONS.
   - PRODUCT DATA FOR ALL ITEMS.
10. ALL LIGHTING & CONTROLS SHALL MEET OR EXCEED THE REQUIREMENTS OF THE 2019 CA ENERGY CODE, TITLE 24.
11. THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISES' ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, AN INTEGRATED BATTERY BACKUP SHALL AUTOMATICALLY ILLUMINATE SELECT EGRESS FIXTURES IDENTIFIED BY THE SUFFIX 'E' AS WELL AS EXIT SIGNS AND EGRESS FIXTURES. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E1.2.
12. THE EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION OF NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF INTEGRATED BATTERIES.
13. EMERGENCY LIGHTING FACILITIES SHALL BE ARRANGED TO PROVIDE INITIAL ILLUMINATION THAT IS AT LEAST AN AVERAGE OF 1 FOOTCANDLE AND A MINIMUM OF 0.1 FOOTCANDLE MEASURED ALONG THE PATH OF EGRESS AT FLOOR LEVEL. ILLUMINATION LEVELS SHALL BE PERMITTED TO DECLINE TO 0.6 FOOTCANDLE AVERAGE AND A MINIMUM AT ANY POINT OF 0.06 FOOTCANDLE AT THE END OF THE EMERGENCY LIGHTING TIME DURATION. A MAXIMUM-TO-MINIMUM ILLUMINATION UNIFORMITY RATIO OF 40 TO 1 SHALL NOT BE EXCEEDED.
14. CONTRACTOR SHALL AIM FIXTURE HEADS AND FIELD MEASURE ILLUMINANCE AT THE WALKING SURFACE. PROVIDE ADDITIONAL EGRESS FIXTURES AS NEEDED TO MEET THE MINIMUM EGRESS ILLUMINATION REQUIREMENTS.



2 LIGHTING PLAN - UPPER LEVEL
1/8" = 1'-0"

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04/18/2022

REVISIONS

NUMBER	DESCRIPTION	DATE
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DATE: 04/18/2022

ISSUE: BID SET

SCALE: See Plan

SHEET NAME: LIGHTING PLANS

SHEET NO.: E3.1

Shakori Garage Replacement

W+P Project Number 20035.00

Project Manual

April 18, 2022
Rev 0

ARCHITECTS + PLANNERS williams+paddon

00 01 10
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200035.00 Rev 0

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33 51 00	Natural Gas Distribution

END SECTION

00 01 03
PROJECT DIRECTORY
Shakori Garage Replacement
200035.00

PROJECT :		
Project Name	**Shakori Garage Replacement**	
Address	**1121 Shakori Drive Myers, CA 96150**	
Company/Client/People	**Phone**	**Email**
OWNER TEAM:		
Owner/Client		
County of El Dorado Chief Administrative Office, Facilities 3000 Fairlane Ct., Ste 1, Placerville, CA 95667		
Russ Fackrell Division Manager	530- 621-7596	russell.fackrell@edcgov.us
Chuck Harrell Capital Programs Manager	530-621-6051	charles.harrellll@edcgov.us
Owners Project Manager		
County of El Dorado Chief Administrative Office, Facilities 3000 Fairlane Ct., Suite 1, Placerville, CA 95667		
Derek Blogin, Facilities Project Manager	530- 621-5104	derek.blogin@edcgov.us
Owners Consultant – Project Manager		
Christenson Consulting 1221 Macaulay Circle Carmichael, CA 95608		
Bob Christensen	916-416-7271	bob@christensenconsulting.com
Geotechnical Engineer		
Geocon Consultants, Inc 3160 Gold Valley Drive, Suite 800 Rancho Cordova, CA 95742		
Sean Dixon, PG	916.852.9118	
DESIGN TEAM:		
Architect		
Williams + Paddon Architects + Planners 2237 Douglas Blvd., Suite 160 Roseville, CA 95661		
Greg Tonello AIA, Principal	916-786-8178	tonello@williamspluspaddon.com
Interior Designer		
Williams + Paddon Architects + Planners 2237 Douglas Blvd., Suite 160 Roseville, CA 95661		
Greg Tonello AIA, Principal	916-786-8178	tonello@williamspluspaddon.com
Structural		
Buehler Engineering, Inc 600 Q Street Sacramento, CA 95811		
William Radar, SE	916-443-0303	bradar@buehlerengineering.com

Mechanical / Plumbing		
Sugarpine Engineering, Inc 12710 Northwoods Blvd Truckee, CA 96161		
Mark Schlosser	530-214-0859	mark@sugarpineeng.com
Electrical		
Sugarpine Engineering, Inc 12710 Northwoods Blvd Truckee, CA 96161		
Ken Bousqet	530-214-0859	ken@sugarpineeng.com
Civil		
Warren Consulting Engineers 1117 Windfield Way, Suite110 El Dorado Hills, CA 95762		
Anthony Tassano, CE	916-985-1870	anthony@wceinc.com
Landscape		
N/A		
Contact Name, Title		
Cost Estimator		
Sierra West Group 9700 Business Park Drive, Suite 102 Sacramento, CA 95827		
John Moreno	916-925-4000	jmoreno@sierrawestgroup.com
Consultant		
Company Name & Address		
Contact Name, Title		
Consultant		
Company Name & Address		
Contact Name, Title		
CONSTRUCTION TEAM:		
General Contractor		
Company Name & Address		
Contact Name, Title		
Construction Manager		
Company Name & Address		
Contact Name, Title		
AGENCIES:		
Building Department		
El Dorado County 2850 Fairlane Court Placerville, CA 95667		
Contact Name, Title	530-621-5315	
Planning Department		

El Dorado County Planning & Building Department 924 B Emerald Bay Rd. South Lake Tahoe, CA 96150		
Brendan Ferry, Deputy Director Tahoe Planning & Stormwater Division	530- 573-7905	brendan.ferry@edcgov.us
Fire Department		
Lake Valley Fire Protection District Admin HQ 2211 Keetak Street South Lake Tahoe, CA 96150	530-577-3737	
Environmental Planning Agency		
Tahoe Regional Planning Agency PO Box 5310 Stateline, NV 89449	775-588-4547	
UTILITIES:		
Refuse		
South Lake Tahoe Refuse & Recycling 2140 Ruth Avenue South Lake Tahoe, CA 96150	530-541-5105	
Water Company		
South Tahoe Public Utilities District 1275 Meadows Drive South Lake Tahoe, CA 96150	530-544-6474	
Gas Company		
Southwest Gas Company Southwest Gas P.O. Box 24531 Oakland, CA 94623-1531	877-860-6020	
Electric Company		
Liberty Utilities 933 Eloise Avenue South Lake Tahoe, CA 96150	530-543-5281	
Sewer Services		

South Tahoe Public Utilities District 1275 Meadows Drive South Lake Tahoe, CA 96150	530-544-6474	
Telephone		
Company Name & Address		
Contact Name, Title		
Other		
Company Name & Address		
Contact Name, Title		
Other		
Company Name & Address		
Contact Name, Title		
Other		
Company Name & Address		
Contact Name, Title		

00 01 25
USER GUIDE FOR THE PROJECT MANUAL
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 SUMMARY GENERAL:

1. This Guide is provided as a basis for understanding the organization, use and implementation of this Project Manual.

B. DESCRIPTION:

1. **Construction Documents**:
   a. Defined as the graphic/drawings - graphic representations of the Work which illustrates/indicates the materials, components, systems, etc. and their relationships to one another, including sizes, shapes, fit, location, and connections and at specific locations the product & manufacturer, etc., is noted in the drawing documents as specific and/or general notes and written documents prepared and/or assembled by the **Architect**, his or her consultant engineers and/or the independent design build engineers for communicating the design intent of the project and administering the contract for its construction.
      1. These include Bidding Requirements (Invitation to Bid, Instructions to Bidders, and Bid Forms) and the Contract Documents.
      2. Refer to all Division one documents.

2. **Demolition and Protection Documents**:
   a. Defined as the graphic/drawings - graphic representations of the Demolition and Protection Work, which illustrates/indicates the materials, components, finishes, fixtures, etc., is noted in the drawing documents as specific and/or general notes and written documents prepared and/or assembled by the **Architect**, his or her consultant engineers and/or the independent design build engineers for communicating the Demolition and Protection intent of the project and administering the contract for the work.
      1. These include Bidding Requirements (Invitation to Bid, Instructions to Bidders, and Bid Forms) and the Contract Documents.
      2. Refer to all Division one documents.

3. **Contract Documents:**
   a. Defined as the legally enforceable requirements that become part of the contract when the agreement is signed, these include;
      1. **Contract Forms:** agreement, bonds and certificates
      2. **Conditions of the Contract:** define the basic rights, responsibilities, and relationships of the parties involved in the construction process
      3. **Project Manual – Documents, Bidding and Contract Requirement Documents and Specifications**, **Drawings, Addenda,** and **Contract Modifications**
         a. Written instruments used to add to, delete from or otherwise modify the Work after the construction agreement has been signed).
         b. They describe the proposed construction (referred to as the "Work") that results from performing services, furnishing labor, and supplying and incorporating materials and equipment into the construction.
      4. **Drawings.**

4. **Specifications:**
   a. Divided into multiple sections as herein included.
   b. The Specifications define the qualitative requirements (at specific locations the quantity) for manufactures products, materials, and systems and the standards of workmanship required for installation.
   c. The specifications provide information regarding Demolition and Protection.
   d. They also at times include schedules which may define quantities and/or locations for installation.
   e. Division 1 documents and sections constitute the GENERAL REQUIREMENTS necessary for the Project; the specification sections comprise the Technical Specifications portion of the Project Manual.

5. **Bidding and Contract Requirements:**
   a. These Documents are included to clarify specific criteria related to general requirements and include all Division 1 and including the General Conditions and Supplemental Conditions when included.

6. **Addenda:**
   a. Written and/or graphic documents issued to clarify, revise, add to, or delete information in the original bidding documents or in previous addenda.

7. **Alternates:**
   a. **Add Alternate:** Specific items which are intended to be listed as separate line item in addition to overall bid of project but not included in base bid by **General Contractor**. **Owner** and their representative will make decision if item will be incorporated into project and final bid price.
   b. **Deductive Alternate:** Specific items to be listed as separate deductive line item but not to be included in base bid by **General Contractor**. **Owner** and their representative will make decision if item will be deducted from base bid.

8. **Geotechnical Report:** Report referred to in this Project Manual is available upon request from the **Owner** for reference only.

C. DIVISION 1
1. Include 'Documents' as part of Bidding and Contract Requirements which expand on general requirements.
2. Division 1 of the Specifications expands on certain broad provisions of the Conditions of the Contract and governs the execution of all Technical Sections of the Specifications.
   a. Sections included in Division 1 specify the administrative and procedural requirements, as well as temporary facilities, required for the Project.
   b. These sections shall be used in concert with the General Condition document(s)
   c. All requirements stated in Division 1 apply to and will be in force for all Sections included in the specifications.

D. OWNER
1. **Type:**
   a. **GENERAL REQUIREMENTS**
2. The Division 1 - General Requirements (Owner Supplied) shall be used in conjunction with Supplemental conditions provided by the Owner, if any. The **Owner's** documents include provisions for the relationship between the **Owner** and **General Contractor** and may include additional provisions related to the **Architect** and the **Architect's consultants**.

E. PRODUCT REFERENCES:
1. The Section titles represent a class of product and may be stated in the singular or plural without regard to the actual quantity used on the project.
2. The organization of product specifications by Section is not meant to define subcontracts or other divisions of work by trades.

F. MANUAL FORMAT:
1. **General:** The top of each page of each Section appears with;
   a. Project Name
   b. Project Number
   c. Document or Specification Section name and number
   d. Page of document or specification

2. **Underlined and Boldface Type:**

a. Underlining and bolding have been used in different combinations throughout the Project Manual to highlight headings and significant text.
   1. This device has been used to assist the user in finding items of information or to emphasize the importance of certain information.
      a. No other meaning is attached to the use of boldface and underlined text which provides and/or implies any more or less importance.

3. **Dates:**
   a. The official date of issue of the Project Manual appears on the cover sheet of this Project Manual.
      1. Dates subsequent to that date on individual Section pages indicate reissue of entire Sections or portions thereof for clarification.

4. **Deleted scope/text related to revisions:**
   a. Items lined out typically represent deleted items and/or text as part of a revision during Bidding as part of Addenda and also during construction as part of written changes and will have a line or multiple lines thru them;
      1. ~~**Deleted Revisions:**~~
      2. ~~**Deleted Revisions:**~~

5. ***Added Revisions:***
   a. Items in ***bold italics*** typically represent added items and/or text as part of a revision during Bidding as part of Addenda and also during construction as part of written changes.
   b. If multiple revisions have been made in multiple issuances of a document, then the previous revision(s) will stay as *italic* type text, but only the most current revisions shall be ***italics and bold.***

1.02 DEFINITIONS AND INTERPRETATIONS:

A. **WORDS AND TERMS:**
   1. Those which are frequently used with special meanings, within but not limited to this Project Manual and drawings are defined in;
      a. Sections 01 41 00 – Regulatory Requirements and Sections 01 42 00 – References.

B. **GOVERNING DICTIONARY:**
   1. "The Merriam-Webster Dictionary of the English Language".

C. **SPECIFICATION LANGUAGE:**
   1. These Specifications are typically written in the imperative mood, as defined in the Construction Specifications Institute's Manual of Practice.
      a. Imperative language is directed to the **General Contractor**.
         1. The indicative mood is employed on occasion when such sentence structure is necessary to convey the intended meaning in a more accurate or understandable form.
            a. The text is streamlined, with the colon (:) employed as a symbol for the words "shall be", "shall have", "shall conform with", "shall comply with", or "shall meet the requirements of".
            b. The colon is also used to separate a paragraph title or heading from the text that follows.

D. **GENERAL CONTRACTOR:**
   1. The **General Contractor** may also be listed in documents herein included as the Lessor, Entity and/or the Corporation and where listed as such shall be the same as listed other places as **General Contractor.**

1.03 QUANTITIES AND SCHEDULES

A. In specific locations the specifications may list quantities, but it is still the responsibility of the **General Contractor** to confirm & coordinate.

B. In specific locations the specifications may include schedules for specific items to assist the **General Contractor**.

1. The **General Contractor** shall still be responsible to confirm all items, coordinate with documents & associated scopes of work, and clarify through the submittal process.

1.04 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Scope as indicated in drawings, documents as part of Project Manual and specifications

B. Related Sections include, but are not limited to the following:
   1. Division 1

END OF SECTION

01 21 00
ALLOWANCES
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 DESCRIPTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Allowances described herein have been established to allow **Owner** to establish a fund for each item herein listed which the **Owner** can use at their discretion.

1.02 RELATED REQUIREMENTS

A. Refer to Division 0 – Bidding and Contract Requirements and Division 1 – General Requirements.
B. Pertinent Specification Sections: Requirements of individual Allowance items.

1.03 MODIFICATIONS TO WORK AND/OR MATERIALS

A. If **Owner** elects to proceed with Allowance items, make all modifications to Work required of selected Allowances.
   1. Amount: $[fill In]
B. Provide and furnish all labor, material and equipment necessary for services to install and construct Allowance bid items approved and accepted for construction by the **Owner**.

PART 2 - PRODUCTS

2.01 DESCRIPTION OF ALLOWANCES

A. Allowances
   1. Item: Pre-Manufactured Metal Building
      a. Section: 13 34 19
      b. Description: Prefabricated Metal Building, including structure, wall panels, roof panels mezzanine framing, concrete-filled metal deck, flashings, steel stairs and building thermal insulation
      c. Amount Value To Be Determined (*Refer to Request for Bids/Instructions to Bidders – Owner Supplied*)

PART 3 – EXECUTION

A. All allowances shall be tracked separately by **General Contractor** and included in Payment Requests.
B. All Allowance money not expended as approved by **Owner** shall be credited back to **Owner** during project closeout.

END OF SECTION

01 41 00
REGULATORY REQUIREMENTS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. This section and related attachments are for general use and specific use as herein indicated, as herein specified and as necessary to complete the work required by project conditions, including but not limited to:
   1. References to;
      a. Building Codes and Regulations
         1. All construction shall be in accordance with:
            a. All applicable codes & all local regulations & local agencies having jurisdiction.
            b. The Americans with Disabilities Act
            c. State and Federal Regulations and Agencies having jurisdiction
C. The **General Contractor** shall obtain and maintain at the project site a copy of the referenced codes as deemed necessary to complete the work.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
   1. Part 1 – California Administrative Code
   2. Part 2 , Volume 1 & 2 - California Building Code – (CBC)
   3. Part 3 – California Electrical Code – (CEC)
   4. Part 4 – California Mechanical Code – (CMC)
   5. Part 5 – California Plumbing Code – (CPC)
   6. Part 6 – California Energy Code
   7. Part 7 – (No longer published, refer to Title 8)
   8. Part 8 – California Historical Building Code
   9. Part 9 – California Fire Code (CFC)
   10. Part 11 – California Green Building Standards Code
   11. Part 12 – California Referenced Standards Code
B. Current California Code of Regulations (CCR), Office of Administrative Law www.oal.ca.gov/CCR.htm
   1. Title 8, CCR, Industrial Regulations, Subchapter 6. Elevator Safety Orders
   2. Title 19 CCR, Public Safety
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version
D. NFPA: Including, but not limited to the following; editions as listed, unless jurisdiction recognizes another edition:
   1. 2016 NFPA 13 Installation of Sprinkler Systems
   2. 2016 NFPA 13E Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems
   3. 2016 NFPA 14 Installation of Standpipe, Private Hydrant and Hose Systems
   4. 2017 NFPA 15 Standard for Water Spray Fixed Systems for Fire Protection
   5. 2017 NFPA 17 Dry Chemical Extinguishing Systems
   6. 2017 NFPA 17A to a UL 300 for Class I Hood Fire Suppression System. (Wet Chemical Extinguishing Systems)
   7. 2017 NFPA 18 Standard on Wetting Agents
   8. 2017 NFPA 18A Standard on Additives for Fire Control and Vapor Mitigation
   9. 2016 NFPA 20 Installation of Stationary Pumps for Fire Protection
   10. 2018 NFPA 22 Water Tanks for Private Fire Protection
   11. 2016 NFPA 24 Installation of Private Fire Service Mains and Their Appurtenances
   12. 2013 NFPA 25 Inspection, Testing, Maintenance of Water-Based Fire Protection Systems
   13. 2018 NFPA 30 Combustible and Flammable Liquids Code
   14. 2018 NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages
   15. 2016 NFPA 72 National Fire Alarm Code
   16. 2020 NFPA 75 Standard for the Protection of Information Technology Equipment
   17. 2020 NFPA 76 Standard for the Fire Protection of Telecommunications Facilities

18. 2016 NFPA 80 Standard for Fire Doors and Other Opening Protectives
19. 2017 NFPA 80A Recommended Practice for Protection of Buildings from Exterior Fire Exposures
20. 2015 NFPA 85 Boiler and Combustion Systems Hazards Code
21. 2019 NFPA 86 Standard for Ovens and Furnaces
22. 2021 NFPA 90A Standard for the Installation of Air-Conditioning and Ventilating Systems
23. 2021 NFPA 90B Standard for the Installation of Warm Air Heating and Air-Conditioning Systems
24. 2018 NFPA 101 Life Safety Code
25. 2016 NFPA 110 Standard for Emergency and Standby Power Systems
26. 2015 NFPA 2001 Clean Agent Fire Extinguishing Systems

1.03 DATES OF CODES

A. Except where a specific date of issue is mentioned herein, references to specifications issued by the above named and other organizations shall mean the edition current on the date of the issuance of project permit.

1.04 MISCELLANEOUS REQUIREMENTS

A. OSHA Requirements
   1. **General Contractor** must comply with all standards and requirements of the occupational safety and health administration.
      a. Notify **Owner** immediately of items not complying.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

01 42 00
REFERENCES
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.

B. This section and related attachments are for general use and specific use as herein indicated as herein specified and as necessary to complete the work required by project conditions, including but not limited to:
   1. References to:
      a. Standards
      b. Associations
      c. Definitions
      d. Abbreviations
      e. Miscellaneous items are intended to provide a central location for reference.
         1. This section shall provide assistance with definitions.

C. The **General Contractor** shall obtain and maintain at the project site a copy of the referenced standards as deemed necessary to complete the work.

1.02 REFERENCE STANDARDS

A. Refer to Section 01 41 00 – Regulatory Requirements

1.03 ASSOCIATIONS

A. Associations shall include, but not be limited to:

1.	AA	Aluminum Association www.aluminum.org
2.	AABC	Associated Air Balance Council
3.	AAC	Aluminum Anodizers Council
4.	AAMA	American Architectural Manufacturers Association www.aamanet.org
5.	AAN	American Association of Nurserymen
6.	AASHTO	American Association of State Highway and Transportation Officials www.transportation.org
7.	AATCC	American Association of Textile Chemists and Colorists
8.	AAU	Amateur Athletic Union
9.	ABMA	American Boiler Manufacturers Association www.abma.com
10.	ACI	American Concrete Institute www.aci-int.org
11.	ACIL	American Council of Independent Laboratories
12.	ACPA	American Concrete Pipe Association
13.	ADA/ ADAAG	Americans with Disabilities www.usdoj.gov/crt/ada/adahom1.htm Act Accessibility Guidelines www.access-board.gov
14.	ADC	Air Diffusion Council
15.	AFPA	American Forest and Paper Association
16.	AGA	American Gas Association www.aga.org
17.	AGC	Associated General Contractors of America www.agc.org
18.	AGMA	American Gear Manufacturers Association www.agma.org
19.	AHA	American Hardboard Association
20.	AHAM	Association of Home Appliance Manufacturers
21.	AI	Asphalt Institute
22.	AIA	American Institute of Architects www.aia.org
23.	AIHA	American Industrial Hygiene Association
24.	AIMA	Acoustical and Insulating Materials Association
25.	AISC	American Institute of Steel Construction www.aisc.org
26.	AISI	American Iron and Steel Institute www.**steel**.org
27.	AITC	American Institute of Timber Construction
28.	ALI	Associated Laboratories, Inc.
29.	ALSC	American Lumber Standards Committee
30.	AMCA	Air Movement and Control Association
31.	ANSI	American National Standards Institute www.ansi.org

32.	AOSA	Association of Official Seed Analysts
33.	APA	American Plywood Association www.apawood.org
34.	API	American Petroleum Institute www.api.org
35.	APWA	American Public Works Association www.apwa.net
36.	ARI	Air-Conditioning and Refrigeration Institute
37.	ARMA	Asphalt Roofing Manufacturers Association
38.	ASA	Acoustical Society of America www.asa.aip.org
39.	ASC	Adhesive and Sealant Council
40.	ASCE	American Society of Civil Engineers www.asce.org
41.	ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers www.ashrae.org
42.	ASME	American Society of Mechanical Engineers(ASME), www.asme.org
43.	ASPA	American Sod Producers Association (ASPA)
44.	ASPE	American Society of Plumbing Engineers (ASPE), www.aspe.org
45.	ASSE	American Society of Sanitary Engineering (ASSE), www.asse-plumbing.org
46.	ASTM	American Society For Testing & Materials www.astm.org
47.	ATIS	Alliance for Telecommunications Industry Solutions
48.	AWG	American Wire Gage
49.	AWI	Architectural Woodwork Institute www.awinet.org
50.	AWPB	American Wood Preservers Bureau www.awpa.com
51.	AWS	American Welding Society www.aws.org
52.	AWWA	American Water-Works Association www.awwa.org
53.	AWPA	American Wood Protection Association
54.	AWPI	American Wood Preservers Institute www.awpai.com
55.	BHMA	Builder's Hardware Manufacturers Association www.buildershardware.com
56.	BIA	Brick Industry Association
57.	BIFMA	The Business and Institutional Furniture Manufacturer's Association
58.	BSI	Building Stone Institute
59.	CAGI	Compressed Air and Gas Institute
60.	CALTrans	State of California, Department of Transportation
61.	CAUS	Color Association of the United States
62.	CBHF	Bureau of Home Furnishings and Thermal Insulation, State of California, Dept. of Consumer Affairs
63.	CBSC	California Building Standards Commission (California Code of Regulations, Title 24) www.bsc.ca.gov
64.	CBM	Certified Ballast Manufactures
65.	CCC	Carpet Cushion Council
66.	CCMTC	California Concrete Masonry Technical Committee
67.	CDA	Copper Development Association
68.	CFFA	Chemical Fabrics and Film Association, Inc.
69.	CGA	Compressed Gas Association
70.	CISCA	Ceilings & Interior Systems Construction Association www.cisca.org
71.	CISPI	Cast Iron Soil Pipe Institute
72.	CLFMI	Chain Link Fence Manufacturing Institute
73.	CPSC	Consumer Product Safety Commission
74.	CRA	California Redwood Association www.calredwood.org
75.	CRI	Carpet and Rug Institute
76.	CRSI	Concrete Reinforcing Steel Institute www.crsi.org
77.	CS	Commercial Standard
78.	CSA	Canadian Standards Association
79.	CSI	Construction Specifications Institute www.csinet.org
80.	CSSB	Cedar Shingle and Shake Bureau
81.	CTI	Ceramic Tile Institute www.ctioa.org
82.	DFPA	Douglas Fir Plywood Association now known as American Plywood Association www.apawood.org

83.	DHI	Door Hardware Institute
84.	DIPRA	Ductile Iron Pipe Research Association
85.	DLPA	Decorative Laminate Products Association
86.	DSA	Division of the State Architect www.dsa.ca.gov
87.	EIA	Electronic Industries Association
88.	EIMAEIFS	Industry Manufacturers Association
89.	EJMA	Expansion Joint Manufacturers Association
90.	ETL	Electrical Testing Laboratory
91.	FCI	Fluid Controls Institute
92.	FCICA	Floor Covering Installation Contractors Association
93.	FGMA	Flat Glass Marketing Association
94.	FM	Factory Mutual Research Corporation www.fmglobal.com
95.	FS	Federal Specifications www.fss.gsa.gov/pub/fedspecs/search.cfm
96.	FSC	Forest Stewardship Council
97.	FTI	Facing Tile Institute
98.	GA	Gypsum Association
99.	GANA	Glass Association of North America
100.	GIS	Germany Institute for Standardization
101.	HEI	Heat Exchange Institute
102.	HI	Hydronics Institute
103.	HMA	Hardwood Manufacturers Association
104.	HMMA	Hollow Metal Manufacturers Association (Division of NAAMM) www.naamm.org/hmma
105.	HPVA	Hardwood Plywood and Veneer Association
106.	HUD	U.S. Dept of Housing and Urban Development
107.	IAPMO	International Association of Plumbng and Mechanical Officials
108.	IBD	Institute of Business Designers
109.	ICC	International Code Council www.iccsafe.org
110.	ICC-ES	International Code Council Evaluation Service
111.	ICEA	Insulated Cable Engineers Association
112.	ICBO	International Conference of Building Officials www.iccsafe.org
113.	ICRI	International Concrete Repair Institute www.icri.org
114.	IEC	International Electro-technical Commission
115.	IEEE	Institute of Electrical and Electronics Engineers www.ieee.org
116.	IESNA	Illuminating Engineering Society of North America www.iesna.org
117.	IFAI	Industrial Fabrics Association International
118.	IGCC	Insulating Glass Certification Council
119.	ILI	Indiana Limestone Institute of America
120.	IMIAC	International Masonry Industry All-Weather Council
121.	IMSA	International Municipal Signal Association
122.	IPCEA	Insulated Power Cable Engineers Association www.icea.net
123.	IPEMA	International Play Equipment Manufacturers Association
124.	IRI	Industrial Risk Insurers
125.	ISA	Instrument Society for Measurement and Control
126.	ISO	International Standards Organization
127.	JICS	Joint Industry Conference Standards
128.	KCMA	Kitchen Cabinet Manufacturers Association
129.	LEED	Leadership in Energy and Environmental Design www.usgbc.org/LEED
130.	LIA	Lead Industries Association, Inc.
131.	LPI	Lightning Protection Institute
132.	LSGA	Laminators Safety Glass Association
133.	MBMA	Metal Building Manufacturers Association www.mbma.com
134.	MCAA	Mechanical Contractors Association of America
135.	MFMA	Maple Flooring Manufacturers Association
136.	MIA	Marble Institute of America

137.	ML/SFA	Metal Lath/Steel Framing Association (Division of NAAMM)
138.	MMSA	Materials and Methods Standards Association
139.	MSS	Manufacturer's Standardization Society of the Valve and Fitting Industry www.mss-hq.org
140.	NAA	National Arborist Association
141.	NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org
142.	NAIMA	North American Insulation Manufacturers Association
143.	NAPA	National Asphalt Pavement Association
144.	NBFU	National Board of Fire Underwriters (American Insurance Assn.) www.nbfu.com
145.	NCAA	National Collegiate Athletic Association
146.	NCCA	National Coil Coaters Association www.coilcoating.org
147.	NCMA	National Concrete Masonry Association
148.	NCPI	National Clay Pipe Institute
149.	NCRPM	National Council on Radiation Protection and Measurements
150.	NCSBCS	National Conference of States on Building Codes and Standards www.NCSBCS.org
151.	NCSPA	National Corrugated Steel Pipe Association
152.	NECA	National Electrical Contractors Association
153.	NEI	National Elevator Industry, Inc. www.neii.org
154.	NEMA	National Electrical Manufacturers Association www.nema.org
155.	NES	National Evaluation Service www.icc-es.org
156.	NETA	International Electrical Testing Association
157.	NFPA	National Fire Protection Agency www.nfpa.org
158.	NHLA	National Hardwood Lumber Association
159.	NISD	National Institute of Steel Detailing www.nisd.org
160.	NIST	National Institute of Standards and Technology
161.	NLGA	National Lumber Grades Authority
162.	NOFMA	National Oak Flooring Manufacturers Association
163.	NOMMA	National Ornamental and Miscellaneous Metals Association
164.	NPA	National Particleboard Association
165.	NPCA	National Paint and Coatings Association
166.	NRB	National Research Board, Council Of American Building Officials
167.	NRCA	National Roofing contractors Association
168.	NRMCA	National Ready-Mix Concrete Association
169.	NSF	National Sanitation Foundation www.nsf.org
170.	NSSEA	National School Supply and Equipment Association
171.	NSWMA	National Sanitation and Waste Management Association
172.	NTMA	National Terrazzo and Mosaic Association
173.	NWWDA	National Wood Window and Door Association
174.	OSHA	Occupational Safety and Health Administration www.osha.gov
175.	OSHPD	Office of Statewide Health Planning and Development
176.	PATMI	Power Actuated Tool Manufacturer's Institute, Inc.
177.	PCA	Portland Cement Association www.cement.org
178.	PCI	Pre-stressed Concrete Institute www.pci.org
179.	PDCA	Painting and Decorating Contractors of America
180.	PDI	Plumbing and Drainage Institute
181.	PEI	Porcelain Enamel Institute
182.	PS	Product Standard of National Bureau of Standards
183.	RFCI	Resilient Floor Covering Institute
184.	RIS	Redwood Inspection Service
185.	RMA	Rubber Manufacturers Association
186.	SAMA	Scientific Apparatus Makers Association
187.	SDI	Steel Deck Institute
188.	SIGMA	Sealed Insulating Glass Manufacturers Association
189.	SFM	State Fire Marshal
190.	SGCC	Safety Glazing Certification Council

191.	SJI	Steel Joist Institute
192.	SMA	Screen Manufacturers Association
193.	SMA	Stucco Manufacturers Association
194.	SMACNA	Sheet Metal and Air Conditioning Contractors, Association www.smacna.org
195.	SPIB	Southern Pine Inspection Bureau
196.	SPR	Simplified Practice Recommendation
197.	SPRI	Single-Ply Roofing Institute
198.	SSMA	Steel Stud Manufacturers Association www.ssma.com
199.	SSPC	Steel Structures Painting Council www.sspc.org
200.	SSPMA	Sump and Sewage Pump Manufacturers Association
201.	STI	Steel Tank Institute
202.	SWI	Steel Window Institute
203.	SWPA	Submersible Wastewater Pump Association
204.	SWRI	Sealant, Waterproofing and Restoration Institute www.swrionline.org
205.	SWRCB	California Environmental Protection Agency, State Water Resources Control Board Water Quality (Stormwater Prevention Plan)
206.	TCNA	The Tile Council of North America, Inc. www.tileusa.com
207.	TIMA	Thermal Insulation Manufacturers Association
208.	TPI	Truss Plate Institute
209.	UL	Underwriters Laboratories, Inc. www.ul.com
210.	UNI	Uni-Bel PVC Pipe Association
211.	USGBC	United States Green Build Council
212.	USP	United States Pharmacopoeial Convention
213.	USPHS	United States Public Health Service www.usphs.gov
214.	USDA	United States Department of Agriculture
215.	USTC & TBA	United States Tennis Court and Track Builders Association
216.	VWDI	Vinyl Window and Door Institute
217.	WA	Wall Coverings Associations
218.	WCLIB	West Coast Lumber Inspection Bureau www.wclib.com
219.	WCMA	Window Covering Manufacturers Association
220.	WCRSI	Western Concrete Reinforcing Steel Institute
221.	WH	Warnock Hersey International, Inc.
222.	WI	Woodwork Institute
223.	WLPDIA	Western Lath, Plaster, Drywall Industries Association
224.	WPS	Welding Procedures Specifications
225.	WRI	Wire Reinforcement Institute
226.	WSC	Water Systems Council
227.	WSFI	Wood and Synthetic Flooring Institute
228.	WWPA	Western Woods Product Association www.wwpa.org
229.	W.I.	Woodwork Institute Manual of Millwork www.woodworkinstitute.com

1.04 DATES OF STANDARDS

A. Except where a specific date of issue is mentioned herein, references to specifications issued by the above named and other organizations shall mean the edition current on the date of the issuance of project permit.

1.05 DEFINITIONS

A. The following are used in specifications and documents in addition to Division 1 as herein defined:
   1. Accepted Equal or Accepted Equivalent:
      a. Reviewed and accepted by the **Architect** as being equal in quality, utility and appearance and within the Design Intent of the documents, but shall not in any way change or delete the original intent of the documents.
   2. Approved:
      a. As accepted by the **Architect**, (shop drawings & Submittals shall be reviewed for design intent but shall not be approved.

1. Does not include review for items changed but not specifically noted by **Contractor**.

3. Approved Equal / Approved Equivalent:
   a. As accepted by the **Architect**, (shop drawings & Submittals shall be reviewed for design intent but shall not be approved.
      1. Does not include review for items changed but not specifically noted by **Contractor**.
4. As Required:
   a. As required by referenced standards, existing project conditions, Contract Documents or regulatory requirements.
5. Directed:
   a. As instructed by the **Architect** and/or **Owner** in writing.
6. Documents:
   a. Includes:
      1. Drawings
      2. Project Manual/Specifications
      3. Owner/Contractor Contract
      4. Addendums
      5. Supplemental Documents in accordance with project manual / specifications.
7. Drawings:
   a. Drawn representation of the scope of work.
8. Furnish (materials):
   a. To supply and deliver to the project site in new condition ready for installation and in operable and new condition.
9. Geotechnical Engineer
   a. A **Civil** or **Geotechnical Engineer** licensed in the State of California, who is retained and paid by the **Owner** to perform services as specified in the Contract Documents.
10. Indicated:
    a. As shown, noted on the drawings and/or specifications or scheduled in the drawings.
11. Install (service or labor):
    a. Anchor, fabricate, connect and/or fasten in place and adjust for use and/or place or apply in proper position & location and/or establish in place for use or service.
    b. To place in final position, complete, anchored, connected, and in operable condition with respect to required codes and/or governing agency requirements.
12. Project Manual:
    a. Is the volume which includes the; Bidding Requirements, Contract Forms, Conditions of the Contract and the Specifications.
13. Provide:
    a. To furnish, install and fabricate complete.
14. Shall:
    a. To be construed as ‘mandatory’.
15. Site:
    a. Area to be occupied by the Project.
    b. Any portion directly outside exterior face of exterior walls.
16. Similar:
    a. Shall be interpreted in its general sense and not as necessarily meaning identical, and all details shall be worked out in relationship to their location and to their connection with other parts of the work.
17. Owner:
    a. The Owner of the project, or their authorized agent / on-site representative.
18. Testing Agency:
    a. An organization other than the Testing Laboratory retained and paid by the **Contractor** to perform tests and reports on whether or not designated items of Work comply with the requirements of the Contract Documents.
19. Testing Laboratory:
    a. An independent commercial testing organization, retained and paid by the **Owner** to perform tests and report on Work as specified in the Contract Documents, and as otherwise required.

1. **General Contractor** shall pay for Testing when they have not provided the appropriate time prior to testing being required to be done.

1.06 ABBREVIATIONS

A. The following is a reference list including basic abbreviations included in Project manual and/or drawings including, but not limited to;
   1. Refer also to drawings and individual specifications for additional abbreviations.

&	and
L	Angle
@	at
CL	Centerline
Ø	Diameter
#	Number
(E)	Existing
(F)	Future
(N)	New
ACOUST	Acoustical
ACP	Asphalt Concrete Paving
ADA	Americans with Disabilities Act
ADDL	Additional
ADO	Automatic Door Opener
ADJ	Adjustable
A.F.F.	Above Finish Floor
A.F.G.	Above Finish Grade
AGGR	Aggregate
ALUM	Aluminum
APPROX	Approximate
ARCH	Architectural
ASSY	Assembly
AV	Audio Visual
BD	Board
BITUM	Bituminous
BKG	Backing
BLDG	Building
BLKG	Blocking
BM	Beam
BMP	Best Management Practices
B.O.	Bottom of / Back of
BR	Backer Rod
BTWN	Between
CAB	Cabinet
CASAM	Cold Applied Self Adhering Waterproof Membrane
CBC	California Building Code
CFCI	Contractor Furnished Contractor Installed
CFOI	Contractor Furnished Owner Installed
CJ	Control Joint
CLG	Ceiling
CLR	Clear

CMU	Concrete Masonry Unit
CNTR	Counter
C.O.	Cased Opening
COL	Column
CONC	Concrete
CONT	Continuous
CORR	Corridor
CR	Card Reader
CTR	Center
CTSK	Countersunk
CUST	Custodial
CW	Cold Water
DBL	Double
DEG	Degree
DEPT	Department
DF	Drinking Fountain
DIA	Diameter
DIM	Dimension
DISP	Dispenser
DN	Down
D.O.	Door Opening
DR	Door
DS	Downspout
DTL	Detail
DWG	Drawing
E	East
EA	Each
EJ	Expansion Joint
EL	Elevation
ELEC	Electrical
ELEV	Elevator
EMER	Emergency
ENCL	Enclosure
EQ	Equal
EQUIP	Equipment
ETC	Et Cetera
EW	Each Way
EXP	Expansion
EXT	Exterior
FA	Fire Alarm
FD	Floor Drain
FND	Foundation
FE	Fire Extinguisher and Bracket Mount with Signage
FEF	Fire Extinguisher and Fully Recessed Cabinet with Signage
FES	Fire Extinguisher and Semi- Recessed Cabinet with Signage
F.F.	Finish Floor
FIN	Finish

FHC	Fire Hose Cabinet
FLG	Flooring
FLR	Floor
FM	Floor Mounted
F.O.	Face of
FRP	Fiber Reinforced Plastic
FT	Foot or Feet
FTG	Footing
FURR	Furring
FURN	Furniture
GA	Gauge
GALV	Galvanized
GC	General Contractor
GD	Garbage Disposal
GLB	Glue Laminated Beam
GR	Grade
GSM	Galvanized Sheet Metal
GYP	Gypsum
HB	Hose Bibb
HC	Hollow Core
HDWR	Hardware
HT	Height
HM	Hollow Metal
HOR	Horizontal
HVAC	Heating, Ventilating, and Air Conditioning
I.D.	Inside Diameter
i.e.	Example
INSUL	Insulation
INT	Interior
IOR	Inspector of Record
IT	Information Technology
JT	Joint
KIT	Kitchen
LAB	Laboratory
LAM	Laminate
LAV	Lavatory
LT	Light / Lighting
LTWT	Lightweight
LVL	Laminated Veneer Lumber
MATL	Material
MAX	Maximum
MECH	Mechanical
MFGR	Manufacturer
MIN	Minimum
MISC	Miscellaneous

M.O.	Masonry Opening
MTD	Mounted
MTL	Metal
N	North
N/A	Not Applicable
NIC	Not in Contract
NOM	Nominal
NTS	Not To Scale
O/	Over
O.C.	On Center
O.D.	Outside Diameter
OF	Overflow
OFCI	Owner Furnished Contractor Installed
OFOI	Owner Furnished Owner Installed
OPNG	Opening
OPP	Opposite
PLAM	Plastic Laminate
PL	Plate
PLYWD	Plywood
PR	Pair
PROP	Property
PSF	Pounds per Square Foot
PSI	Pounds per Square Inch
PSL	Parallel Strand Lumber
PT	Pressure Treated
PV	Photovoltaic
RAD	Radius
RD	Roof Drain
REF	Reference
REFR	Refrigerator
REINF	Reinforcement/Reinforcing
REQD	Required
RM	Room
R.O.	Rough Opening
RWL	Rain Water Leader
S	South
SAABM	Spray Applied Air Barrier Membrane
SCHED	Schedule
SF	Square Foot/Feet
SHTG	Sheathing
SHWR	Shower
SIM	Similar
SMS	Sheet Metal Screws
SPEC	Specification
SS	Stainless Steel
STD	Standard
STL	Steel
STOR	Storage

STRL	Structural
T	Tread
TBD	To Be Determined
TEL	Telephone
TEMP	Temporary
T&G	Tongue and Groove
T.O.	Top of
TS	Tube Steel
TV	Television
TYP	Typical
UC	Under Counter
UL	Underwriters Laboratory
UON	Unless Otherwise Noted
VERT	Vertical
VEST	Vestibule
VIF	Verify in Field
W	West
W/	With
WC	Water Closet
WDW	Window
WH	Water Heater
W.O.	Where Occurs
W/O	With Out
WRB	Water Resistant Barrier
WT	Weight

1.07 MISCELLANEOUS REQUIREMENTS

A. Prior Use or Occupancy
   1. Refer to Division 1 for closeout submittal procedures.
B. Lines &Levels
   1. Before starting work, locate all general reference points.
      a. Take such steps as are necessary to prevent their dislocations or destruction.
      b. If disturbed or destroyed, replace as directed.
      c. Employ competent surveyor to lay out work; be responsible for its accuracy.

C. As-Built – Record Drawings
   1. Scope of contractors responsibilities, refer to, but not limited to:
      a. Individual specification sections.
      b. Division 1 – General Requirements
      c. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      d. Refer to Division 1 for closeout submittal procedures.
D. Workmanship
   1. Refer to individual specification sections
   2. Refer to Division 1 general requirements
   3. Refer to Division 1 for quality control requirements.
   4. All work involved in this project shall reflect the best possible workmanship.
      a. Any work which is not of the best workmanship shall be corrected or redone as is required for approval by the **Architect**, at no additional cost to the **Owner**.
   5. No trade should apply any finishes or materials to any surfaces until they feel that the surfaces are ready to receive the finish or material and produce the best possible workmanship.
      a. Any trade who does apply the finish or materials to surfaces that are not ready shall remove and correct their work as well as prepare the existing surfaces involved at no additional cost to the **Owner**.
E. Vendor and Sub-Contractors
   1. **General Contractor** shall provide **Architect** with a complete list of subcontractors and principal vendors including addresses and telephone numbers. List each under heading of subcontractor category and/or vendor type.
   2. The **General Contractor** is responsible for determination and coordination of union and/or non-union project affiliation.
      a. **General Contractor** shall prepare and adhere to the Contract Construction Schedule based on required Contract time of completion. In the event of termination by parties hereto, all work performed and materials furnished shall be fairly allocated and apportioned in accordance with good construction practices.
F. Termination by **Owner**
   1. Refer to but not limited to; General Conditions.
G. Warranties:
   1. Refer to individual specification sections.
   2. Refer to Division 1 for closeout submittal procedures.
H. Maintenance Manuals:
   1. Refer to individual specification sections.
   2. Refer to Division 1 for closeout submittal procedures.
I. Other items not herein listed;
   1. Refer to but not limited to:
      a. Refer to Division 1 for closeout submittal procedures.

PART 2 - PRODUCTS
Not used

PART 3 - EXECUTION
Not used

END OF SECTION

01 45 00
QUALITY CONTROL
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with all trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Control quality of installation of materials & systems.
   2. Control quality of construction.
   3. Control quality of site demolition.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. Title 24, California Code of Regulations, California Building Standards Commission
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. CBC Energy Code, California Code of Regulations, Title 24, Part 6, California Building Standards Commission
E. Title 24, Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4. Testing shall be done as herein specified and as listed in drawings.
   5. Comply with requirements of specific Specification Section and/or Drawings.

1.04 SUBMITTALS AND MOCK-UPS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
   1. Coordinate with each specific Specification Section.
B. Refer to Division 1 for sustainability requirements.
C. Mock-ups
   1. Shall be reviewed and approved in field by **Architect**.

1.05 QUALITY ASSURANCE

A. Refer as herein indicated and as indicated in each specific Specification Section.
B. Hazardous materials:
   1. It is illegal to manufacture, sell or use products containing asbestos in the United States.
      a. These specifications rely on the product manufacturers and distributors to insure that the products they manufacture and/or distribute comply with all statutes and regulations governing their products.
      b. It is understood that there has not been any testing or inspection done to confirm any hazardous materials of the specified products to confirm compliance with these statutes and regulations by the **Architect**.
      c. Therefore these specifications are done not knowingly including any specified products or materials which contain asbestos and/or any other hazardous material.
      d. Any materials suspected of containing hazardous materials shall be brought to the attention of **Owner.**

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.

1.07 JOB CONDITIONS

A. Refer as indicated in each specific Specification Section.
B. Field-verify that all components, substrates, backing, mock-ups, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times during testing.

1.09 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Project construction
   2. Project site demolition
   3. Testing & inspection by others
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. All Drawings and Specification Sections.

1.10 SEQUENCING AND SCHEDULING

A. **General Contractor** shall schedule all testing & inspections and coordinate attendance by **Architect**, **Owner,** and others.
B. Schedule required testing, prior to the installation of materials, components, etc.

1.11 TESTING AND INSPECTIONS

A. Testing required by Testing Agent / Testing Agency shall be done in accordance with Division 1 Testing Laboratory service requirements and as indicated in the Contract Documents.
B. Testing required by **General Contractor** shall be done in accordance with this Section and each specific Specification Section requiring field testing and/or inspection.
C. Geotechnical Engineer:
   1. Services of a **Geotechnical Engineer** are required for Work specified in various individual Specification Sections and/or as indicated in drawings and Division 1 Testing Laboratory service requirements.

1.12 GENERAL SYSTEM DESCRIPTION

A. Observation and Supervision:
   1. The **Architect** and **Owner** or their appointed representatives will review the Work for design intent at appropriate stages, and the Contractor shall provide facilities and access to the Work at all times as required to facilitate this review.
      a. Owner
         1. The **Owner** shall have access to the Work wherever it is in preparation or progress for ascertaining that work is in accordance with the Contract Documents. The **General Contractor** shall provide facilities, hard hats, and access and shall provide assistance for sampling or measuring materials.
         2. The **Owner** will notify the **Architect** and **Engineers of Record**, and call to the **General Contractor's** attention all observed failure of work and/or material not conforming to Contract Documents.
      b. **General Contractor**:
         1. Shall comply with all requirements of the Contract Documents (Drawings, Specifications, **Owner's** General Conditions and Owner–General Contractor Contract). He shall supervise and direct the Work and maintain a competent superintendent on the job who is authorized to act in all matters pertaining to the Work. The **General Contractor's** superintendent shall also inspect all materials as they arrive for compliance with the Contract Documents. He shall reject defective work or materials immediately upon performance or delivery.

B. Geotechnical Engineer services:
   1. Refer to Division 1 for Testing Laboratory service requirements.
C. Testing Laboratory services:
   1. Refer to Division 1 for Testing Laboratory service requirements.
D. Field testing not done under Division 1:
   1. By **General Contractor** as required per Drawings and or Specifications
E. Inspections:
   1. Done by product and/or system manufacturer's approved representative for products/systems requiring Inspections.
F. Observations:
   1. Done by product and/or system manufacturer's approved representative for products/systems requiring observations for general compliance.
G. Mock-ups
   1. Reviewed for acceptance by **Architect** and **Owner** as indicated in specific Specification Sections.

1.13 MAINTENANCE

A. Refer to each specific Specification Section for which products and/or assemblies will require follow-up maintenance and/or adjustment after project is complete and has been occupied for a given period of time.

PART 2 – PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 TESTING, INSPECTIONS AND OBSERVATIONS

A. General
   1. Product manufacturer inspections and observations shall be done by authorized representative & observed by **General Contractor**.
   2. The **General Contractor** shall be responsible for scheduling all required tests and inspections.
      a. Notify the **Owner** and **Architect** 48 hours in advance of scheduled performance of any work requiring testing or inspection.
   3. The **General Contractor** shall provide access to Work to be tested, facilitate inspections, observations, tests and furnish incidental labor and facilities.
   4. The **General Contractor** shall orchestrate inspections of work performed, and construction of mock-ups with **Architect** and **Owner.**
   5. Re-Inspection & Testing
      a. The **General Contractor** shall pay for:
         1. Tests of materials, inspections, and certifications required by Specifications.
         2. Testing, adjusting, and balancing of equipment and systems required by Specifications.

3. Re-tests or re-inspections, if required, and tests or inspections required to established Contractor error or missing test data required by Specifications.
4. Uncovering of work in accordance with Division 1 cutting and patching requirements.
5. Additional tests directed by the **Architect** or **Owner** which establish that materials and installation do not comply with the Contract Document.

6. Testing & Inspection Reports and Certifications
   a. A copy of each **General Contractor** provided testing, inspection, observation report or certification shall be provided to each of the following:
      1. **Owner**
      2. **Architect**
      3. **General Contractor**

B. **General Contractor** testing shall be done in accordance with individual Specification Sections and manufacturer's requirements.

3.04 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. **General Contractor** shall keep the work areas in a clean and safe condition so their testing and inspection services do not interfere with the work of others.
C. **General Contractor** shall protect work and materials of others testing and protect the installed work and materials of other trades.
D. Perform testing in accordance with listed requirements, industry standards and also as indicated in drawings and other specification sections.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.

END OF SECTION

01 45 29
TESTING LABORATORY SERVICES
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION:

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with **General Contractor**.
C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Field inspections
   2. Field testing
   3. Laboratory testing
D. **Owner** will employ and pay for services of an independent testing laboratory to perform specified testing unless otherwise specified to be performed and/or paid for by others.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society For Testing and Materials (ASTM), www.astm.org
   1. ASTM – E329 Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as used in Construction

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with Building Code.
   2. Job site inspections shall be done as herein specified.
   3. Testing shall be done as herein specified.
   4. Comply with requirements of specific Specification Section and/or Drawings.

1.04 SUBMITTALS

A. Testing Agent / Agency shall submit schedule list of all testing to **Owner**, **Architect** and **General Contractor**.

1.05 QUALITY ASSURANCE

A. Refer to Section 01 45 00 - Quality Control.
B. Testing Agent/Agency shall have been in business for **five (5)** years providing inspection services for projects of similar size and complexity.
C. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of Contract Documents, or to perform any duties of **General Contractor** and/or Subcontractors.

1.06 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.

1.07 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Construction by others
   2. Site demolition by others
   3. Testing by **General Contractor**.
   4. Inspections by product/system manufacturers
B. Related Sections include, but are not limited to the following:
   1. Section 01 81 13 – Project Sustainability Requirements
   2. Section 01 45 00 – Quality Control

3. Section 01 74 19 – Construction Waste Management and Disposal/Recycling

C. Related Documents include, but are not limited to the following:
   1. Section 00 72 00 – General Conditions

1.08 SEQUENCING AND SCHEDULING

A. Schedule testing with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.
C. **General Contractor**'s Responsibilities
   1. Refer to Section 01 45 00 Quality Control.

1.09 TESTING AGENT

A. Company: TBD
   1. Address: TBD
   2. Address: TBD
   3. Website: TBD
   4. Phone number: TBD
B. The **Owner** reserves the right to change testing laboratories if the need arises.

1.10 GENERAL SYSTEM DESCRIPTION

A. Testing and inspection performed by Testing Agent/Agency shall include, but not be limited to:
   1. Refer to drawings and specifications.
   2. Refer to Agency approved Special Testing and Inspections form.
   3. Refer to Geotechnical Report
   4. Roofing; refer to specification section 07 54 00.

PART 2 - PRODUCTS:

Not Used

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which testing and inspection is to be performed.
   2. Identify conditions detrimental to proper or timely completion of testing and/or inspection and coordinate with **General Contractor** to rectify.

3.02 COORDINATION

A. Refer to Section 01 31 13 – Project Coordination.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades is ready for testing and/or inspection.

3.03 TESTING

A. General
   1. Testing required by **General Contractor** shall be done in accordance with Section 01 45 00 - Quality Control and specific sections requiring field testing and/or inspection.
   2. Testing Agent/Agency tests shall be in conformance with requirements of the Contract Documents.
      a. Refer to project Structural Tests as indicated in Contract Documents and approved Agency Special Inspections and Testing form.
   3. Testing and inspection in connection with earthwork shall be under the direction of the **Owner**'s consulting Geotechnical Engineer, referred to hereinafter as the "Geotechnical Engineer".

4. Testing and inspection of construction materials and workmanship shall be done by a qualified laboratory, referred to hereinafter as the “Testing Laboratory”.
    a. The Testing Laboratory shall be under direction of a Civil Engineer registered in the State of California to oversee the work / items being tested and shall conform to, but not be limited to the requirements of ASTM E329, and shall be employed by the **Owner**.

B. Laboratory Duties:
1. General: Comply with ASTM E329 "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction". Cooperate with **Architect**, **Engineer** and **Contractor**; provide qualified personnel after due notice. Perform specified inspections, sampling and testing of materials and methods of construction. Verify compliance with specified standards. Ascertain compliance of specified materials with requirements of Contract Documents. Promptly inform **Architect** and **Engineer** of observed irregularities or deficiencies of work or products.
2. Reports and Additional Testing:
    a. Submit one (1) pdf copies of each report each to the **Owner**, **Architect** and **General Contractor**.

C. Testing Laboratory:
1. Services of a **Testing Agent / Agency** are required for Work specified in various individual Specification sections and/or as indicated in drawings.
2. **General Contractor**’s Responsibilities:
    a. Cooperate with Testing Laboratory personnel.
    b. Furnish copies of product test reports as specified.
    c. Furnish incidental labor and facilities:
        1. To provide access to Work to be tested.
        2. To obtain and handle samples at the Project site or at the source of the product to be tested.
        3. To facilitate inspections and tests.
        4. For storage and curing of test samples.
    d. Notify the **Owner**'s Representative sufficiently in advance of operations to allow 48 hours minimum for Testing Laboratory assignment of personnel and scheduling of tests.
    e. If tests or inspections cannot be performed after such notice, reimburse the **Owner** for the Testing Laboratory personnel and travel expenses incurred.

D. Geotechnical Engineer:
1. Services of a Geotechnical Engineer are required for Work specified in various individual specification sections and/or as indicated in drawings.

3.04 PROTECTION AND CLEAN UP

A. Refer to Section 01 74 00 – Protection and Cleaning.
B. Testing agent/Agency shall keep the work areas in a clean and safe condition so their testing and inspection services do not interfere with the work of others.
C. Testing agent/Agency shall protect work and materials of others testing and protect the installed work and materials of other trades.
D. Perform testing in accordance with listed requirements, industry standards and also as indicated in drawings and other specification sections.
E. In the event of damage, immediately notify the **Owner**.
F. After completion of testing and/or inspection remove all equipment and implements of service, and debris.
    1. Leave entire area in a neat, clean, acceptable condition.

END OF SECTION

01 81 13
PROJECT SUSTAINABILITY REQUIREMENTS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades
C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to as herein specified.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. CBC Energy Code, California Code of Regulations, Title 24, Part 6, California Code of Regulations, Title 24, Part 6
C. Title 24, Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types

1.03 PERFORMANCE, TESTING AND INSPECTION

A. General:
    1. Title 24, Chapter 11 – California Green Building Standards Code
B. Standards:
    1. Refer to Drawings and as herein specified.
    2. **General Contractor** shall be responsible for full implementation of Construction BMP's, testing and monitoring in the project Storm Water Prevention Plan (SWPPP)
        a. Plan Number: WDID [Fill in number]
        b. Note: Including required reporting to the States Web site
            1. https://smarts.waterboards.ca.gov/.
C. Construction Testing:
    1. Refer to Drawings and as herein specified.

1.04 SUMMARY

A. This section lists requirements and procedures for compliance with certain Green Building Standards as set forth in the California Code of Regulations, Title 24 Part 11.

1.05 MEETINGS

A. Refer to Division 1 project meeting requirements.

1.06 RELATED WORK/SECTIONS

A. Related Sections include, but are not limited to:
    1. Division 1
    2. Division 1 substitution, deviation and/or submittal procedures
    3. Division 1 construction waste management and disposal/recycling requirements
B. Divisions 2 through 49 Sections for sustainability requirements specific to the Work of each of those Sections.
C. **The General Contractor** shall refer to Division 1 commissioning requirements.

1.07 GENERAL REQUIREMENTS

A. The **General Contractor** shall designate an on-site field staff person to act as the **General Contractor's** Sustainability Project Coordinator for the duration of the project.
    1. The **General Contractor's** Sustainability Project Coordinator shall have the following qualifications:
        a. Experience on at least 2 prior projects for:
            1. Preparation and implementation of Construction Waste Management Plan
            2. Building Commissioning

2. The **General Contractor's** Sustainability Project Coordinator shall facilitate the implementation and documentation of all sustainability requirements assigned to the **General Contractor**, including coordination with sub-contractors on preparation of related construction submittals.

B. The **General Contractor** shall prepare a **Construction Waste Management Plan** and submit to the **Owner** and **Architect** within 30 days after the date of the Notice to Proceed and prior to the start of any work on site indicating how the following requirements will be met:
   1. Refer to Division 1 for construction waste management and disposal/recycling requirements
   2. Diversion of required percentage of construction and demolition debris from disposal in landfills and incinerators in compliance with the requirements of reference standards and as herein indicated.
      a. Recycled amount:
         1. 75%
         2. *Note that diversion may include donation of materials to charitable organizations and salvage of materials on site.*
      b. Identify the materials to be diverted from disposal: provide an analysis of jobsite waste to be generated, including types and quantities.
         1. Identify a specific area on the construction site for collection of recyclable materials.
         2. Identify how and where these materials will be sorted.
         3. Identify how these materials are to be diverted: provide strategies for salvage, reuse or recycling.
         4. Identify where these materials will be diverted: include a list of recycling facilities to which indicated recyclable materials will be distributed for disposal.
         5. Identify methodology for maintaining records of recycling efforts throughout construction process.
         6. Identify construction haulers and recyclers to handle the designated materials.
      c. Identify materials that are not recyclable or otherwise conservable that must be disposed of in a landfill or other means acceptable under governing State and Local regulations.
      d. Indicate any instances where compliance with requirements of this section does not appear to be possible and request resolution from **Owner** and **Architect.**
      e. Include participation in and procedures for recycling/re-use programs.
         1. Participation in Re-Use Programs: Rebates, Tax Credits, and other savings obtained for recycled or re-used materials shall accrue to the **General Contractor.**
      f. Include participation in and procedures for rebate programs.
         1. Participation in Re-Use Programs: Rebates, Tax Credits, and other savings obtained for recycled or re-used materials shall accrue to the **General Contractor**.
   3. Show Compliance with applicable State and Local ordinances and regulations.
   4. The Construction Waste Management Plan shall be subject to review and approval by **Owner** and **Architect**.
   5. Review of **General Contractor's** Waste Management Plan shall not relieve **General Contractor** of responsibility for control of pollutants and other environmental protection measures.

C. The **General Contractor** shall submit sustainability related documentation as part of construction submittals for:
   1. Items defined within Division 1 sustainability requirements
   2. All materials specified in Divisions 2 through 49.

1.08 CALIFORNIA GREEN BUILDING STANDARDS CODE REQUIREMENTS

A. General:
   1. The **General Contractor** is responsible for maintaining all records relating to the California Green Building Standards Code sections noted herein.
   2. Verification of compliance with the California Green Building Standards Code sections noted herein shall be provided by the **General Contractor** to the enforcing agency upon request.

B. California Building Standards Related **Mandatory Measures** Requirements:

1. **Storm Water Soil Loss Prevention Plan (CalGreen 5.106.1)**
   a. Requirements: Implement the Storm Water soil loss prevention plan, included in the Contract Documents, which has been designed, specific to its site, conforming to the State Storm water NPDES Construction Permit 99-08-DWQ or local ordinance, whichever is stricter, as is required for projects on acre or more. The plan covers prevention of soil loss by storm water run-off and/or wind erosion, of sedimentation, and/or of dust/particulate matter air pollution.
2. **Construction Waste Reduction, Disposal & Recycling (CalGreen 5.408)**
   a. Requirements:
      1. Prepare and implement the Construction Waste Management Plan as identified under Section 1.08 General Requirements. Update the waste management plan as may be required during construction.
      2. **General Contractor** shall recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction and demolition debris, or meet a local construction and demolition waste management ordinance, whichever is more stringent.
         a. **General Contractor** shall maintain waste haul tickets or other such records identifying the diversion rate achieved by the project.
         b. Material diversion rate shall be calculated by weight or volume, but not by both in the same project.
         c. Material diversion calculations shall exclude excavated soil and land-clearing debris.
      3. **General Contractor** shall reuse or recycle 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing. For a phased project, such material may be stockpiled on site until the storage site is developed.
      4. **General Contractor** shall provide final summary of construction waste diversion to **Owner** and Building Official at the end of the project.
3. **Commissioning (CalGreen 5.410.2)**
   a. Requirements:
      1. Refer to Division 1 Commissioning requirements.
4. **Duct Protection (CalGreen 5.504.3)**
   a. Requirements:
      1. At the time of rough installation, during storage on the construction site and until final startup of the heating and cooling equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or other methods acceptable to the enforcing agency to reduce the amount of dust or debris which may collect in the system.
5. **Finish Material Pollutant Control – Adhesives, Sealants and Caulks (CalGreen 5.504.4.1)**
   a. Requirements:
      1. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards:
         a. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits as shown in CalGreen Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene, dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified below.
         b. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weight more than one pound, and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.

6. **Finish Material Pollutant Control – Paints and Coatings (CalGreen 5.504.4.3)**
    1. Requirements:
        a. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in CalGreen Table 5.504.4.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in CalGreen Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Non-flat, or Non-flat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 or the 2007 California Air Resources Board Suggested Control Measure and the corresponding Flat, Non-flat or Non-flat-High Gloss VOC limit in CalGreen Table 5.504.4.3 shall apply.
        b. Aerosol paints and coating shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522 (c)(2) and (d)(2) of California Code of Regulations, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.
7. **Finish Material Pollutant Control – Carpet Systems (CalGreen 5.504.4.4)**
    a. Requirements:
        1. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:
            a. Carpet and Rug Institute's Green Label Plus Program
            b. California Department of Public Health Standard Practice for the testing of VOC's (Specification 01350)
            c. NFS/ANSI 140 at the Gold Level
            d. Scientific Certifications Systems Sustainable Choice
        2. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.
        3. All carpet adhesive shall meet the requirements of Table 5.504.4.1.
8. **Finish Material Pollutant Control – Composite Wood Products (CalGreen 5.504.4.5)**
    a. Requirements:
        1. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17CCR 93120 et. seq.), by or before the dates specified in those sections as shown in CalGreen Table 5.504.4.5.
9. **Finish Material Pollutant Control – Resilient Flooring Systems (CalGreen 5.504.4.6)**
    a. Requirements:
        1. For 50% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its Low-emitting Materials List (or product registry) or certified under the Resilient Floor Covering Institute (RFCI) FloorScore program.
10. **Filters (CalGreen 5.504.5.3)**
    a. Requirements:
        1. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a Minimum Efficiency Reporting Value (MERV) of 8.

PART 2 - PRODUCTS
NOT USED

PART 3 - EXECUTION

3.01 FIELD EXECUTION OF SUSTAINABILITY REQUIREMENTS

A. The **General Contractor** is responsible for ensuring proper field execution of all sustainability requirements, communication with Subcontractor's of all requirements and submission of all documentation in a timely manner.
B. Refer also to Part 1 of this Specification Section.

3.02 CONSTRUCTION VENTILATION AND PRECONDITIONING

A. **General Contractor** shall execute the **Owner/Architect** approved Construction IAQ Management Plan.
B. Temporary Construction Ventilation: **General Contractor** shall maintain sufficient temporary ventilation of areas where materials are being used that emit VOC's, and maintain ventilation continuously during installation, and until emissions as described below dissipate after installation. If continuous ventilation is not possible via the building's HVAC system(s) then ventilation shall be supplied via open windows and temporary fans, sufficient to provide no less than three air changes per hour.
    1. **General Contractor** shall ensure that:
        a. Where odorous and/or high VOC emitting products are applied on-site, apply prior to installation of porous and fibrous materials. Where this is not possible, protect porous materials with polyethylene vapor retarders.
        b. The period after installation shall be sufficient to dissipate odors and elevated concentrations of VOCs. Where no specific period is stated in these Specifications, a time period of 72 hours shall be used.
        c. All areas shall be vented directly to outside. Areas shall not be vented to other enclosed areas.
C. During dust producing activities (e.g. drywall installation and finishing) ventilation system shall be off, and openings in supply and return HVAC system shall be protected from dust infiltration. Provide temporary ventilation as required.
D. Preconditioning: Prior to installation, **General Contractor** shall allow products which have odors and VOC emissions to off-gas in dry, well-ventilated space outside of building for 14 calendar days, in order to allow for reasonable dissipation of odors and emissions.

3.03 PROTECTION

A. Protect stored on-site and installed absorptive materials from moisture damage. Where absorptive materials not intended for wet applications are exposed to moisture, immediately remove from site and dispose of properly.
B. Protect installed materials using methods that do not support growth of molds and mildews
C. Immediately remove from site and properly dispose of materials showing signs of mold and signs of mildew, including materials with moisture stains.

END OF SECTION

02 41 00
SITE DRAINAGE
Shakori Garage Replacement
200035.00

PART 1 – GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 015000, Construction Facilities and Temporary Controls.
B. Section 015713, Erosion Control
C. Section 310000, Earthwork.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable jurisdictional authority regulations and codes for disposal of debris.
B. Coordinate clearing Work with utility companies.
C. Maintain emergency access ways at all times.
D. Contractor shall comply with all applicable laws and ordinances regarding hazardous materials, including contaminated soils, hazardous material transformers, and similar materials or components.

1.04 SUBMITTALS

A. Schedule: Submit a detailed sequence of demolition and removal work, including dates for shutoff, capping, and continuance of utility services.
B. Procedures: Submit written procedures documenting the proposed methods to be used to control dust and noise.

1.05 EXISTING CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

1.06 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
C. Safety Precautions Prevent damage to existing elements identified to remain or to be salvaged, and prevent injury to the public and workmen engaged on site. Demolish roofs, walls and other building elements in such manner that demolished materials fall within foundation lines of building. Do not allow demolition debris to accumulate on site. Pull down hazardous work at end of each day; do not leave standing or hanging overnight, or over weekends.
D. Protect existing items which are not indicated to be altered.
    1. Protect utilities designated to remain from damage.
    2. Protect trees, plant growth, and features designated to remain as final landscaping as shown on drawings.
    3. Protect bench marks from damage or displacement.
E. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

F. Fire Safety: The contractor shall conform to chapter 33 of the California Fire Code (CFC), "Fire Safety During Construction and Demolition", at all times during the construction process. A copy of this chapter can be provided.
G. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
H. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
I. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
J. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

PART 2 - PRODUCTS
Not Used

PART 3 – EXECUTION
3.01 EXAMINATION
A. Examine conditions of work in place before beginning work; report defects.
B. Report existence of hazardous materials or unsafe structural conditions.

3.02 PREPARATION
A. Scheduling:
   1. General: Coordinate and schedule demolition work as required by the Owner and as necessary to facilitate construction progress.
B. Hazardous Materials:
   1. General: Identify chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations, and notify such jurisdictional agencies as may be required. Collect and legally dispose of such materials at official disposal locations away from the site.
   2. Asbestos: If asbestos or materials containing asbestos are encountered, stop work immediately and contact the Owner. Do not proceed with demolition until directed by Owner.
C. Utility and Service Termination
   1. Locate and identify existing utility, service and irrigation system components affected by work of this contract. Review existing record drawings, conduct site investigations, contact Underground Service Alert and other qualified cable/pipe/line locator services, and implement all other means necessary to define the location of underground systems.
   2. Prior to beginning any demolition, properly disconnect all water, gas and electrical power supply at appropriate disconnect locations. Obtain all necessary releases and approvals from serving utility companies.
   3. Prior to demolition or disconnect, obtain Owners approval that such system does not impact facilities or systems beyond the extent of this contract.
   4. Mark location of disconnected systems. Identify and indicate stub-out locations on Project Record Documents.
D. Verify that existing plant life and features designated to remain are tagged or identified.
   1. The Architect will mark the features, trees, and shrubs to remain within the construction area. Contractor shall not commence clearing and grubbing operations until authorized by the Owner and all protective measures are in place.
E. Coordinate the time and duration of all system disconnects with Owner.

3.03 DEMOLITION

A. General Requirements
   1. Clear areas required for access to site and execution of Work, including pavements, structures, foundations, vegetation, trash and debris.
   2. Coordinate with Owner the time of day and route to remove demolished materials from premises.
   3. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
   4. Remove all buried debris, rubble, trash, or other material not deemed suitable by the Geotechnical Engineer.
   5. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with specified fill material.

B. Fixture and Equipment Removal:
   1. Remove existing fixtures and equipment as identified and shown on drawings and required by Architect.
   2. Verify all service connections to fixtures and equipment designated for removal have been properly disconnected.
   3. Remove all conductors from conduit at all abandoned circuits.

3.04 UTILITY AND BUILDING SERVICES REMOVAL AND RE-INSTALLATION

A. Where crossing paths and potential points of interference with existing utility services are shown or can be reasonably inferred from surface conditions or evidence of subsurface systems, such as meter boxes, vaults, relief vents, cleanouts and similar components.
   1. Review all contract documents showing crossing paths and potential points of interference.
   2. Pot-hole or determine by other means the accurate depth and location of such utilities.
   3. Incorporate all costs required to complete work under this contract, including additional trenching, re-routing of existing and new utilities, and all means necessary to construct work under this contract.
   4. No additional cost to the Owner will be allowed for work necessary to accommodate utility conflicts where such crossing paths are shown on contract drawings or can be reasonably inferred from surface conditions or components.

B. Remove all conductors from conduit at all abandoned electrical circuits.

C. Seal off ends of all piping, drains and other components as directed by Architect and serving utility.

D. Where necessary to maintain service to existing utility and building systems, relocate or redirect all conduit and conductors, piping, drains, and associated system components.
   1. Re-circuit all electrical as required.
   2. Re-circuit all landscape irrigation valving and control systems as required.
   3. Temporarily terminate landscape system components in approved boxes or with approved caps, suitable for re-connection or extension.
   4. Extend or otherwise modify all site drainage systems, including catch basins, drain inlets and piping. Fine grade to maintain proper drainage flow pattern to drains.

E. Demolish structure in an orderly and careful manner.
   1. Use of explosives prohibited.

3.05 SITE PAVEMENT REMOVAL

A. Remove sidewalk and curb where required for new construction as specified and as indicated on the Drawings.
   1. Remove all paving by saw-cutting.
   2. Remove concrete paving and curbing at locations shown on drawings. Locate closest adjacent expansion or weakened plane joint to define start of removal or saw-cutting.

B. Remove asphalt concrete paving areas where required for new construction as specified and as indicated on the Drawings.
   1. Remove all paving by saw-cutting.
   2. Remove paving assembly as required to expose subgrade.

3.06 LANDSCAPE AND IRRIGATION SYSTEMS DEMOLITION AND RENOVATION

A. Clearing, grubbing, and planting demolition.
   1. Remove grass and grass roots to a minimum depth of two inches below existing grade.
   2. Remove all shrubs, plants and other vegetation within the area of the work unless designated to remain. Grub and remove all roots of all vegetation to a depth of 24 inches below existing grade.
   3. Remove only those trees which are specifically designated for removal, or as shown on the drawings, within the construction area. Remove all stumps. Remove root ball and root systems larger than 1 inch in diameter to a depth of two feet below existing or finished grades, whichever is lower and a minimum of five feet beyond the edge of paving, structure, wall or walkway.
   4. Hand cut existing tree roots over 1 inch in diameter as necessary for trenching or other new construction, apply multiple coats of emulsified asphalt sealant especially made for horticultural use on cut or damaged plant tissues to cut faces and adjacent surfaces. Cover exposed roots with wet burlap to prevent roots from dying out until backfilling is complete.
   5. Discing and mixing of vegetation, trash, debris, and other deleterious materials with surface soils prior to grading is not permitted.
   6. Remove all buried debris, organic material, rubble, trash, or other material not deemed suitable by the Geotechnical Engineer.
   7. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with fill material in compliance with Section 310000.
   8. Selected equipment of such sizes and capacities that the existing environment is disturbed as little as possible, and to afford ease of mobility within limited and relatively confined work areas. Make every effort to preserve the topography in its natural state.
   9. Keep drains, catch basins, surface drainage courses and related drainage system components clear of debris and construction materials.

3.07 DISPOSAL:

Demolished materials become property of the Contractor and shall be removed from premises, except those items specifically listed to be retained by Owner.

A. Dispose of all demolished material, trash, debris, and other materials not used in the work in accordance with the regulations of jurisdictional authority.
B. It is recommended that all materials that are of a recyclable nature, be transported to a suitable legal recycling facility instead of a dump or refuse facility (unless they are one-in-the same).
C. Burning and Burying of Materials: NOT ALLOWED.
D. Haul Routes:
   1. Obtain permits as required by jurisdictional agencies. Establish haul routes in advance; post flagmen for the safety of the public and workmen.
   2. Keep streets free of mud, rubbish, etc.; assume responsibility for damage resulting from hauling operations; hold Owner free of liability in connection therewith.
E. Remove demolished materials and debris from site on a daily basis.

3.08 CLEANING

A. Upon completion of work of this Section promptly remove from the working area all scraps, debris.
B. Clean excess material from surface of all remaining paved surfaces and utility structures.
C. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END SECTION

02 41 19
BUILDING DEMOLITION AND PROTECTION
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 WORK INCLUDED THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable extents of work and dimensions at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
    1. **General:**
        a. Pay all disposal fees
        b. Coordinate all recycling procedures and provide appropriate documentation
        c. Obtain all permits
        d. Coordinate and get approval for demolition of all existing utilities with **Owner** and appropriate utility company/governing jurisdiction.
    2. **Scope:**
        a. Including, but not limited to;
            1. Demolition.
            2. Removal and Disposal.
            3. Removal and Storage for **Owner** use.
            4. Removal and Storage for Future Installation.
            5. Recycling - Construction Waste Management and Recycling.
            6. Waste - Construction Waste Management and Recycling.
            7. Capping of piping as indicated in drawings.
            8. Patching of concrete and reinforcing
            9. Testing - Pressure testing of all capped piping.
            10. Protection of materials and surfaces to remain after demolition is complete
            11. As-Built drawings derived from Record Drawings keep at project during demolition and construction.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. Title 24, California Code of Regulations, California Building Standards Commission
C. CBC Energy Code, California Code of Regulations, Title 24, Part 6, California Building Standards Commission
D. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
E. Title 24, Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
F. American National Standards Institute (ANSI), www.ansi.org
G. American Society of Safety Engineers, www.asse.org
H. American Society For Testing and Materials (ASTM), www.astm.org
I. National Demolition Association, www.demolitionassociation.com
J. Occupational Safety and Health Administration (OSHA), United States Department of Labor, www.osha.gov
    1. OSHA – Regulations Standards – 29 (CFR) as approved by State of California
    2. OSHA – Regulations Standards – 29 (CFR), Section 1926 Occupational Safety and Health Standards for Construction as approved by State of California
K. Jurisdiction having authority (JHA)
    1. Within project site property lines: County of Merced
    2. Street and frontage outside project site property lines: City of Merced

1.03 PERFORMANCE, TESTING AND INSPECTION

A. General:
    1. Comply with manufacturer's standards.

2. Comply with Building Code.

B. Sustainability:
   A. Refer to Division 1 sustainability requirements.
   B. Refer to product criteria identified herein.
   C. Refer to Division 1 for construction waste management and disposal/recycling requirements

D. Construction Testing:

Item	Name of Test	Performance Results	Testing Std.
Capped piping – natural gas to remain capped	Pressure test	After capping piping, subject pipe to pressure testing and meet minimum standards.	Confirm requirements with gas company and jurisdiction having authority.
Capped plumbing – domestic water to remain capped	Water pressure test for all hot and cold water lines.	After capping piping, subject pipe to water pressure from local source and leave on for 24 hours to ensure there are not any leaks at each capped pipe location. Refit all leaking conditions and retest.	None
Capped piping - sewer lines to remain capped	Cap	After capping sewer piping; Plug pipe discharge directly outside building at clean out or directly inside the building at closest location to exterior. Install cap at farthest location upstream from capped pipes and install cap to fit a water line to supply water pressure from local source and leave on for 24 hours to ensure there are not any leaks at each capped pipe location. Refit all leaking conditions and retest.	None
Capped line voltage and low voltage conduits to remain capped	Leak testing	Fit end of conduit with threaded type cap in material to match that of conduit.	None

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements.
D. Submit a written list of all items to be as indicted below and organize in a spread sheet;
   1. Demolition items/material
   2. Removed and disposed of items/materials
   3. Removed and stored items by contractor and supplied at later date to **Owner**
   4. Removed and stored items to be installed at later date by contractor as directed by **Owner**
   5. Acknowledgment of “As-Demolished” scope for As-Built Record Drawings to include markup of drawings and pdf files named specific to each drawing sheet for all final record keeping and included in construction as-built documents.
      a. This shall be included in as-built record drawings.
   6. Protection and maintenance plan for existing vegetation.

7. Schedule of items to be tested

E. Submit shop drawings indicating the location for concrete saw cutting with extents indicated.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. **Contractor** shall have been in business for **five (5)** years providing demolition services for projects of similar size and complexity.
C. **Contractor** shall be a member of the National Demolition Association in good standing.
D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.

1.07 JOB CONDITIONS

A. Field-verify that all work by others is installed correctly prior to proceeding with demolition work under this specification and drawings.
B. Retain and have all applicable permits obtained prior to commencing with work.
C. Hazardous materials:
   1. Any known or presumed hazardous material discovered shall be brought to the **Owner**'s attention immediately.
   2. Any mold or mildew discovered shall be brought to the **Owner**'s attention immediately.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.
D. Protect all materials to remain in place after demolition is complete, including, but not limited to as herein listed and indicated in drawings.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.

1.10 RELATED WORK / SECTIONS

A. The following is related work including, but not limited to the following;
   1. New Site Work
   2. Coordination with Utility Companies
   3. Coordination with Agencies
   4. Acquisition of permits
   5. Coordination with **Owner**
   6. Surveying
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 01 73 29 – Cutting and Patching
   3. Section 01 33 00 – Submittal Procedures
   4. Section 01 25 00 – Substitution and Standard Deviation Procedures
   5. Section 01 50 00 – Temporary Facilities and Controls
   6. Section 01 74 19 – Construction Waste Management and Disposal/Recycling
   7. Section 01 78 00 – Closeout Submittals
   8. Section 01 74 00 – Protection and Cleaning
   9. Section 02 41 13 – Selective Site Demolition

1.11 OPERATION AND MAINTENANCE DATA

A. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

C. General:
   1. Schedule work and sequence with **General Contractor**.
   1. Schedule required investigation, shutoff of utilities, etc., prior to commencing with demolition, etc.
   2. Coordinate with any new work to follow or occur simultaneously.
   3. Coordinate work with **Owner**'s representative including Existing Utilities:

D. Coordinate work of disconnecting existing capped utilities which will be connected to as part of new construction including, but not limited to;
   1. Gas
   2. Domestic water
   3. Fire service water
   4. Sewer
   5. Electrical
   6. Low voltage cabling,
   7. Etc,

E. Coordinate work of testing existing capped utilities which will remain capped after new construction including, but not limited to;
   1. Gas
   2. Domestic water
   3. Sewer
   4. Electrical
   5. Low voltage cabling,
   6. Etc.

F. Coordinate removal and disposal of the following including, but not limited to;
   1. Existing Building in its entirety

G. Coordinate reinstalling the following from demolition including, but not limited to;

H. As noted on drawings

I. Recycling
   1. Coordinate items and/or materials which will be recycled.
      a. Refer to Division 1 for product delivery, storage and handling requirements
      b. Refer to drawings.

J. Notices:
   1. **General Contractor** shall make the following notices to **Owner** in addition to Specifications and Division 1 including, but not limited to;
      a. 72 hours prior to interruption of utilities.
      b. 48 hours prior to demolishing and/or removing items/materials not specifically noted in drawings and/.or specifications.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products are acceptable to use as intended for demolition work.

B. Refer to Division 1 for substitution, deviation and/or submittal procedures.

2.02 MATERIALS

A. As necessary by contractor to complete their work and used for the purpose of demolition, etc. as herein specified and additionally as indicated in contract documents.

2.03 OTHER MATERIALS

A. Provide other materials, not specifically described but required for complete and proper demolition activities, as selected by the **General Contractor** subject to the approval of the **Architect** and **Owner**

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   2. Examine areas and conditions under which demolition work is to be performed.
   3. Identify conditions detrimental to proper or timely completion of demolition work and coordinate with **General Contractor** to rectify.

B. Hazardous materials:
   1. Any known or presumed hazardous material discovered shall be brought to the **Owner**'s attention immediately.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate demolition work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Protect all existing installations from damage.
D. Coordinate scope of work with, but not limited to; civil documents and landscape documents.
E. Take measures to prevent damage to existing items indicated to remain during the course of work under this specification.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with required demolition practices.

3.04 INSTALLATION - DEMOLITION

A. General:
   1. Perform work in accordance with accepted demolition and protection practices, as herein specified and in compliance with contract documents.
   2. Pay all disposal fees
   3. Coordinate all recycling procedures and documentation
   4. Coordinate and get approval for demolition of all existing utilities with **Owner** and appropriate utility company/governmental jurisdictions having authority.
   5. Codes, regulations, agencies and jurisdictions:
      a. Obtain all permits
      b. Demolition work shall comply with;
         1. Local ordinances having jurisdiction.
         2. Appropriate utility company/governmental jurisdiction.
         3. Safety Codes of State of California.
         4. Rules and regulations of Industrial Accident Commission of State of California.
   6. Perform demolition and protection work in such manner as to prevent damage to existing facilities to remain or to be salvaged, and to prevent injury to public and workmen engaged on site under this or other contracts.
      a. Roofs and walls, or other building elements, shall be demolished in such manner that materials or units thereof shall fall within foundation lines of building being removed.
      b. Demolition debris shall not be allowed to accumulate on site.
      c. Hazardous work shall not be left standing or hanging overnight or weekends, but shall be knocked or pulled down at end of each day to avoid damage or injury to persons or existing facilities due to toppling or falling of such hazardous elements.
   7. Wherever cutting and removal of portions of existing work is indicated, such work shall be sawn in manner that will produce neat and straight lines, parallel to adjacent surfaces or plumb for vertical surfaces.
      a. Grind smooth resulting edges of concrete slabs or walks.
      b. Neatly remove existing finish materials back to clean straight line or nearest support patches or repairs.
      c. Execute cutting and demolition by methods which will prevent damage to other work, and which will provide proper surfaces to receive installation of repairs and new work.

B. Demolition:
   1. General:

a. Demolished items are to become the property of the **General Contractor** and removed from premises at contractor's expense, typical, u.n.o.

2. Remove and dispose of all items indicated in documents.
3. Remove and dispose of all items herein indicated including, but not limited to;
   a. Concrete:
      1. Floor slabs and reinforcing
      2. Foundations and reinforcing
      3. Footings and reinforcing
   b. Electrical (including below slab):
      1. Wiring
      2. Conduit
      3. Light fixtures
      4. Switching and power devices
      5. J-boxes and alike items
   c. Plumbing (including below slab):
      1. Piping
      2. Plumbing fixtures
   d. Framing:
      1. Wall framing
      2. Ceiling and soffit framing
   b. Sheathing:
      1. Wall sheathing
      2. Roof sheathing
   c. Miscellaneous
      1. Any other items required to facilitate new construction

C. Removal and Disposal
   1. All materials resulting from demolition work, except those items specifically listed or shown to be retained by **Owner** or reinstalled, shall become property of **General Contractor** and shall be removed from premises.
   2. HAUL ROUTES:
      a. Establish haul routes in advance and post flagmen to assure safety of visitors, public and workers.
      a. Keep streets and parking areas free of mud, rubbish, debris, etc.
         1. **General Contractor** will assume responsibility for any damage resulting from hauling operations and hold **Owner** free and clear of any liability in connection therewith.
   1. Appropriate utility company/governmental jurisdiction.
      a. Coordinate with utility companies for and removed items that might be the property of said utility company.

D. Removal and Storage for **Owner** use:
   1. Items to be retained for **Owner** shall be safely stored until said time the **Owner** requires delivery of items.

F. Removal and Storage for future Installation for **Owner:**
   1. Items to be retained for **Owner** shall be safely stored until said time the **Owner** requires the items be installed.
   2. Includes items as listed in drawings and also includes, but is not limited to;
      a. Exterior tile wall veneer.

G. Removal and Storage for future Installation by **Contractor:**
   1. Items to be retained and safely stored until said time it is deemed appropriate to be installed.
   2. Includes items as listed in drawings and also includes, but is not limited to;
      a. TBD

H. Removal and Storage for future modification and/or replacement:
   1. Items to be retained shall be safely stored until said time **Contractor** requires the items be modified replaced for installation.
      a. TBD

I. Recycling - Construction Waste Management and Recycling:
   1. Refer to Division 1 for product delivery, storage and handling requirements

2. Refer to drawings.

J. Waste - Construction Waste Management and Recycling.
   1. Refer to Division 1 for product delivery, storage and handling requirements
   2. Refer to drawings.

K. Capping of piping:
   1. Refer to drawings
   2. All capping shall be done with a threaded type assembly or approved adhesive method for pipe material.

L. Testing:
   1. Pressure testing of all capped piping as herein indicted and/or noted in drawings.
   2. Pressure testing of existing capped utilities.
   3. In compliance with agency and/or utility having jurisdiction.

M. Protection:
   1. Protect materials and surfaces to remain after demolition is complete.
      a. Repair to new condition all damaged materials.

N. Waste Management
   1. Refer to Division 1 for construction waste management and disposal/recycling requirements.

O. As-Built drawings:
   1. General:
      a. Carefully document, photograph and provide hard copy of As-Built Drawings and Specifications of all removed items, capped off utilities and terminated utilities, conduits, etc. for as-built conditions after demolition is complete.
         1. Include As-Demolished items also
   2. Submit as-built drawings for demolition work including , but not limited to;
      a. As indicated in drawings
      b. Capped piping.
      c. Termination locations for all conduit, piping, etc.
      d. Items discovered which were not noted and/or indicated in demolition drawings.
   3. Refer to Division 1 for closeout submittal procedures.

3.05 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
   2. The Applicator shall be responsible for the proper application of the materials.

B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others and are removed from project.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.

I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor**'s **NOTICE** of “Certificate of Substantial Completion”.

END OF SECTION

03 00 61
CONCRETE FLOOR LEVELING, PATCHING AND GROUTING
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
    1. Apply 100% cementitious Concrete Floor Leveling products to level and to correct unsatisfactory conditions at concrete floors:
        a. New concrete.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
E. Published specifications, standards tests and recommended methods of trades, industry or governmental organizations apply to work of this section.
F. American Concrete Institute (ACI), www.aci-int.org
G. American Society For Testing and Materials (ASTM), www.astm.org

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
    1. Comply with manufacturer's standards.
    2. Comply with Building Code.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings, including data sheets, MSDS sheets and manufacturer installation instructions for each product to be used on the project.
E. Provide Certification of compatibility of proposed floor leveling, patching and/or grouting compound(s) with applied Concrete Vapor Emission and Alkalinity Control Treatment(s).

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **Five (5)** years providing/installing/finishing similar size projects and complexity.
    1. Provide at least one person, present at all times during execution of this portion of the work, who is thoroughly familiar with the type of materials being installed and the best methods for their installation. They shall direct all work performed under this Section.
C. Manufacturer shall have been in business for **Five (5)** years providing/installing/finishing similar size projects and complexity.
D. Coordinate installation of these products with work performed per Section 07 28 00 – Concrete Slab Vapor Emission Control Treatment.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK / SECTIONS

A. The following is related work including, but not limited to the following;
   1. Floor Substrate
   2. Remedial Floor Vapor and Alkalinity Control Treatment
   3. Finish Flooring
   4. All notes on the structural drawings are included in this specification.
B. The following are related sections including, but not limited to the following:
   1. Division 1
   2. Section 03 00 51 – Concrete Cleaning
   3. Section 03 30 00 – Cast in Place Concrete

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturer/fabricator/installer shall meet the requirements as herein specified and also as indicated in the drawings.
   1. Refer to documents and as herein specified.
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturer's specifications/recommendations.

2.02 MATERIALS

A. Patching Mortar:
   1. Application:

a. Horizontal slab repair
2. Manufacturer & Product:
   a. U.S. Spec, Transpatch
3. Material: One component, Portland cement based partial depth repair mortar
4. Limitations:
   a. Per data sheet
   b. Do not use at colored concrete areas.
   c. Do not use for building slabs, refer to Leveling Compound heading
5. Installation: Install per manufacturer's recommendations

B. Resurface Coating - Horizontal:
1. Application:
   a. Resurface/repair coating to be applied over interior and exterior exposed concrete surfaces.
2. Up to 1/2" maximum thickness:
   a. Application:
      1. Feathered edge at non-treated floors
      2. 1/4" min. at floors treated per Section 07 28 00 – Concrete Slab Vapor Emission Control Treatment
   b. Manufacturer/Product:
      1. US MIX Products Co., Thinpatch
      2. L & M Const. Chemicals, Durathin
   c. Material:
      1. Polymer Modified Repair Mortar
   d. Properties:
      1. Compressive Strength: Comply with ASTM C109
      2. Rate of Set: Comply with ASTM C266
      3. Bond Strength: Comply with ASTM C882
      4. Flexural Strength: Comply with ASTM C78
   e. Substrates:
      1. Concrete flatwork
      2. Concrete stairs and ramps
      3. Exposed horizontal face of concrete site walls
      4. Exposed horizontal face of concrete curbs
      5. Concrete vehicular paving
   f. Limitations:
      1. Refer to manufacturer's product data sheets, specifications and installation instructions.
      2. Do not use for building slabs; refer to Leveling Compound heading
      3. Do not use on seatwalls; these conditions shall be replaced if deemed defective by **Architect**.
      4. Do not use at colored or stained concrete areas.
      5. Do not use at decorative concrete, including but not limited to;
         a. Stamped and/or patterned concrete
         b. Exposed aggregate
         c. Salt finish
         d. Sandblasted finish
3. Up to 3" deep patch:
   a. Application:
      1. Resurface/repair coating to be applied over interior and exterior exposed concrete surfaces.
      2. Add pea gravel per manufacturer's recommendation's for thick applications
   b. Manufacturer/Product:
      1. US MIX Products Co., V/O Patch
      2. BASF, Master Builders, Emaco R 350 CI
      3. Dayton Superior, Conspec, SPECIAL PATCH
   c. Substrates:

1. Concrete flatwork
2. Concrete stairs and ramps
3. Exposed horizontal face of concrete site walls
4. Exposed horizontal face of concrete curbs
5. Concrete vehicular paving

d. Limitations:
1. Refer to manufacturer's product data sheets, specifications and installation instructions.
2. Do not use for building slabs; refer to Leveling Compound heading
3. Do not use on seatwalls; these conditions shall be replaced if deemed defective by **Architect**.
4. Do not use at colored or stained concrete areas.
5. Do not use at decorative concrete, including but not limited to;
   a. Stamped and/or patterned concrete
   b. Exposed aggregate
   c. Salt finish
   d. Sandblasted finish

e. Installation: Install per manufacturer's recommendations

C. Patching And Resurface Coating – Vertical Surface
1. Application:
   a. Resurface/repair coating to be applied over interior and exterior exposed concrete surfaces.
2. Manufacturer & Product:
   a. Patching/resurfacing and crack/spalling filler: US SPEC, VTU Resurfacer
   b. Resurfacer/sealer: US SPEC, Permasil
3. Properties:
   a. Compressive Strength: Comply with ASTM C109
   b. Rate of Set: Comply with ASTM C266
   c. Bond Strength: Comply with ASTM C882
   d. Flexural Strength: Comply with ASTM C78
4. Substrates:
   a. Seatwalls – vertical and horizontal surfaces
      1. Coordinate with sandblasting
   b. Concrete light pole bases
   c. Exposed face of concrete foundation walls
   d. Concrete Columns
   e. Exposed face of concrete retaining walls

D. Non-Shrink Grout: (Non-metallic, no chlorides, no aluminum powder)
1. Application: Typical all conditions including but not limited to;
   a. Anchor bolts, reinforcing dowels and rods
   b. Grouting of structural and non-structural building members
   c. Coordinate with structural drawings
2. Manufacturer & Product:
   a. US SPEC, Premium Grout
   b. L & M Construction Chemicals, Inc., Crystex Grout
   c. BASF, Master Builders Masterflow 713 or 928
3. Material: A high flow, High strength, pre-packaged compound consisting of non-metallic aggregates, cement, water reducing and plasticizing agents.
4. Properties:
   a. Compressive Strength: 13,400 psi in 28 days ASTM C109
   b. Material: Comply with ASTM C1107
5. Installation: Install per manufacturer's recommendations

2.03 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 INSTALLATION

A. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
B. Inspect floor surfaces within project limits with **Owner**, **Architect** & **Structural Engineer** to determine unacceptable conditions, and before commencing demolition construction to repair unsatisfactory conditions in the concrete substrate.
C. Apply concrete floor patching and leveling materials at unsatisfactory locations in accordance with manufacturer's application instructions. Finish and cure to meet product requirements and to produce a uniform substrate to receive all new work and final floor finishes.

3.05 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer / Applicator.
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
B. The Applicator shall be responsible for the proper application of the materials.
C. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
G. Leave entire area in a neat, clean, acceptable condition.

H. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
I. Provide record drawings in accordance with Division 1 closeout submittal procedures.
J. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

03 10 00
CONCRETE FORMWORK AND ACCESSORIES
Shakori Garage Replacement
200035.00

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all work of this section.

1.2 SCOPE

A. Design, furnish and install forms for concrete as indicated on drawings and specified here. Remove forms and shores at specified time. Clean up.

1.3 RELATED WORK (See also Table of Contents)

A. Reinforcing Steel: Section 03 21 00.

B. Cast-In-Place Concrete: Section 03 30 00.

C. Structural Steel: Section 05 12 00.

D. Metal Fabrications: Section 05 50 00.

E. Rough Carpentry: Section 06 10 00.

F. Items relating solely to mechanical or electrical work are included under those Divisions, except as specifically indicated otherwise on Drawings.

1.4 QUALITY ASSURANCE

A. General:
   1. Conform to all requirements of ACI 347 and ACI 318 Section 26.11.
   2. Concrete formwork shall be designed and constructed to safely support fluid concrete and superimposed construction loads without excessive deflection or concrete leakage. Provide bracing to maintain accurate alignment and to resist all anticipated lateral loads. Forms shall conform with drawings as to shape, line, and dimension. Design, engineering and construction of forms shall be Contractor's responsibility. Formwork for exposed concrete shall be constructed to tolerances indicated in ACI 303R.
   3. Cooperate and coordinate with other trades who furnish and/or install piping, conduit, reglets, anchors, inserts, sleeves, hangers, etc., as their work requires; including provisions for recesses and chases.

B. Submittals: (Submit under provisions of Section 01 33 00)
   1. Product Data. Provide manufacturers data and installation instructions for the following:
      a. Tie rods and spreaders.
      b. Formwork for exposed concrete.
      c. Form coatings and release agents.

C. Standards and References: (Latest Edition unless otherwise noted)
   1. 2019 California Building Code (CBC).
   2. American Concrete Institute (ACI).
      a. ACI 303R - “Guide to Cast-In-Place Architectural Concrete Practice”
      b. ACI 318 – “Building Code Requirements for Structural Concrete”
      c. ACI 347R - "Guide to Formwork for Concrete”
   3. Standard Grading and Dressing Rules #17, West Coast Lumber Inspection Bureau (For Douglas Fir Form Lumber).
   4. U.S. Product Standard PS 1-83 (For Plywood Form Lumber).

PART 2 - PRODUCTS

2.1 MATERIALS

A. Form Material:
   1. Smooth Concrete exposed to view: 5/8 inch minimum APA Plyform or steel.
   2. Concrete concealed from view: 5/8 inch minimum APA Plyform, steel or clean and sound 1 x 8 Standard Grade Douglas Fir.

B. Fiber Forms: Tubular column forms spirally constructed of laminated plies of fiber. Plies shall be laminated using a non-water sensitive adhesive and surface wax impregnated for moisture protection. Forms shall give a smooth and seamless appearance to the cast concrete. Provide reveals, as shown on the drawings, as supplied by the form manufacturer. Forms shall be as manufactured by Sonoco Products, plastic lined; Burke Smoothtube by Burke Co.; or approved equal.

C. Form Clamps: Assembly to have cone washers, (1 inch break back) 3/8” inch center rod.

D. Form Ties:
   1. Concrete exposed to view: Snap ties allowing full 1 inch break back.
   2. Concrete concealed from view: Snap ties or wire.
   3. Verify special spacing requirements with architectural drawings at exposed concrete.

E. Spreaders: Metal (no wood).

F. Form Coating: Non-grain and non-staining types of form coating that will not leave a residual matter on the face of the concrete or adversely affect proper bonding of any subsequent paint or other surface applications.
   1. Form coating containing mineral oils or other non-drying materials will not be permitted for any concrete work.

G. Joint Tape: No. 471 plastic film tape 3 inches wide, as manufactured by the Industrial Tape Division of 3M Company.

H. Expansion Joint Filler (Preformed): ½ inch thick; Flexcell by Celotex Corporation, Elastic Fiber Expansion Joint by Phillip Carey Mfg. Co., or Sealtight Fiber Expansion Joint by W.R. Meadows, Inc.

I. Extruded Polystyrene Foam: ASTM C578 type IV. Dow Chemical Corp. "Styrofoam", UC Industries "Foamular", or approved equal.

PART 3 - EXECUTION

3.1 FORM CONSTRUCTION

A. Construct substantial forms to the shapes, lines, grades and elevations shown, sufficiently tight to prevent leakage of mortar, and tied, clamped and braced to prevent spreading, shifting or settling. Plywood joints shall be square and tight; plywood shall be arranged in such manner as to minimize number of joints and to provide a smooth, attractive finished concrete surface.

B. Apply form coating to forms before reinforcing steel is in place.

C. Sleeves, anchors and bolts, including those for angle frames, supports, ties and other materials in connection with concrete construction, shall be secured in position before the concrete is placed.

D. Proper provisions shall be made for openings, blockouts, sleeves, offsets, sinkages, recesses and depressions required by other trades and suppliers prior to placing concrete.
   1. The Contractor shall also see that sleeves have been installed and other provisions have been made for the installation of mechanical, electrical and other equipment.
   2. Coordinate with all trades to insure proper placement of all items in forms and to provide proper blockouts wherever required.

E. Concrete work out of alignment, level or plumb will be cause for rejection of the whole work affected and, if so rejected, such work shall be removed and replaced, as directed by Architect, with no additional cost to the Owner.

F. Form Not Required: Concrete footings may be poured directly against cut earth where feasible and when the Architect's approval has been obtained.
   1. See structural drawings for requirements for placing concrete footings directly against earth without forms.

G. Use ¾ inch minimum wood chamfer strips typical at all exposed corners unless noted otherwise on drawings.

3.2 CLEANING OF FORMS

A. All dirt, chips, sawdust, rubbish, water, etc. shall be completely removed from form by water hosing and air pressure before any concrete is deposited therein. No wooden ties or blocking shall be left in concrete except where indicated for attachment of other work.

B. Thoroughly clean and patch all holes in formwork and re-coat as required before reusing. Forms not suited to obtain concrete surfaces and tolerances in conformity with Contract requirements will be rejected by Architect.
   1. Reuse of forming materials shall be limited only as required to produce the finishes as specified, free from blemishes and other defects unless covered by other building materials in which case blemish free concrete is not required.

3.3 INSPECTION OF FORMS

A. Notify the Architect at least 48 hours in advance of the beginning of pouring operations and at the completion of formwork and location of all construction joints. An inspection of forms and joints will be made for approval of finished work and general layout only. The foregoing inspection shall in no way relieve the Contractor of responsibility of design and safety or formwork, bulkheads and shorings.

3.4 REMOVAL OF FORMS AND SHORING

A. Do not remove forms until concrete has attained sufficient strength to support its weight and any construction loading. Concrete must be allowed to cure long enough to avoid damage during form removal. Contractor or his representative in charge of concrete construction shall be present during removal of forms and shores, and shall be personally responsible for safety of this operation at all times and under all conditions.

B. As a minimum, formwork and shoring shall remain in place for the following periods:
   1. Concrete on grade: 24 hours
   2. Walls and Columns: 3 days

3. Formwork may be removed and reshores installed before the times indicated above, provided the concrete has cured sufficiently to avoid damage when formwork is removed. Shores must be immediately replaced with reshores in a sequence designed to avoid inducing stress in the concrete member.

3.5 ADJUSTING AND CLEANING

A. Upon completion of this Work, clean up and remove from Site all equipment and debris resulting from this work.

B. Surfaces to be painted shall be smooth and free of substances such as dirt, wax, excessive latence, grease or materials that would prevent proper bonding of finishes.
   1. Removal of foregoing contaminants, and complete removal of parting and curing compounds affecting proper paint bond, shall be responsibility of this Section of Work. Sandblast cleaning shall not be employed without specific approval of Structural Engineer.

END OF SECTION 03 10 00

03 21 00
REINFORCING STEEL
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all work of this Section.

1.2 SCOPE

A. Unless noted otherwise, furnish and install reinforcing for all concrete, including dowels, chairs, spacers, bolsters, etc., necessary for supporting and fastening reinforcement in place as shown on the Drawings and specified herein.

1.3 RELATED WORK (See also Table of Contents)

A. Concrete Formwork: Section 03 10 00.

B. Cast-In-Place Concrete: Section 03 30 00.

C. Clay Unit Masonry: Section 04 21 00.

D. Concrete Unit Masonry: Section 04 22 00.

1.4 QUALITY ASSURANCE

A. General:
   1. Acceptable Manufacturers: Regularly engaged in the manufacture of steel bar and welded wire fabric reinforcing.
   2. Installer Qualifications: Installation shall be done only by an installation firm normally engaged in this business. All work shall be performed by qualified mechanics working under an experienced supervisor.
   3. Welding Qualifications: Welding procedures, welding operators and welders shall be qualified in accordance with AWS D1.4 - "Structural Welding Code Reinforcing Steel".
      a. Welders whose work fails to pass inspection shall be re-qualified before performing further welding.
   4. Reinforcement Work shall conform to ACI 301 and ACI 318 Chapter 25, as minimum standards.
   5. Allowable Tolerances:
      a. Fabrication:
         1) Sheared length: 1 inch.
         2) Depth of truss bars: Plus or minus ½-inch.
         3) Ties: Plus or minus ½-inch.
         4) All other bends: Plus or minus 1 inch.
      b. Placement:
         1) Concrete cover to form surfaces: Plus or minus ¼-inch.
         2) Minimum spacing between bars: Plus or minus ¼-inch.
         3) Crosswise of members: Spaced evenly within 2 inches of stated separation.
         4) Lengthwise of members: Plus or minus 2 inches.
      c. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 2 bar diameters.

B. Standards and References: (Latest Edition unless otherwise noted):
   1. 2019 California Building Code (CBC).

   2. American Concrete Institute (ACI).

   a. ACI 301 – “Specifications for Structural Concrete”
   b. ACI 315R - "Guide to Presenting Reinforcing Steel Design Details".
   c. ACI 318 – “Building Code Requirements for Structural Concrete”
3. American Society for Testing and Materials (ASTM).
   a. ASTM A82 - "Cold Drawn Wire for Concrete Reinforcement".
   b. ASTM A1064 - "Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete".
   c. ASTM A615 - "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement".
   d. ASTM A706 – “Low Alloy Steel Deformed Bars for Concrete Reinforcement”.
4. Concrete Reinforcing Steel Institute (CRSI) - "Manual of Standard Practice".
5. American Welding Standard (AWS).
   a. AWS D1.4 - "Structural Welding Code – Reinforcing Steel".

C. Submittals: (Submit under provisions of Section 01 33 00)
1. Shop Drawings: Prepare in accordance ACI 315R. Indicate bending diagrams, assembly diagrams, splicing and laps of bars and shapes, dimensions and details of bar reinforcing and assemblies. Correctness of all reinforcing requirements and work is the responsibility of Contractor. Identify such shop drawings with reference thereon to sheet and detail numbers from Contract Drawings.
   a. Do not use scaled dimensions from Contract Drawings in determining the lengths of reinforcing bars.
   b. No reinforcing steel shall be fabricated without approved shop drawings.
   c. Any deviations from the contract documents must be clearly indicated as a deviation on the shop drawings.
   d. Areas of high congestion, including member joints and embed locations shall be fully detailed to verify clearances and assembly parameters and coordination with other trades.
2. Certified mill test reports of supplied reinforcing indicating chemical and physical analysis. Tensile and bend tests shall be performed by the mill in accordance with ASTM A615.
3. Product Data:
   a. Manufacturer's specifications and installation instructions for splice devices.
   b. Bar Supports.
4. Certificates of Compliance with specified standards:
   a. Reinforcing bars.
   b. Welded wire fabric.
   c. Welding electrodes.
5. Samples: Only as requested by Architect.

D. Tests and Inspections:
1. A testing program is required prior to start of construction. Testing program to be done in compliance with the CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
2. All reinforcing steel whose properties are not identifiable by mill test reports shall be tested in accordance with ASTM A615. One Series of tests for each missing report to be borne by the Contractor.
3. When inspections are indicated for reinforcement placement on the Structural drawings, a special inspector shall be employed to inspect reinforcing placement per CBC Section 1704.
4. When tests are indicated for reinforcing steel on the structural drawings, the reinforcing steel used shall be tested in accordance with ASTM A615. One tensile and one bend test for each 2-1/2 tons of steel or fraction thereof, shall be made.
5. Inspect shop and field welding in accordance with AWS D1.4, including checking

materials, equipment, procedure and welder qualification as well as the welds. Inspector will use non-destructive testing or any other aid to visual inspection that he deems necessary to assure himself of the adequacy of the weld.

6. Tests and inspection shall be performed by Owners testing agency except when needed to justify rejected work, in which case the cost of retests and reinspection shall be paid by the Owner and backcharged to the Contractor.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.

B. Handle and store materials to prevent contamination.
   1. Store reinforcement in a manner that will prevent excessive rusting or coating with grease, oil, dirt, and other objectionable materials. Storage shall be in separate piles or racks so as to avoid confusion or loss of identification after bundles are broken.

C. Deliver and store welding electrodes in accordance with AWS D1.4.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcement Bars: ASTM A615, Grade 60 for all bars.
   1. Bar reinforcement to be welded shall meet chemical requirements of ASTM A706.
   2. Longitudinal reinforcement in columns and beams of special moment-resisting frames and special reinforced shear walls shall meet the chemical requirements of ASTM A706.

B. Stirrups and Ties: ASTM A615, Grade 60 for all bars.

C. Steel Dowels: Same grade as bars to which dowels are connected.

D. Welded wire Fabric: ASTM A1064.

E. Tie Wires: FS-QQ-W-461, annealed steel, black, 16 gauge minimum.

F. Welding Electrodes: AWS D1.4, low hydrogen, E70XX series.

G. Bar Supports:
   1. Typical, unless noted otherwise; CRSI Class 2 wire supports.
      a. Do not use wood, brick or other objectionable materials.
      b. Do not use galvanized supports.
   2. Supports placed against ground: Pre-cast concrete blocks not less than 4 inches square with embedded wire.

H. Mechanical Couplers: Comply with ACI 318 section 25.5.7.1

PART 3 - EXECUTION

3.1 FABRICATION

A. Shop fabricate reinforcement to meet requirements of Drawings.

B. Fabricate reinforcement in accordance with the requirements of ACI 315R where specific

details are not shown or where Drawings and Specifications are not more demanding.

C. Steel reinforcement shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of bars for bending will not be permitted.

D. Reinforcing shall not be field bent or straightened without structural engineer's review.

E. Provide offsets in rebar (1:6 maximum) where required to maintain clearances.

3.2 CONDITION OF SURFACES

A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions have been corrected.

3.3 GENERAL

A. Concrete shown without reinforcing shall be reinforced as similar parts shown with reinforcing except where concrete is specifically noted to be unreinforced.

3.4 PLACEMENT

A. All reinforcement shall be accurately set in place, lapped, spliced, spaced rigidly and securely held in place and tied with specified wire at all splices and crossing points. All wire tie ends shall point away from the form. Carefully locate all dowel steel to align with wall and column steel.
   1. Bars shall be in long lengths with laps and splices as shown. Offset laps in adjacent bars. Place steel with clearances and cover as shown. Bar laps shall be as indicated on the Drawings. Tie all laps and intersections with the specified wire.
   2. Maintain clear space between parallel bars not less than 1-1/2 times nominal diameter, but in no case shall clear space be less than 1-1/2 times maximum size concrete aggregate.
   3. Reinforcing dowels for slabs shall be placed as detailed. Sleeves may be used if reviewed by the Structural Engineer before installation. Install dowel through all construction and expansion joints for all slabs on grade.

B. Bar Supports: Support and securely fasten bars with chairs, spacers and ties to prevent displacement by construction loads or placement of concrete beyond the tolerances specified. Conform to CRSI as a minimum standard.

C. Steel Adjustment:
   1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
   2. Do not move bars beyond allowable without concurrence of Structural Engineer.
   3. Do not heat, bend, or cut bars without concurrence of Structural Engineer.
   4. Reinforcement shall not be bent after being embedded in hardened concrete.

D. Splices:
   1. Splice reinforcing as shown.
   2. Lap Splices: Tie securely with wire to prevent displacement of splices during placement of concrete.
   3. Splice Devices: Install in accordance with manufacturer's written instructions. Obtain

Structural Engineer's review before using.

4. Do not splice bars except at locations shown without concurrence of Structural Engineer.
   a. Where splices in addition to those indicated are required, indicate location on shop drawings clearly and highlight "for Engineer's approval".

E. Welding:
   1. Welding is not permitted unless specifically detailed on Drawings or approved by Engineer.
   2. Employ shielding metal-arc method and meet requirements of AWS D1.4.
   3. Welding is not permitted on bars where the carbon equivalent is unknown or is determined to exceed 0.55.
   4. Welding shall not be done within two bar diameters of any bent portion of a bar which has been bent cold.
   5. Welding of crossing bars is not permitted.

F. Welded Wire Fabric: Install in long lengths, lapping 24 inches at end splices and one mesh at side splices. Offset laps in adjacent widths. Place fabric in approximately the middle of the slab thickness unless shown otherwise on the Drawings by dimension. Wire tie lap joints at 12-inch centers. Use concrete blocks to support mesh in proper position.

G. Reinforcement shall be free of mud, oil or other materials that may reduce bond at the time concrete is placed. Reinforcement with tightly adhered rust or mill scale will be accepted without cleaning provided that rusting has not reduced dimensions and weights below applicable standards. Remove loose rust.

H. Protection against rust:
   1. Where there is danger of rust staining adjacent surfaces, wrap reinforcement with impervious tape or otherwise prevent rust staining.
   2. Remove protective materials and clean reinforcement as required before proceeding with concrete placement.

I. Drawing Notes: Refer to notes on Drawings for additional reinforcement requirements.

J. Mechanical and Electrical Drawings: Refer to Mechanical and Electrical Drawings for formed concrete requiring reinforcing steel. All such steel shall be included under the work of this Section.

END OF SECTION 03 21 00

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all Work of this Section.

1.2 SCOPE

A. Furnish, place and finish cast in place concrete and related work as indicated on the Drawings and specified here.
   1. Install miscellaneous metal and other items furnished by other trades to be installed in concrete work.
   2. Provide facilities for job curing of test cylinders and transporting to Testing Laboratory.

B. Provide grouting of steel base plates as indicated on the Drawings and specified here.

1.3 RELATED WORK (See also Table of Contents)

A. Concrete Formwork: Section 03 10 00.

B. Reinforcing Steel: Section 03 21 00.

C. Mortar and Grout: 04 05 00.

D. Structural Steel: Section 05 12 00.

E. Metal Decking: Section 05 30 00.

F. Metal Fabrications: Section 05 50 00.

1.4 QUALITY ASSURANCE

A. Standards and References: (Latest Edition unless otherwise noted)
   1. 2019 California Building Code (CBC).
   2. American Concrete Institute (ACI)
      a. ACI 117 – “Specification for Tolerances for Concrete Construction and Materials”
      b. ACI 211.1 – “Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete”
      c. ACI 211.2 – “Standard Practice for Selecting Proportions for Structural Lightweight Concrete”
      d. ACI 301 – “Specifications for Structural Concrete”
      e. ACI 302.1R – “Guide to Concrete Floor and Slab Construction”
      f. ACI 305R – “Guide to Hot Weather Concreting”
      g. ACI 306R – “Guide to Cold Weather Concreting”
      h. ACI 318 – “Building Code Requirements for Structural Concrete”
      i. ACI 360R – “Guide to Design of Slabs-On-Ground”
   3. American Society for Testing and Materials (ASTM)
      a. ASTM C31 – “Making and Curing Concrete Test Specimens in the Field”
      b. ASTM C33 – “Concrete Aggregates”
      c. ASTM C39 – “Compressive Strength of Cylindrical Concrete Specimens”
      d. ASTM C42 – “Obtaining and Testing Drilled Cores and Sawed Beams of Concrete”
      e. ASTM C94 – “Ready-Mixed Concrete”
      f. ASTM C109 – “Test of Hydraulic Cement Concrete”
      g. ASTM C143 – “Slump of Hydraulic Cement Concrete”

h. ASTM C150 – "Portland Cement"
i. ASTM C172 – "Sampling Freshly Mixed Concrete by the Volumetric Method"
j. ASTM C192 – "Making and Curing Concrete Test Specimens in the Laboratory"
k. ASTM C260 – "Air-Entraining Admixtures for Concrete"
l. ASTM C330 – "Lightweight Aggregates for Structural Concrete"
m. ASTM C494 – "Chemical Admixtures for Concrete"
n. ASTM C567 – "Standard Test Method for Determining Density of Structural Lightweight Concrete"
o. ASTM C618 – "Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete"
p. ASTM C685 – "Volumetric Batching and Continuous Mixing"
q. ASTM C1157 – "Hydraulic-Cement"
r. ASTM C989 – "Standard Specification for Slag Cement for Use in Concrete and Mortars"

B. Submittals: (Submit under provisions of Section 01 33 00)
1. Concrete mix designs. See "Mix Design" below. Include results of test data used to establish proportions.
2. Certificates of Compliance from Manufacturer
   a. Cement certificates per CBC Section 1910
      1. Cement without certificate shall not be used.
   b. Aggregates
   c. Admixtures
3. Data regarding hardeners and sealers.
4. Grout samples for sacked surface textures and colors upon Architects request only.
5. Layout drawings for construction, control and expansion joints.
6. Transit-mix delivery slips:
   a. Keep record at the job site showing time and place of each pour of concrete, together with transit-mix delivery slips certifying contents of the pour.
   b. Make the record available to the Architect for his inspection upon request.
   c. Upon completion of this portion of the work, deliver the record and the delivery slips to the Architect.
7. See Section 03 21 00 for reinforcing steel submittals.

C. Tests and Inspections:
1. Provide special inspections and testing as described in the "Statement of Structural Special Inspections and Testing" within the structural drawings and as required by this section.
2. A testing program is required prior to start of construction. Testing program to be done in Compliance with the CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
3. The following tests shall be made by a recognized testing laboratory selected by the Owner and approved by the governing agency. All tests shall be in accordance with the previously mentioned standards and ACI 318 Section 26.12. A complete record of all tests and inspections shall be kept per CBC Section 1910.
   a. Compressive Strength: Make and cure in accordance with ASTM C-31. Test in accordance with ASTM C-39 and ACI 318 Section 26.12.
      1) A record shall be made of time and of locations of concrete from which samples were taken.
      2) Four identical cylinders shall be taken from each pour of 150 cubic yards or 5000 square feet or part thereof, being placed each day per ACI 318 Section 26.12.2.

One cylinder shall be tested at age 7 days, and two at age 28 days unless otherwise specified. Preserve remaining cylinder for future use.

b. Drying Shrinkage: (applies to lightweight concrete only unless noted otherwise)
   1) A record shall be made of time cylinders and of locations of concrete from which samples were taken.
   2) Three identical 4" x 4" x 11" specimens shall be made from same concrete as used in structure. Percent of shrinkage shall be reported at 21 days after 7 day moist curing period. Average results of 3 specimens shall be used as the accepted value. The value for laboratory cast specimens shall not exceed .075%. If field test specimens are used in lieu of laboratory specimens, a tolerance of +33% may be used.
   3) Test specimens in accordance with ASTM C157.

c. Concrete consistency (slump) shall be tested in accordance with ASTM C143.

4. Provide full time inspection per CBC Section 1705.3 during the taking of test specimens and during the placing of all concrete and embedded steel.
5. See Section 03 21 00 for reinforcing steel tests and inspections.
6. Provide concrete batch plant inspections per ASTM C685.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Portland Cement: ASTM C 150, Type II or Type V. One brand of cement shall be used throughout to maintain uniform color for all exposed concrete.

B. Concrete Aggregate: Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as combination of sizes when two or more are used, shall conform to grading requirements of appropriate ASTM Standards and ACI 318 Section 26.4.1.2.
   1. Concrete Aggregates for Standard Weight Concrete: ASTM C 33. Aggregate shall be crushed granite or Perkins type.
   2. Concrete Aggregates for Lightweight Concrete: ASTM C330 to produce concrete weighing no more than 116 pcf at 28 days. Aggregate shall be vacuum saturated expanded shale as produced through the rotary kiln method.

C. Water: Clean and free from injurious amounts of oil, acids, alkali, organic matter and other deleterious substances; suitable for domestic consumption.

D. Admixtures shall be subject to prior approval by the Architect, in accordance with ACI 318 Section 26.4.1.4. Calcium Chloride is not permitted.
   1. Water Reducing
      a. ASTM C494 Type A - for use in cool weather.
      b. ASTM C494 Type D - for use in hot weather.
   2. Air Entraining
      a. Conform to ASTM C 260
   3. Fly Ash
      a. Conform to ASTM C 618
   4. Mid-Range Water-Reducers
      a. Master Builders “Polyheed” or approved equal.
   5. Fly Ash Pozzolan
      a. Conforming to ASTM A-618 Class F
   6. Slag Cement
      a. Conform to Grade 80, 100, or 120.

E. Slab on Grade Vapor Retarder
   1. Vapor Retarder must have the following qualities:
      a. 15 mil thickness minimum
      b. WVTR less than 0.008 as tested by ASTM E 96
      c. ASTM E 1745 Class A (Plastics)
   2. Vapor Retarder Products
      a. Stego Wrap Vapor Retarder by STEGO Industries LLC.
      b. Perminator by W.R. Meadows.

   3. Vapor Retarder Tape
      a. Water Vapor Transmission Rate: ASTM E 96, 0.3 perms or lower
      b. Minimum 6-mils thick
      c. Minimum 3 3/4 inches wide
      d. Manufactured from High Density Polyethylene
      e. Pressure Sensitive Adhesive

F. Sand: Clean, dry, well graded.

G. Abrasive aggregate for non-slip finish: Fused aluminum oxide grits, graded 12/30. Use factory-graded rustproof and non-glazing material that is unaffected by freezing, moisture and cleaning materials.
   1. Products offered by manufacturers to comply with the above requirements include: A-H Alox; Anti-Hydro Waterproofing Co., Toxgrip; Toch Div. - Carboline, or approved equal.

H. Expansion Joint Filler:
   1. Joint fill shall be a preformed non-extruded resilient filler, saturated with bituminous materials and conforming to ASTM D 1751. Products shall be equivalent to Burke "Fiber Expansion Joint", W.R. Meadows "Fibrated Expansion Joint Filler", or approved equal.

I. Bonding Agent: Sonneborn "Sonobond"; the Euclid Chemical Company "Euco-Weld"; Larsen Products Corp., "Weld-Crete" or approved equivalent.

J. Concrete Sealer: Cure and Seal, as manufactured by the Euclid Chemical Company "Aqua-Cure VOX", Sonneborn "Kure-N-Seal WB", Burke "Spartan-Cote",W.R. Meadows "Intex" or approved equal conforming to ASTM C-309, Type I, Class B requirements, and conforming to State of California Air Resources Board VOC Regulations.

K. Concrete Hardener/Sealer: Clear, water soluble, sprayable in-organic silicate based hardener/sealer or acrylic co-polymer resin. Products shall be equal to Euclid Chemical Company "Eucosil", Burke "Spartan-Cote", Sonneborn "Sonosil", W.R. Meadows "Pena-Lith", or approved equal and must conform to State of California Air Resources Board VOC Regulations.

L. Concrete Cure: Water based curing compound conforming to ASTM C-309, Type 1, Class A and B, and AASHTO Specification M-148; Type 1, Class A and B requirements, and State of California Air Resources Board VOC Regulations. Product shall be equivalent to Euclid Chemical Company "Kurez VOX", Burke "No. 1127" or "Aqua-Resin Cure", W.R. Meadows "1100 Clear", or approved equal.

M. Non-Shrink Grout: See Section 2.2.A.6.

2.2 CONCRETE

A. Concrete Mixes:

1. Type A Concrete:
   Strength: 3500 lbs. per square inch at 28 days.
   Maximum Aggregate Size: 1-1/2 inch.
   Cement Content: As required by mix design (ACI 318 Section 26.4.3).
   5.0 sacks per yard minimum.
   Maximum Water to Cement Ratio: 0.58
   Admixture: Water Reducing.
   Weight: 145 lbs. per cubic foot
   Use for unexposed foundation concrete except as otherwise specified. At Contractor's option, Type B concrete may be substituted for this.

2. Type B Concrete:
   Strength: 3500 lbs. per square inch at 28 days.
   Maximum Aggregate Size: 1 inch.
   Minimum Cement Content: As required by mix design. (ACI 318 Section 26.4.3).
   5.5 sacks per yard minimum.
   Maximum Water to Cement Ratio: 0.45
   Admixture: Water reducing.
   Weight: 145 lbs. per cubic foot
   Use for building slab on grade

3. Type D Concrete:
   Strength: 3500 lbs. per square inch at 28 days.
   Maximum Aggregate Size: 3/4 inch.
   Minimum Cement Content: As required by mix design (ACI 318 Section 26.4.3).
   6.0 sack per cubic yard minimum.
   Maximum Water to Cement Ratio: 0.52
   Admixture: Water reducing.
   Weight:145 lbs. per cubic foot
   Use for normal weight concrete over metal deck

4. Grout shall be non-shrink, non-metallic, flowable Type "713" or "928" by BASF.
   a. Metallic grout equivalent to Master Builders "Embeco" may be used only where covered by earth, concrete, or masonry.
   b. Acceptance by Architect required before using.

B. Consistency of Concrete: Concrete slump, measured in accordance with ASTM C 143, shall fall within following limits.
   1. For General concrete placement (with no admixtures): 4 inch ± 1 inch.
   2. Mixes employing the specified mid-range water reducer shall provide a measured slump not to exceed 7 inch $\pm$1 inch after dosing, 2 inch $\pm$1 inch before dosing.
   3. Concrete slump shall be taken at point of placement. Use water reducing admixtures as required to provide a workable consistency for pump mixers. Water shall not be added at the jobsite without written review by the structural engineer.

C. Mix Design:
   1. Initial mix design shall be prepared for all concrete in accordance with ACI 318 Section 26.4.3. Mix proportions shall be determined in accordance with ACI 318 Section 26.4.3 or 26.4.4. In the event that additional mix designs are required due to depletion of aggregate sources, aggregate not conforming to Specifications or at request of Contractor, these mixes shall be prepared as above.
   2. Contractor shall notify the Testing Laboratory and Architect of intent to use concrete pumps to place concrete so that mix designs can be modified accordingly.

3. Fly ash shall not exceed 25% of the total cementitious material. Where slag is used to replace cement, slag shall not exceed 25% of the total cementitious material by mass. Ternary systems where more than one supplementary cementitious material is used are prohibited without consent of SEOR.
4. Provide 6% air entrainment typical for exterior concrete exposed to freeze-thaw cycles.
5. Owner's testing laboratory shall review all mix designs before submittal. A registered civil engineer with experience in concrete mix design shall review the concrete mixes.

D. Mixing:
1. Equipment: All concrete shall be machine mixed. Provide adequate equipment and facilities for accurate measurement and control of materials.
2. Method of Mixing:
   a. Transit Mixing: Comply with ASTM C 94. Ready mixed concrete shall be used throughout, except as specified below.
   b. On-Site Mixing: Use only if method of storing material, mixing of material and type of mixing equipment is approved by Architect. Approval of site mixing does not relieve Contractor of any other requirements of Specifications.
   c. Mixing shall be in accordance with ASTM C94 or ASTM C685.
3. Mixing Time: After mix water has been added, concrete shall be mixed not less than 1-1/2 minutes nor more than 1-1/2 hours. Concrete shall be rejected if not deposited within the time specified.
4. Admixtures:
   a. Air entraining and chemical admixtures shall be charged into mixer as a solution and shall be dispensed by an automatic dispenser or similar metering device. Powdered admixtures shall be weighed or measured by volume as recommended by manufacturer. Accuracy of measurement of any admixture shall be within plus or minus 3%.
   b. Two or more admixtures may be used in same concrete, provided such admixtures are added separately during batching sequence, and provided further that admixtures used in that combination retain full efficiency and have no deleterious effect on concrete or on properties of each other.
   c. All admixtures are to be reviewed by Structural Engineer prior to commencing this work.
5. Retempering:
   a. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall be discarded, not retempered.
   b. Indiscriminate addition of water to increase slump is prohibited.
   c. When concrete arrives at project with slump below that suitable for placing, water may be added only if neither maximum permissible water-cement ratio nor maximum slump is exceeded. Water shall be incorporated by additional mixing equal to at least half of total mixing time required. Any addition of water above that permitted by limitation of water-cement ratio shall be accompanied by a quantity of cement sufficient to maintain proper water-cement ratio. Such additions shall only be used if approved by Architect. In any event, with or without addition of cement, not more than 2 gallons of water per cubic yard of concrete, over that specified in design mix, shall be added.
6. Cold Weather Batching: When average of the highest and lowest air temperature falls below 40 degrees F for more than three consecutive days, provide adequate equipment for heating concrete materials. No frozen materials or materials containing ice shall be used. When placed in forms, concrete placed in these temperatures shall have a minimum temperature based on dimensions of concrete sections placed per ACI 301.
7. Hot Weather Batching: Concrete deposited in hot weather shall have a placing temperature below 90 degrees F per ACI 301. If necessary, ingredients shall be cooled to accomplish this.

2.3 FLOOR LEVELING AND FILL MATERIALS

A. Epoxy Concrete Mortar: Floor leveling, non-shrink trowel applied epoxy concrete mortar; TPM 115 General Polymers Corp., A-H Emery Epoxy Topping #170 Anti-Hydro Corp., or approved equal, where areas to fill are less than 1/4 inch thick.

B. Concrete Mortar: Floor leveling, patching and repair, non-shrink trowel applied concrete mortar; Master Builders EMBECO 885, Euclid EUCO, or approved equal, where areas of fill are greater than 1/4 inch thick.

C. Cementitious Floor Leveling Material: Shall be self-leveling or trowelable with a minimum 28 day compressive strength of 3000 psi in accordance with ASTM C-109. Material shall be equal to Quickrete No. 1249, Ardex V-800/K-55, Mapei "Ultra/Flex" or approved equal.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Before any concrete is placed, the following items of work shall have been completed in the area of placing.
   1. Forms shall have been erected, adequately braced, cleaned, sealed, lubricated if required, and bulkheaded where placing is to stop.
   2. Any wood forms other than plywood shall be thoroughly water soaked before placing any concrete. The wetting of forms shall be started at least 12 hours before concreting.
   3. Reinforcing steel shall have been placed, tied and supported.
   4. Embedded work of all trades shall be in place in the forms and adequately tied and braced.
   5. The entire place of deposit shall have been cleaned of wood chips, sawdust, dirt, debris, hardened concrete and other foreign matter. No wooden ties or blocking shall be left in the concrete except where indicated for attachment of other work.
   6. Reinforcing steel, at the time the concrete is placed around it, shall be cleaned of scale, mill scale or other contaminants that will destroy or reduce bond.
   7. Concrete surfaces to which fresh concrete is to be bonded shall be brush cleaned to remove all dust and foreign matter and to expose the aggregate, and then coated with the bonding adhesive herein specified.
   8. Prior to placing concrete for any slabs on grade, the moisture content of the subgrade below the slabs shall be adjusted to at least optimum moisture.
   9. No concrete shall be placed until formwork and reinforcement has been approved by Architect. Clean forms of all debris and remove standing water. Thoroughly clean reinforcement and all handling equipment for mixing and transporting concrete. Concrete shall not be placed against reinforcing steel that is hot to the touch. Notify Structural Engineer 48 hours in advance of concrete pour.

B. Conveying: Handle concrete from mixer to place of final deposit by methods which will prevent separation or loss of ingredients. Deposit concrete in forms as nearly as practicable at its final position in a manner which will insure that required quality is obtained. Chutes shall slope not less than 4 inches and not more than 6 inches per foot of horizontal run.

C. Depositing: Deposit concrete into forms in horizontal layers not exceeding 24 inches in thickness around building, proceeding along forms at a uniform rate and consolidating into previous pour. In no case shall concrete be poured into an accumulation of water ahead of pour, nor shall concrete be flowed along forms to its final place of deposit. Fresh concrete shall not be permitted to fall from a height greater than 6 feet without use of adjustable length

pipes or, in narrow walls, of adjustable flexible hose sleeves. Concrete shall be scheduled so that placing is a continuous operation for the completion of each section between predetermined construction joints. If any concreting operation, once planned, cannot be carried on in a continuous operation, concreting shall stop at temporary bulkheads, located where resulting construction joints will least impair the strength of the structure. Location of construction joints shall be as shown on the drawings or as approved by Structural Engineer. The rate of rise in walls shall not be less than 2 feet per hour.

1. Consolidation: Concrete shall be thoroughly compacted and worked to all points with solid continuous contact to forms and reinforcement to eliminate air pockets and honeycombing. Power vibrators of approved type shall be used immediately following pour. Spading by hand, hammering of forms or other combination of methods will be allowed only where permitted by Structural Engineer. In no case shall vibrators be placed against reinforcing steel or used for extensive shifting of deposited fresh concrete. Provide and maintain standby vibrators, ready for immediate use.
2. Hot Weather Concreting: Unless otherwise directed by the Architect, perform all work in accordance with ACI 305 when air temperature rises above 75 degrees F and the following:
    a. Mixing Water: Keep water temperature as low as necessary to provide for the required concrete temperature at time of placing. Ice may be required to provide for the design temperature.
    Aggregate: Keep aggregate piles continuously moist by sprinkling with water.
    Temperature of Concrete: The temperature of the concrete mix at the time it is being placed in the forms shall not exceed 90 degrees F per ACI 301. The method employed to provide this temperature shall in no way alter or endanger the design mix or the design strength required.
    Dampen subgrade and formwork before placing concrete. Remove all excess water before placing concrete. Keep concrete continuously wet when air temperature exceeds 85 degrees F for a minimum of 48 hours after placing concrete. For slab on grade construction, see Section 3.1.E.
    Protection: Minimize evaporation from concrete in place by providing shade and windbreaks. Maintain such protection in place for 14 days minimum.
3. Cold Weather Concreting: Follow recommended ACI 306 procedures when average of the highest and lowest air temperature falls below 40 degrees F for more than three consecutive days, as approved by Architect. Concrete placed in these temperatures shall have a minimum temperature based on dimensions of concrete sections placed as shown in ACI 301. No chemicals or salts shall be used to prevent freezing and no accelerating agents shall be used without prior approval from Architect.

D. Construction Joints: Install only as indicated and noted on Drawings. Joints not indicated on Drawings shall be so located, when approved, as to least impair strength of structure, and shall conform to typical details. Construction joints shall have level tops, vertical sides. Horizontal construction joints shall be thoroughly cleaned and roughened by removing entire surface film and exposing clean aggregate solidly embedded in mortar matrix. Joints between concrete and masonry shall be considered construction joints. Vertical construction joints need not be roughened. See Drawings for doweling and required keys.
    1. Roughen construction joints by any of following methods:
        a. By sandblasting joint.
        b. By thoroughly washing joint, using a high pressure hose, after concrete has taken initial set. Washing shall be done not less than 2 hours nor more than 4 hours after concrete has been poured, depending upon setting time.
        c. By chipping and wire brushing.
    2. All decisions pertaining to adequacy of construction joint surfaces and to compliance with requirements pertaining to construction joints shall be reviewed with the Structural Engineer.

3. Just before starting new pour, horizontal and vertical joint surfaces shall be dampened (but not saturated).
4. Before placing regular concrete mix, horizontal construction joint surfaces shall be covered with a layer of mortar composed of cement and fine aggregate of same proportions as that used in prescribed mix, but omitting coarse aggregate.
5. For slabs, construction joints shall be in locations shown on plan. If not shown, locate at intervals not exceeding 150 feet in each direction. Refer to drawings for proper details for reinforcing at construction joints.

E. Concrete Slabs on Grade:
1. Exterior and interior concrete slabs on grade shall be poured as required under this Section. Base shall be accurately leveled and compacted prior to placing of concrete.
2. Typically, interior slabs on grade shall be poured over a minimum of four (4 inch) inches of compacted crushed rock, unless otherwise indicated, over a vapor retarder.
3. Protect slab on grade subbase from moisture prior to placing concrete. Avoid wetting rock layer to allow adequate concrete curing and avoid future vapor transmission. If the subbase has been wet excessively, verify that water has been eliminated prior to placement of concrete.
4. Vapor Retarder installation shall be in accordance with manufacturer's instructions and ASTM E 1643.
    a. Unroll Vapor Retarder with the longest dimension parallel with the direction of the pour.
    b. Lap Vapor Retarder over footings and seal to foundation walls.
    c. Overlap joints 6 inches and seal with specified tape.
    d. Seal all penetrations (including pipes) per manufacturer's instructions.
    e. No penetration of the Vapor Retarder is allowed except for reinforcing steel and permanent utilities.
    f. Repair damaged areas by cutting patches of Vapor Retarder, overlapping damaged area 6 inches and taping all four sides with tape.

F. Control Jointing - Slabs on Grade:
1. Joints shall be in locations indicated on Drawings, or as directed by Architect.
2. Joints in interior slabs shall be made by one of following methods:
    a. By use of construction joints laid out in checkerboard pattern; pour and allow alternate slabs to set; fill out balance of checkerboard pattern with second pour.
    b. By use of dummy groove joints at least 1/4 depth of slab, and at least 1/8 inch wide. These joints may be sawcut as soon as wet concrete can support the weight of the equipment and operator. Delaying sawcutting past this point will make jointing ineffective.
3. Control jointing in exterior paving slabs shall be laid out in a checkerboard pattern; pour as described above, but with joint edges tooled to provide a uniform joint at least 3/8 inch in depth.
4. Slab reinforcing need not be terminated at control joints.
5. Construction and expansion joints shall be counted as control joints.

G. Expansion Joints:
1. Unless otherwise indicated, use 3/8 inch thick expansion joint filler. See Section 2.1.H
2. Joints in interior slabs on grade shall be only in locations indicated.
3. Joints in exterior slabs on grade shall be installed at each side of structures, at curb transitions opposite apron joints, at ends of curb returns, at back of curb when adjacent to sidewalk, and at uniformly spaced intervals not exceeding 20 feet.
4. Edges of concrete at joints shall be edger finished to approximately 3/8 inch radius.
5. Interrupt reinforcing at all expansion joints.

H. Score markings on exterior slabs on grade shall be located as indicated. Where not indicated, mark slabs into rectangles of not less than 12 square feet nor more than 20 square feet using a scoring tool which will leave edges of score markings rounded.

3.2 CURING AND PROTECTION

A. Curing: Exposed surfaces of all concrete used in structure shall be maintained in a moist condition for at least 7 days after placing. The following final curing processes shall normally be considered to accomplish this. Concrete shall be maintained at not less than 50 degrees F nor more than 100 degrees F for a period of 72 hours after being deposited.
   1. Flatwork to be exposed, stained, or painted shall have curing process submitted and approved by the architect prior to construction.
   2. Initial Curing Process - Flat Work:
      a. Mist Spraying: As soon as troweling of concrete surfaces is completed, exposed concrete shall be sprayed continuously with a special atomizer spray nozzle, capable of producing a fine mist. Spraying shall be done without any dripping of water from nozzle. Amount of spraying shall be such as to maintain surface of concrete moist without any water accumulating on surface. Maintain spraying for a minimum of 12 hours, or until such time as hereinafter described curing process is applied. Mist spraying will not normally be required when the ambient air temperature is below 90 degrees F.
   3. Final Curing Process - Flatwork: Except as noted, use any of following:
      a. Water Curing: Concrete shall be kept wet by mechanical sprinklers or by any other approved method which will keep surfaces continuously wet.
      b. Saturated Burlap Curing: Finished surfaces shall be covered with a minimum of two layers of heavy burlap which shall be kept saturated during the curing period.
      c. Curing Compounds: Membrane curing compounds of chlorinated rubber or resin type conforming to ASTM C309 may be used only if specifically approved by Architect. Use of membrane curing compound will not be permitted on surfaces to be painted, or to receive ceramic tile, membrane water-proofing or hardeners and sealers. Membrane curing compound may be used in areas to receive resilient floor tile, provided it is wax-free, compatible with adhesive used and approved by adhesive manufacturer. Agitate curing compounds thoroughly by mechanical means continuously during use and spray or brush uniformly in accordance with manufacturer's recommendations. Apply immediately following final finishing operation. All curing compounds shall conform to State of California Air Resources Board VOC Regulations.
      d. Waterproof paper conforming to ASTM C 171, or opaque polyethylene film, may be used. Concrete shall be covered immediately following final finishing operation. Anchor paper or film securely and seal all edges in such a manner as to prevent moisture escaping from concrete.
   4. Curing Process - Formed Surfaces: Forms heated by sun shall be kept moist during curing period. If forms are to be removed during curing period, curing as described for flatwork shall be commenced immediately.

B. Refer to Drawings for areas of concrete slab not to receive curing compounds or hardening compounds. Where concrete floors are to receive heavy duty coatings, waterproof coatings and the like, verify with coating installer the type of finish required for specified coating.

C. Protection: Contractor shall be responsible for protection of finished concrete against injury by rain, cold, vibration, animal tracks, marking by visitors, vandalism, etc.

D. Provide additional curing agents or compounds, not necessarily listed herein, but as recommended and or required for use with shake type hardeners or other special coatings and coverings by their manufacturers for a complete and proper installation.

3.3 FINISHES

A. Formed Surfaces:
   1. Rough Form Finish: Surfaces shall be reasonably true to line and plane with no specified requirements for selected facing materials. Tie holes and defects shall be patched and fins exceeding 1/4 inch in height shall be rubbed down with wooden blocks. Fins and other rough spots at surfaces to receive membrane waterproofing shall be completely removed and the surfaces rubbed smooth. Otherwise, surfaces shall be left with the texture imparted by forms.
      a. Rough finish shall be used for the following areas:
         1) Below grade and unexposed surfaces.
   2.. Smooth Plywood Form Finish: Finish shall be true to line and plane. Tie holes and defects shall have been patched and ground with surface fins removed. Arrangement of plywood sheets shall be orderly, symmetrical, as large as practical and free of torn grain or worn edges. Surface concrete shall be treated with 1 part muriatic acid, in three parts water solution, followed immediately by a thorough rinsing with clear water. Surfaces which are glazed, have efflorescence, or traces of form oil, curing compounds or parting compounds shall be cleaned or treated to match other formed surfaces, except as otherwise indicated or specified.
      a. Smooth Plywood Form Finish shall be used for the following areas:
         1) All surfaces above grade unless otherwise specified.
         2) At Contractor's option, may also be used in lieu of rough form finish.
   3. Smooth Plastic Liner Finish: Surface shall be smooth, concrete free of honeycombing, air pockets larger than 1/8 inch in diameter, and fins.
      a. This finish shall be used only where indicated on the Drawings.

B. Flatwork:
   1. Unless otherwise indicated or specified, flatwork shall have an integral monolithic finish.
   2. Integral Monolithic Finish: Apply as soon as freshly poured concrete slabs will bear weight of workers. Pour slabs full thickness to finish floor elevations indicated. At proper time, tamp surface repeatedly with a wire mesh or grid tamper in a manner to force aggregate down below surface and to bring sufficient mortar to surface to provide for a smooth coating of cement mortar over entire surface. Allow surface mortar to partially set, then float with wooden floats and finish with one of following, as required.
      a. Broom Finish: Steel trowel surface to a smooth dense surface free of lines, tool marks, cat faces and other imperfections. After troweling, and before final set, give surface a broom finish, brushing in direction noted on Drawings, or as directed. A slip-resistant broom finish shall be used typically on exterior flatwork except as otherwise indicated or specified and shall be "medium" texture as approved by Architect.
      b. Smooth Steel Trowel Finish: Apply 2 steel trowelings to obtain hard, smooth surface. All lips, irregularities, uneven levels, etc. shall be worked out before last troweling. All interior flatwork shall have a smooth steel trowel finish unless specified otherwise.
   3. Tolerances:
      a. For tolerances not indicated, refer to ACI 117.
      b. Slabs on grade – Comply with F_F & F_L as specified by Architect, or at a minimum shall be sufficiently even to contact a 10' long straightedge with a tolerance of 1/8 inch.
      c. Concrete over metal deck – Refer to Section 05 30 00 for minimum requirements.
      d. Elevated slabs – Comply with Architectural requirements.
      e. Finished surfaces of exterior integral finished flatwork shall not vary more than 1/4 inch from a 10' long straightedge, except at grade changes.

C. Sacked Surfaces: Exposed surfaces that are unacceptable in appearance to the Architect shall be sacked.
   1. Prepare concrete surfaces in accordance with the referenced standards. Remove any form release materials by stoning by hand, power grinding or other method approved by the Architect.
   2. Prepare concrete surfaces to receive sack finishing with a light sand blasting.
   3. For best results, grout application and rubbing should be performed when areas to be treated are shaded and during cool, damp weather. When work is to be performed in hot and dry weather, a fog spray should be available for continuous use.
   4. Prepare grout samples for matching of concrete surfaces for approval by the Architect. These shall be made in the following proportions of gray cement to white cement to sand: 1:1:2, 1:2:3, and 2:1:3, etc. until the correct matching color is obtained on the test areas. Sand should be fine enough to pass the Number 30 sieve. Mixes should be made to a good workable consistency in a clean container and the mix with the best color chosen, or modified if needed.
   5. Provide sufficient qualities of sand and cement from the same source for the complete work at the job site.
   6. Mixing and Application:
      a. Mixing of grout on the job should be timed for it to be used up within 1 to 1-1/2 hours.
      b. Let the grout stand 20 to 30 minutes after mixing, and then remixed before applying.
      c. Soak the concrete surface thoroughly with water at least 15 minutes before applying grout and again just before application so that the surface is adequately wet during the operation.
      d. Apply grout with plasterer's trowel or sponge rubber float in sweeping strokes from the bottom up. Brush or spray gun applications may be used when approved by the Architect.
      e. Work in freshly applied grout vigorously with a sponge rubber float, then let sit until some of its plasticity is gone but not until it loses its damp appearance. At this point it shall be rubbed with clean, dry burlap to remove the excess grout, leaving no visible film on the surface but filling all air holes.
      f. Keep the surface wet for a day after grouting and sack rubbing are completed.
   7. Alternate methods of application and materials shall be subject to the approval of the Architect.

3.4 PATCHING

A. Formed Surfaces:
   1. Promptly upon removal of contact forms and after concrete surfaces have been inspected, form ties shall be removed and all necessary patching and pointing shall be expertly done.
   2. Honeycombed areas shall be removed down to sound concrete, coated with a bonding grout or approved compound and patched using a low shrinkage high bond mortar. Patched areas shall be cured by being kept damp for at least 5 days.
   3. Tie holes shall be cleaned, dampened and filled solid with patching mortar or cement plugs of an approved variety.

B. Slabs on Grade: After entire slab is finished, shrinkage cracks that may appear shall be patched as follows:
   1. Where slab is not exposed or where appearance is not important, cracks larger than 1/32 inch wide shall be filled with cement grout and struck off level with surface.
   2. Where slab is exposed and appearance is important, unsightly cracks shall be repaired in a manner satisfactory in appearance to Architect. If this cannot be accomplished, concrete shall be considered defective.

3.5 DEFECTIVE CONCRETE

A. Defective concrete shall mean any of the following:
   1. Concrete not meeting 100 percent of the specified 28 day compressive strength.
   2. Concrete exhibiting rock pockets, voids, spalls, streaks, cracks, exposed reinforcing to extent that strength, durability, or appearance is adversely affected.
   3. Concrete significantly out of place, line, or level.
   4. Concrete not containing the required embedded items.

B. Upon determination that concrete strength is defective:
   1. Should cylinder tests fall below minimum strength specified, concrete mix for remainder of work shall be adjusted to produce required strength. Core samples shall be taken and tested from cast-in-place concrete where cylinders and samples indicate inferior concrete with less than minimum specified strength.
      a. Cores of hardened concrete shall be taken and tested in accordance with ASTM C 42 and C 39. Number and location of such cores shall be subject to the approval of Architect.
      b. Cost of core sampling and testing will be paid for by the Contractor.
      c. “85 percent” reduction in ACI 318 Section 26.12.4 will not justify low cylinder tests.

C. Upon determining that concrete surface is defective, Contractor may restore concrete to acceptable condition by cutting, chipping, pointing, patching, grinding, if this can be done without significantly altering strength of structure. Permission to patch defective areas will not be considered a waiver of the right to require removal if patching does not, in the opinion of the Architect, satisfactorily restore quality and appearance.

D. If core tests indicate that concrete is below the strength specified, or if patching does not restore concrete to specified quality and appearance, the concrete shall be deemed defective, and shall be removed and replaced without additional cost to the Owner.

E. No repair work shall begin until procedure has been reviewed by the Architect and Structural Engineer.

3.6 SURFACE HARDENER AND SEALER

A. Seal all interior exposed flatwork with clear sealer, except surfaces receiving ceramic tile, quarry tile, poured flooring or other special finishes specified, or as scheduled on the Drawings.
   1. Apply sealer in 2 or 3 coats, in accordance with manufacturer's directions, using the maximum quantity recommended.
      a. Concrete floors must be thoroughly cured for a minimum of 30 days and completely dry before treatment.
      b. Surfaces to be treated must be clean, free of membrane curing compounds, dust, oil, grease and other foreign matter.
      c. Upon completion, concrete surfaces shall be clean and without discoloration or traces of excess hardener left on the surface.

B. Apply sprayable hardener/sealer at locations as scheduled or as indicated on the Drawings. Apply in accordance with the manufacturer's favorably reviewed application instructions and recommendations.

3.7 GROUTING

A. Prepare and place grout materials at locations as indicated on the Drawings in accordance with the manufacturer's recommendations and installation instructions.

B. Pack grout materials solidly between bearing surfaces and bases or plates as indicated and to ensure no voids.

3.8 ADJUSTING AND CLEANING

A. Remove all debris, excess materials, tools and equipment resulting from or used in this operation at completion of this work.

END OF SECTION 03 30 00

04 05 00
MORTAR AND GROUT
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The requirements of Division 1 apply to all Work of this Section.

1.2 SCOPE

A. Provide all materials, labor and accessories as required and specified for complete mortar and grout installation in masonry walls.

1.3 RELATED WORK (See also Table of Contents):

A. Reinforcing Steel: Section 03 21 00.

B. Cast-In-Place Concrete: Section 03 30 00.

C. Concrete Unit Masonry: Section 04 22 00.

1.4 QUALITY ASSURANCE

A. Standards and References: (Latest Edition unless otherwise noted)
   1. 2019 California Building Code (CBC)
   2. TMS 402-16 – Building Code Requirements for Masonry Construction
   3. TMS 602-16 – Specification for Masonry Structures
   4. ASTM C144 – Aggregate for Masonry Mortar.
   5. ASTM C150 – Portland Cement.
   6. ASTM C207 – Hydrated Lime for Masonry Purposes
   7. ASTM C270 – Standard Specification for Mortar for Unit Masonry
   8. ASTM C404 – Aggregates for Grout
   9. ASTM C476 – Standard Specification for Grout for Masonry
   10. ASTM C1019 – Method of Sampling and Testing Grout

B. Tests and Inspections:
   1. A testing program is required prior to start of construction. Testing program to be done in Compliance with CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
   2. All tests and inspections herein are to be performed by an independent testing laboratory approved by the building official.
   3. Sample panel construction: For masonry governed by Level 2 or 3 Quality Assurance, construct sample panels of masonry walls per TMS 602 Article 1.6 D. The specifier has the option of permitting a segment of the masonry construction to serve as a sample panel or requiring a separate stand-alone panel.
   4. Mortar and Grout Tests: If mortar and grout tests are indicated as required on the Structural drawings, at the beginning of Masonry Work, at least 1 test sample each of mortar and grout shall be taken on 3 successive working days, then once per week with at least one sample taken for each 5000 square feet of wall area, or fraction thereof.
      a. Test specimens shall be made in accordance with ASTM C1019 for grout and ASTM C780 for mortar.
      b. Test specimens shall be continuously stored in moist air until tested.
   5. If masonry placement and grouting inspection is indicated as required on the Structural Drawings, a special inspector shall be employed per CBC Section 1704 during the

placement of all units, placement of all reinforcing steel, during all grouting operations and during taking of all test specimens.

C. Submittals:
   1. Mix design for mortar and grout shall be submitted for review.
   2. Supplier's certificates indicating materials comply with the specifications below. They shall include but are not necessarily limited to:
      a. Aggregates
      b. Cement
      c. Admixtures

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement: ASTM C150, Type I or II, low alkali; natural gray.

B. Hydrated Lime: ASTM C207, Type S.

C. Quicklime: ASTM C5.

D. Lime Putty: Made from hydrated lime or quicklime.
   1. If made from quicklime, other than processed pulverized quicklime, slake lime and then screen through a No. 16 mesh sieve. Before using, store and protect slaked and screened lime putty for not less than 10 days.
   2. Processed pulverized quicklime shall be slaked for not less than 48 hours, and shall be cool when used.
   3. Lime putty prepared from hydrated lime may be used immediately after mixing.
   4. Lime putty prepared from quicklime or pulverized quicklime shall have a plasticity figure, after slaking and screening, of not less than 200, and shall weigh not less than 80 lbs. per cubic foot and not more than 90 lbs. per cubic foot. Lime putty prepared from hydrated lime shall conform to ASTM C207, Type S.

E. Aggregate:
   1. For Mortar: ASTM C144.
   2. For Grout: ASTM C404.

F. Admixture: "Sika Grout Aid", "BASF MasterPel 240MA"

G. Water: Suitable for domestic consumption.

2.2 MORTAR

A. Mortar shall be Cement-lime, Type S and shall conform to CBC Section 2103.2.

B. Mortar shall be made with admixtures that are proportioned, added and mixed in strict accordance with manufacturer's directions. Calcium Chloride cannot be used in mortar mixes.

C. Refer to architectural drawings for mortar color requirements.

2.3 GROUT

A. Grout shall have a 28-day compressive strength of 2500 psi or f'm, whichever is greater. Grout shall conform to CBC Section 2103.3

B. Fine Grout or Coarse Grout: The contractor is to determine the proper application of Fine Grout or Coarse Grout based on the grout pour height used and the clear grout space width for multi-wythe construction or clear grout space dimensions for hollow units in accordance with TMS 402 Table 3.2.1.

C. Add grout admixture in accordance with the manufacturer's recommendations. Calcium Chloride cannot be used in grout mixes.

PART 3 **-** EXECUTION

3.1 MIXING MORTAR AND GROUT

A. Mix mortar and grout in accordance with TMS 602 Articles 2.6A and 2.6B.

B. Accurately measure materials in suitably calibrated devices; shovel measurements are not acceptable.

C. Place sand, cement and water in mixer in that order and mix for at least 2 minutes; then add lime putty and continue mixing as long as necessary to secure a uniform mass, but in no case less than 10 minutes.

D. Use mixers of at least 1 sack capacity; batches requiring fractional sacks will not be permitted unless cement is weighed for each batch.

3.2 GROUTING PROCEDURES

A. Specified under Sections 04 22 00.

3.3 RETEMPERING

A. When necessary to retemper mortar, add water and remix; retempering by dashing water over mortar will not be permitted.

B. Any mortar which is unused within 2-1/2 hours after initial mixing and any mortar that has begun to set shall not be used.

3.4 DEFECTIVE MORTAR OR GROUT

A. Should the strength of mortar or grout fall below that specified, remainder of Work shall be adjusted to reach required strength. Work in place representing inferior grout and mortar and indicating a strength less than the minimum specified shall be tested by taking and testing core samples. Number and location of cores shall be determined by Structural Engineer.

B. Should compression tests of cores fail to meet required strength, masonry shall be deemed to be defective and shall be removed and replaced at no cost to Owner.

C. Costs relative to taking and testing of core samples shall be paid by Owner and will be deducted from Contract Amount. Cost of patching core holes shall be borne by Contractor.

END OF SECTION 04 05 00

04 22 00
CONCRETE UNIT MASONRY
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The requirements of Division 1 apply to all Work of this Section.

1.2 SCOPE

A. Furnish and install all concrete unit masonry, reinforcement, and all required accessories and materials as shown on the Drawings and specified here.
   1. Cooperate with other trades for embedded items, furnished under those sections and installed here.
   2. Supervise setting of dowels for masonry furnished and installed under Section 03 21 00, Reinforcing Steel.

1.3 RELATED WORK (See also Table of Contents):

A. Reinforcing Steel: Section 03 21 00.

B. Cast-in-Place Concrete: Section 03 30 00.

C. Mortar and Grout: Section 04 05 00.

D. Structural Steel: Section 05 12 00.

E. Miscellaneous Metal: Section 05 50 00.

1.4 QUALITY ASSURANCE

A. Allowable Tolerances: Place masonry in accordance with section 3.3B.

B. Standards and References: (Latest Edition unless otherwise noted):
   1. 2019 California Building Code (CBC)
   2. TMS 402-16 – Building Code Requirements for Masonry Construction
   3. TMS 602-16 – Specification for Masonry Structures
   4. ASTM C90 – Specification for Loadbearing Concrete Masonry Units
   5. ASTM C140 – Standard Test Methods for Sampling and Testing of Concrete Masonry Units and Related Units
   6. ASTM C426 – Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units

C. Submittals: Refer to Section 01 33 00 for submitting the following items:
   1. Suppliers certificate indicating units comply with material standards indicated below:
   2. See Section 03 21 00 for reinforcing steel submittals.

D. Tests and Inspections:
   1. A testing program is required prior to start of construction. Testing program to be done in Compliance with CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
   2. All tests and inspections herein are to be performed by an independent testing laboratory approved by the Building Official.

3. Sample panel construction: For masonry governed by Level 2 or 3 Quality Assurance, construct sample panels of masonry walls per TMS 602 Article 1.6 D. The specifier has the option of permitting a segment of the masonry construction to serve as a sample panel or requiring a separate stand-alone panel.
4. If masonry tests are indicated as required on the structural drawings, three sample units will be tested during construction for each 5,000 square feet of wall area. Test also three sample units prior to construction.
   a. Units will be tested for compressive strength on both the net and gross area per ASTM C140.
   b. Units will be tested for linear drying shrinkage per ASTM C426.
5. If masonry placement and grouting inspection is indicated as required on the structural drawings, a special inspector shall be employed per CBC Section 1704 to inspect the placement of all units, placement of all reinforcing steel, during all grouting operations and during taking of all test specimens.
6. See Section 03 21 00 for reinforcing steel tests and inspections.

1.5 PRODUCT HANDLING

A. Scaffolding, runways and ladders required for work under this Section shall be provided by masonry contractor, and shall be heavy trades type substantially built and in compliance with State labor laws, safety codes and other regulatory agencies as applicable to this project.
B. Store masonry units off the ground in a dry location, covered and protected from absorbing moisture.
C. Store masonry accessories, including metal items, in such a way as to prevent corrosion or accumulation of dirt and oil.

PART 2 **-** PRODUCTS

2.1 MASONRY UNITS

A. Masonry units shall be hollow load bearing masonry units conforming to ASTM C90 and CBC Section 2103.1.
   1. Weight: Medium weight or Light weight.
   2. Maximum lineal shrinkage from saturated to oven dry condition of not more than 0.065 percent.
   3. Twenty-eight day compressive strength of 2500 psi.
   4. Moisture controlled units.

B. Unit Type
   1. 8" wide by 8" high x 16" long unless specified otherwise.

C. Provide bond beam units, open end units, lintel units and other special units as indicated. Use open end units at cells containing vertical reinforcement wherever possible.

2.2 MORTAR AND GROUT

A. Specified under Section 04 05 00.

2.3 ACCESSORY MATERIALS

A. Reinforcing Bars: ASTM A615, Grade 40 or 60, as indicated in Section 03 21 00, deformed bars. Where bars are to be welded, ASTM A706 Grade 60 bars shall be used.
   1. Tie Wire: Black annealed steel wire not lighter than 16 gauge.

B. Ladder-type Joint Reinforcing: ASTM A951. Ladder-type joint reinforcing shall be comprised of 9-gauge side rods and 9-gauge cross rods at 16" on center and shall conform to ASTM A951. Crossrods are to be butt welded to side rods. Ladder-type joint reinforcement shall be hot dip galvanized or stainless steel.
   1. Width: Fabricate joint reinforcement in units with widths a minimum of 2” less than nominal width of walls. Provide mortar coverage over joint reinforcement of not less than 5/8” on joint faces exposed to exterior and ½” elsewhere.

C. Provide spacers to firmly hold reinforcement in place.

D. Anchor Bolts: All anchor bolts cast in masonry shall be headed studs or headed bolts with cut threads conforming to ASTM F1554 Grade 36 or ASTM A307 or ASTM A36 - as indicated on drawings.

E. Expansion Anchors: All expansion bolts installed in masonry shall be Hilti Kwik Bolt 3 per ICC ESR-1385, Simpson Wedge-All per ICC ESR-1396 or Dewalt/Powers Power-Stud+ SD1 per ICC ESR-2966. See Structural Drawings for installation requirements, testing and special head requirements as applicable. Substitution of other brands or anchors shall proceed only after written approval from the Structural Engineer and the Building Official has been obtained.

F. Adhesive Anchors: All drill and epoxy threaded rods shall be ASTM F1554 Grade 36 or Grade 50, as indicated on drawings, and installed in masonry with Hilti HIT-HY 270 per ICC ESR-4143, Simpson SET-XP per UES ER-265 or Dewalt/Powers AC100+ Gold per ICC ESR-3200. See Structural Drawings for installation requirements, testing and special head requirements as applicable. Substitution of other brands or anchors shall proceed only after written approval from the Structural Engineer and the Building Official has been obtained.

G. Screw Anchors: All screw anchors installed in masonry shall be Hilti Kwik HUS-EZ per ICC ESR-3056, Simpson Titen HD per ICC ESR-1056 or Dewalt/Powers Screwbolt+ per ICC ESR-4042. See Structural Drawings for installation requirements, testing and special head requirements as applicable. Substitution of other brands or anchors shall proceed only after written approval from the Structural Engineer and the Building Official has been obtained.

H. Anchor Finish:
   1. Interior Exposure: All anchors, nuts and washers for use in interior environments free of potential moisture shall be manufactured from carbon steel and zinc coated.
   2. Exterior or Exposed Use: All anchors, nuts, and washers for use in exposed or potentially wet environments, or for attached of exterior cladding materials shall be galvanized or stainless steel. Galvanized anchors, nuts and washers shall conform to ASTM A 153. Stainless steel anchors shall be manufactured from 300 series stainless steel. and nuts and washers from 300 series or Type 18-8 stainless steel.

G. Non-Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D1056, Grade RE 41E1, capable of compression up to 35% of width and thickness indicated.

H. Premolded Control Joint Strips: Material as indicated below, designed to fit standard sash block and maintain lateral stability in masonry wall; size and configuration as indicated.
   1. Premolded PVC Control Joint Strips. Strips shall be polyvinyl chloride complying with ASTM D 2287, Type PVC 654-4 with a durometer hardness or 90.

2.4 JOINTS

A. All joints shall be 3/8” thick joints for concrete block. Tool exposed interior and exterior joints and concealed exterior joints to produce a dense slightly concave surface that is well bonded to unit at edges. Tool joints behind room base, switches, and outlet plates to produce a smooth dense joint flush with the face of adjacent masonry units, where occurring on the job. Cut joints flush on concealed interior surfaces and surfaces to be plastered.

2.5 SEALER

A. Contractor shall provide and install minimum two coats, BASF MasterProtect H107 masonry sealer, or equal, at all CMU walls. BASF MasterProtect H107 product, or equal, shall meet all state vapor requirements. Sealer shall be clear and non-gloss product.

PART 3 **-** EXECUTION

3.1 EXAMINATION

A. Examine areas to receive masonry and verify following:
   1. That foundation surface is level to permit bed joint with range of 1/4 minimum to 3/4 inch maximum for partially grouted or 1-1/4” maximum for fully grouted.
   2. That edge is true to line to permit projection of masonry to less than 1/4-inch.
   3. That projecting dowels are free from loose scale, dirt, concrete, or other bond-inhibiting substances and properly spaced and located.

B. Do not begin work before unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean concrete surfaces to receive masonry. Remove laitance or other foreign material lodged in surfaces by sandblasting or other means as required. Joints between concrete and masonry shall be considered construction joints. See Concrete specifications.

B. Ensure masonry units are clean and free from dust, dirt, or other foreign materials before laying. Do not use damaged masonry units, damaged components of structure, or damaged packaged materials.

C. Establish lines, levels, and coursing. Protect from disturbances.

D. Provide temporary bracing during erection of masonry work. Maintain in place until masonry has set to provide permanent bracing.

3.3 COURSING

A. Erect masonry in accordance with CBC Section 2104.

B. Place masonry to lines and levels indicated to the following tolerances:
   1. Variation from Unit to Adjacent Unit: 1/32-inch max.
   2. Variation from Plane of Wall: 1/4-inch in 10 feet.
   3. Variation from Plumb: 1/4-inch in 10 feet; ½-inch maximum.
   4. Variation from Level Coursing: 1/8-inch in 3 feet; 1/4-inch in 10 feet; ½-inch maximum.
   5. Variation of Joint Thickness: 1/8-inch between masonry courses.

C. Bond: Unless noted otherwise in Drawings, lay concrete masonry units in running bond with vertical joints located over score of unit in course below (and vice versa).

D. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.

E. Preserve the vertical continuity of cells in concrete unit masonry per Article 3.3E of TMS 602.

3.4 PLACING AND BONDING

A. Do not install cracked, broken or chipped masonry units.

B. Lay only dry concrete masonry units. Do not wet concrete masonry prior to laying up units unless written permission is obtained from the Engineer.

C. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
   1. Block Cap: Lay with full mortar coverage on horizontal and vertical joints.
   2. Install grout cap where and as indicated.

D. Fully bond intersections and external and internal corners.

E. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.

F. Remove excess mortar.

G. Perform job-site cutting with proper tools to provide straight unchipped edges. Take care to prevent breaking masonry unit corners or edges. Install cut units with cut surfaces and, where possible, cut edges concealed.

H. Step back unfinished work for joining with new work. Do not use toothing.

I. Provide cleanouts as indicated in “grouting” below.

J. Matching Existing Masonry Work: Match coursing, bonding, color and texture of new masonry work with existing work wherever possible.

3.5 JOINTS

A. Horizontal and vertical joints at masonry units shall be 3/8-inch wide and as follows:
   1. Point joint tight in unpurged masonry below ground.
   2. All end joints shall be fully filled with mortar and joints squeezed in bed joints shall be held back approximately ½-inch from cell to provide positive bond with grout.
   3. Joints shall be struck flush at all areas to receive plaster, stucco and any other finish material other than paint.

3.6 MASONRY REINFORCEMENT

A. Place reinforcement in accordance with Article 3.4 B of TMS 602.

B. Reinforcing steel shall not be bent or straightened in a manner that will damage the material. Bars with kinks or bends not shown on the plans shall not be used. Heating of bars for bending is not permitted.
   1. Bars shall conform accurately to the sizes, shapes, lines and dimensions shown on drawings and with hooks and beds made as detailed. Bars shall be placed as indicated on the drawings and centered on grout space.

2. At the time grout is place around it, reinforcing steel shall be clean of mill scale or other coatings that will destroy or reduce bond.
3. All vertical reinforcing steel shall be installed in one piece whenever practical, full height of wall, and braced throughout its height in a manner that will retain the steel in proper position and provide the proper clearance.

C. Foundation dowels that interfere with unit webs are permitted to be bent to a maximum of 1 inch horizontally for every 6 in of vertical height.

D. Reinforcing steel shall be secured to all foundation dowels and held in place at spacing not to exceed 192 bar diameters.

3.7 GROUTING

A. General Requirements:
1. All cells shall be grouted solid.
2. Use of grout lifts above or below 5 feet 4 inches at Contractor's option.
3. Use grout pump, hopper or bucket to place grout.
4. Place grout in final position within 1-1/2 hours after introduction of mixing water.
5. Stop grout approximately 1½ inches below top of last course; except at top course bring grout to top of wall. Do not form grout keys within beams.

B. Grout pours 5 feet 4 inches or less:
1. Do not lay units higher than 64 inches before grouting.
2. If mortar has been allowed to set prior to grouting, remove all fins protruding more than ½-inch into grout space.
3. Consolidate each lift with mechanical vibration twice per Article 3.5 E of TMS 602. Once while placing grout and once more after initial absorption of water but before set.

C. Grout pours greater than 5 feet 4 inches:
1. Layup walls, subject to maximum height limitations of Table 6 under Article 3.5 of TMS 602.
2. Provide clean out holes at the bottom of every pour in cells containing vertical reinforcement. Construct clean out courses with open-bottom bond beam units inverted to permit cleaning of all cells by flushing. Cleanouts shall be not less than 3x4inch openings cut from one face shell. Do not plug clean out holes until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected.
3. Clean mortar droppings from the bottom of the grout space and from reinforcing steel. Remove mortar fins protruding more than ½-inch into the grout space by dislodging the projections with a rod or stick as the work progresses or by washing the grout space at least twice a day during erection using a high-pressure stream of water.
4. Do not place grout in hollow unit masonry until mortar joints have set for at least 24 hours and clean out plugs have cured 24 hours.
5. Place grout in lifts not to exceed 12 feet 8 inches in height, with a waiting period between lifts, dependent on weather and absorption rate of the masonry, in order to place the succeeding lift after the preceding lift becomes plastic but prior to initial set. The first lift shall be consolidated using mechanical vibrators. After the required waiting period, place the second lift and consolidate with the vibrator, reconsolidating the lift below to a depth of 12 to 18 inches. Repeat the waiting, placing and consolidating process until the top of the grout pour is reached. Reconsolidate the top lift after the required waiting period. The high-lift grouting of any section of wall between lateral flow barriers shall be completed to the top of a pour in one working day unless a new series of clean out holes is established and the resulting horizontal construction joint cleaned.

3.8 WEATHER PROVISIONS FOR CONSTRUCTION

A. Cold Weather Construction to be in accordance with Article 1.8 C of TMS 602.

B. Hot Weather Construction to be in accordance with Article 1.8 D of TMS 602.

3.9 EXPANSION AND CONTROL JOINTS

A. See drawings for type and location of expansion and/or control joints.

B. Where control joints are not indicated on the drawings the Contractor shall submit a proposed control joint layout for Architect and Engineer approval. General guidelines for control joint locations are as follows:
   1. At major changes in wall height.
   2. At changes in wall thicknesses.
   3. At corresponding control joints in foundations, floors, or roof construction.
   4. Near wall intersections.
   5. At column centerlines.

C. Maximum Spacing: Maximum control joint spacing in concrete masonry construction shall be such that the ratio of wall length to height shall not exceed 1.5 with a maximum spacing of 25 feet.

3.10 BOND BEAMS

A. Bond beams shall be located where shown and detailed on the drawings, and shall be reinforced as indicated and as herein after specified.

3.11 BUILT-IN WORK

A. Miscellaneous Embedded Items: All items indicated to be embedded in masonry shall be carefully located and anchored to prevent movement during grouting operations. Solidly grout spaces around built-in items. Consult other trades in advance and make provisions for installation of their work to avoid cutting and patching. Install chases minimum of one full masonry unit length for jambs.

3.12 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.13 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damage, or if units do not match adjoining units.

B. Pointing: During the tooling of joints, enlarge any voids or holes and completely fill with mortar.

C. Dry brush masonry surface after mortar has set, at each day's work and after final pointing.

D. Leave work and surrounding surface clean and free of mortar spots and droppings.

E. Cleaning: Upon completion of masonry installation, repair all holes. Defective joints shall be cut out and rejointed. Exposed masonry surfaces shall be cleaned free of mortar, green stain and efflorescence.

3.14 SEALER

A. Contractor shall install sealer as directed by the manufacturer. Coverage and installation rates shall be as per manufacturer's recommendations. Install sealer in minimum two coats at the rates required.

3.15 DEFECTIVE MASONRY

A. Materials or workmanship not conforming to appearance or strength specified, will be deemed defective and shall be removed and replaced at no cost to Owner.

B. Defective mortar and grout, as defined under Section 04 05 00; "Mortar and Grout" shall constitute defective masonry.

END OF SECTION 04 22 00

05 12 00
STRUCTURAL STEEL
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all Work of this Section.

1.2 SCOPE

A. Furnish and install all structural steel as shown and specified including, but not necessarily limited to the following:
   1. Prime coat painting and touch up.
   2. All cast-in-place anchor bolts, nuts, plates, etc.
   3. 10 gauge steel or 3/4 inch plywood templates for column anchor bolts.

1.3 RELATED WORK (See also Table of Contents)

A. Metal Decking: Section 05 30 00.

B. Metal Fabrications: Section 05 50 00.

C. Cast-In-Place Concrete: Section 03 30 00.

D. Welding of Moment Resisting Frames: Section 05 12 24.

E. Metal Stairs: Section 05 50 10.

1.4 QUALITY ASSURANCE

A. General:
   1. Comply with the referenced ASTM standards for materials.
   2. Perform all welding only with AWS certified welders.
   3. Verification of accuracy:
      a. Engage and pay for a registered civil engineer or licensed land surveyor to check the alignment, plumbness, elevation, and overall accuracy of the erected framing at appropriate stages during construction and at completion of erection. Prior to erection, a survey shall be made of the as-built locations of all anchor rods and other embedded items associated with the attachment of structural steel. The party providing the survey shall submit written verification that the entire installation is in accordance with the contract documents and meets the allowable erection tolerances as set forth in the AISC "Code of Standard Practice for Steel Buildings and Bridges".
      b. Columns shall be verified at each lift. Column shim details and procedures shall be submitted for review.
   4. Paint:
      a. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use thinners approved by paint manufacturer, and use within recommend limits.
      b. Coordination of Work: Review other Sections in which prime paints are to be provided to ensure compatibility of coatings system for various substrates. Upon request, furnish information or characteristics of finish materials to be used.
      c. Requirements of Regulatory Agencies: Comply with applicable rules and regulations of governing agencies for air quality control.

B. Except where other requirements are specified, comply with the following standards (latest edition unless noted otherwise)

1. AISC 360 "Specification for Structural Steel Buildings".
2. AISC 303 "Code of Standard Practice for Steel Buildings and Bridges".
3. AISC 341 “Seismic Provisions for Structural Steel Buildings”
4. AISC 358 “Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications”

5. RCSC "Specifications for Structural Joints Using High Strength Bolts".
6. AISC 303 Section 10, Architecturally Exposed Structural Steel, Code of Standard Practice for Steel Buildings and Bridges
7. AWS D1.1 "Structural Welding Code - Steel" – latest edition
8. AWS D1.8 “Structural Welding Code – Seismic Supplement” – latest edition
9. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
10. SSPC-Vis 1 Pictorial Surface Preparation Standards for Painting Steel Structures
11. SSPC-SP2 Hand Tool Cleaning
12. SSPC-SP3 Power Tool Cleaning
13. SSPC-SP6 Commercial Blast Cleaning
14. SSPC-PA2 Measurement of Dry Paint Thickness with Magnetic Gauges
15. California Building Code (CBC) – latest edition

C. Submittals: (Submit under provisions of Section 01 33 00)
   1. Product Data: Include laboratory test reports and other data to show compliance with specifications (include specified standards). Include certified copies of mill reports covering chemical and physical properties of each type of structural steel.
   2. Shop Drawings:
      a. Shop drawings shall include complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
      b. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
      c. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.
      d. Dimensions required to locate structural steel for manufactured items such as mechanical equipment, electrical equipment, dock levelers, etc., shall be coordinated and provided by the General Contractor. General Contractor shall also coordinate and provide dimensions to locate structural steel for window washing supports such as davits, tie-backs, etc.
   3. Procedures:
      a. Provide weld procedures for both prequalified welds and special welds to be submitted to the Owner's Testing Laboratory and the Architect.
      b. Provide installation procedure and inspection for direct tension indicator washers detailed in supplemental specifications provided by the manufacturer for approval.
      c. Procedures shall be submitted for both shop and field welds.

D. Tests and Inspections:
   1. Provide special inspections and testing as described in the “Statement of Structural Special Inspections and Testing” within the structural drawings and as required by this section.
   2. Testing Laboratory:
      a. All materials, work, methods and equipment shall be subject to inspection at the mill, fabricating plant and at the building site. Material or workmanship not complying fully with the Contract Documents will not be accepted. The Contractor shall give the Testing Laboratory reasonable notice when ready for inspection and shall supply samples and test pieces and all facilities for inspection without extra charge. The

Owner will assume the expense of making the tests and inspection except as otherwise specified in Division 1.

3. Cost of Testing and Inspection: Costs of testing and inspection of structural steel, except as specified hereunder and in Division 1, will be paid for by the Owner.
   a. All transportation costs and per diem living costs for inspection at fabricators' plant further than 75 miles from the job site will be back-charged to the Contractor.
   b. It is assumed that all fabrication will take place in one shop location only. All additional inspection costs will be back-charged to the Contractor.
   c. All mill tests and costs of re-test of plain materials shall be at the expense of the Contractor.
   d. Costs of tests required due to Contractor's failure to provide steel identifiable in accordance with the indicated ASTM designation shall be at the expense of the Contractor.
4. Structural Steel Testing and Inspection:
   a. Structural Steel: If structural steel tests are indicated as required on the structural drawings, one tension and one bend test shall be made for each size of structural shape, plate and for each tube and pipe size. Tests to be made in accordance with requirements of appropriate ASTM designations.
   b. If structural steel tests are not indicated as required on the structural drawings, then for shapes, plates, bars, pipe and tubing, manufacturer's certified mill test reports and analysis for each heat will be acceptable for steel identifiable in accordance with indicated ASTM designation. Mill test reports shall indicate the physical and chemical properties of all structural steel used. Correlate individual heat numbers with each specified structural section.
   c. Unidentifiable Steel:
      1) For Fy less than or equal to 36.0 ksi : Provide one tension and elongation test and one bend for each 5 tons or fraction thereof for each size.
      2) For Fy greater than 36.0 ksi : Provide one tension and elongation test and one bend or flattening for each piece.
   d. Costs of retests and additional testing required by the use of unidentifiable steels shall be the Contractor's responsibility. Additional costs of testing incurred by the Owner shall be deducted from the Contract Final Payment.
5. Expansion Anchors: Load test as indicated on drawings.
6. Welding Inspection:
   a. For Moment Resisting Frame Welding inspection and testing requirements, see specification Section 05 12 24 - Welding of Moment Resisting Frames.
   b. If shop or field welding inspection is indicated on the structural drawings or required by the applicable referenced standards, shop and field welded operations shall be inspected in accordance with AISC 360 by a qualified welding inspector employed by the Testing Laboratory. Such inspector will be a person trained and thoroughly experienced in inspection of welds. The inspector's ability to distinguish between sound and unsound welding will be reliably established
   c. The welding inspector will make a systematic record of all welds. This record shall include:
      1) Identification marks of welders.
      2) List of defective welds.
      3) Manner of correction of defects.
   d. The welding inspector will check the material, equipment and procedure, as well as the welds. He will also check the ability of the welder. He will furnish the Architect with a report, duly verified by him that the welding which is required to be inspected is proper, and has been done in conformity with the Contract Documents, and that he has used all means to determine the quality of the welds.

e. All full penetration groove welds will be subject to ultrasonic testing, as per AWS D1.1. All defective welds shall be repaired and retested with ultrasonic equipment at the Contractor's expense.
f. Column Flanges: An area extending 6 inches above and below point where girder flanges are attached will be inspected. Column flange edges will be inspected visually and entire area ultrasonically for lamination, plate discontinuities, and non-metallic inclusions.
g. When ultrasonic indications arising from the weld root can be interpreted as either a weld defect or the backing strip itself, the Engineer will be notified. The Engineer may require the removal of backing strip. The backing strip will be removed at the expense of the Contractor, and if no root defect is visible the weld will be retested. If no defect is indicated on this retest, and no significant amount of base and weld metal have been removed, no further repair of welding is necessary. If a defect is indicated, it will be repaired and retested at Contractor's expense.
h. The ultrasonic instrumentation will be calibrated by the technician to evaluate the quality of the welds in accordance with AWS D1.1.
i. Other methods of inspection, for example, X-Ray, gamma ray, magnetic particle, or dye penetrant, may be used on welds if felt necessary by the inspection laboratory, and with the approval of the Engineer.
j. Base metal thicker than 1-1/2 inches, when subjected to through thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such weld before and after joint completion.
k. End-welded studs shall be sampled, tested, and inspected per the requirements of AWS D1.1.
l. At the discretion of the owner's testing agency, the ultrasonic testing frequency may be reduced but may not be less than the following:
   1) Initially, all welds requiring ultrasonic testing will be tested at the rate of 100 percent in order to establish the qualifications of each individual welder. If the reject rate is demonstrated to be less than 5 percent of the welds tested for each welder, then the frequency of testing for that welder may be reduced to 25 percent. If the reject rate increases to 5 percent or more, 100 percent testing will be re-established until the rate is reduced to less than 5 percent. The percentage of rejects will be calculated for each welder independently.
   2) A sampling of a least 40 completed welds will be made for such reduction evaluation. Reject rate is defined as the number of welds containing rejectable defects divided by the number of welds completed. For evaluating the reject rate of continuous welds over 3 ft in length where the effective throat is 1” or less, each 12 inch increment or fraction thereof shall be considered as one weld. For evaluating the reject rate of continuous welds over 3 ft in length where the effective throat is greater than 1”, each 6 inch of length or fraction thereof shall be considered one weld.

7. High Strength Bolting Tests and Inspection:
   a. Furnish certified test reports for each lot of bolts in accordance with of ASTM A325 and A490. Install bolts under the supervision of a qualified inspector in accordance with, Research Council "Specifications for Structural Joints using ASTM A325 or A490 Bolts".
   b. If high strength bolting inspection is indicated on the structural drawings or required by the applicable referenced standards, the testing laboratory shall provide inspection in accordance with AISC 360.
   c. While the work is in progress, the Inspector shall determine that the requirements of this Specification are met in the work. The Inspector shall observe the calibration procedures and shall monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is properly used to tighten all bolts.

1) In addition to the requirement of the foregoing paragraph, for all connections specified to be slip critical (SC), the Inspector shall assure that the specified procedure was followed to achieve the pretension specified in the AISC. The pretension shall be verified by the inspector for these bolts.
2) Bolts in connections identified as not being slip-critical nor subject to direct tension need not be inspected for bolt tension other than to ensure that the piles of the connected elements have been brought into snug contact.

1.5 PRODUCT HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

B. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 SEQUENCING/SCHEDULING

A. Cooperate and coordinate this work with other trades for anchor bolts, and other required inserts, templates, etc. Align this work prior to installation of other materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel: Except where indicated on drawings.
   1. W shapes: ASTM A572-50 or ASTM A992-50 unless indicated otherwise on drawings.
   2. Channels and other rolled shapes: ASTM A36 unless indicated otherwise on drawings.
   3. Angles, plates and bars: ASTM A36 unless indicated otherwise on drawings.

B. AISC group 4 and 5 shapes and plates greater than 2 inches thick: ASTM A36 and/or ASTM A572 Grade 50 with supplementary requirements S91 Fine Austenitic Grain Size and S5 Charpy V-Notch Impact Test. For location of Charpy V-Notch test, see ASTM A6 Supplementary Requirement S30. Charpy V-Notch test shall be per ASTM A673, frequency P and shall meet a minimum average value of 20 ft-lbs absorbed energy at 70^{o} F.

C. Steel Tubing: ASTM A500, Grade C or ASTM A1085 Grade A.

D. Steel Pipe: ASTM A53, Type E or S, Grade B.

E. Anchor Bolts: All anchor bolts cast in concrete or masonry shall be headed bolts with cut threads conforming to ASTM F1554 grade 36, 55 (weldable per S1 Supplementary Requirements), or 105 as indicated on drawings.

F. Machine Bolts: ASTM A307.

G. High Strength Bolts, Nuts and Washers: Install in accordance with requirements for A325 and A490 slip critical and snug tight conditions as indicated on drawings. Install high strength bolts with snug tight type connections with threads included in shear plane except as otherwise noted. Install hardened washers in conformance with AISC Specifications.
   1. Bolt Specifications: Bolts shall conform to the requirements of the current edition of the Specifications of the American Society for Testing and Materials for High-Strength Bolts

for Structural Steel Joints, ASTM A325, Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength, ASTM A490 as indicated on drawings.

2. Bolt Geometry: Bolt dimensions shall conform to the current requirements of the American National Standards Institute for Heavy Hex Structural Bolts, ANSI Standard B18.2.1. The length of bolts shall be such that the end of the bolt will be flush with or outside the face of the nut when properly installed.
3. Nut Specifications: Nuts shall conform to the current chemical and mechanical requirements of the American Society for Testing and Materials Standard Specification for Carbon and Alloy Steel Nuts, ASTM A563, Appendix Table X1.1. Provide Grade A Heavy Hex nuts for Grade 36 and 55 threaded rods. Provide Grade DH or ASTM A194-2H Heavy Hex nuts for Grade 105 threaded rod.
4. Washers: Flat circular washers and square or rectangular beveled washers shall conform to the current requirements of the American Society for Testing and Materials Standard Specification for Hardened Steel Washers, ASTM F436. Washers for base plates shall be placed top and bottom of plate and shall be ASTM A36 square or circular unless ASTM F844 are permitted on the drawings.
5. Tension Control Fastener System: Bolts shall conform to the requirements of the current edition of the Specifications of the American Society for Testing and Materials for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, ASTM F1852, providing equivalent properties to ASTM A325 or A490 as indicated on drawings.

H. Headed Stud-Type Shear Connectors: ASTM A29-12, Grade 1010 through 1020, cold-drawn carbon steel with dimensions complying with AISC Specifications, with minimum physical properties as follows:
   1. Ultimate Tensile strength: 65,000 psi.
   2. Yield strength – 0.2% offset: 51,000 psi
   2. Elongation in 2 inches: 20 percent
   3. Reduction of area: 50 percent.

I. Provide hexagonal heads and nuts for all connections per ASTM A563, Appendix Table X1.1.

J. Electrodes for Welding: Comply with AWS Code, E70 Series minimum. Fabricator to select proper electrodes according to weld procedures as submitted.

K. Shop Primer – See Section 3.4, Painting and Cleaning

L. Power-Actuated Fasteners (Shot Pins): Tempered steel pins with special corrosive resistant plating or coating. Pins shall have guide washers to accurately control penetration. Fastening shall be accomplished by low-velocity piston-driven power activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems.

M. Expansion Bolts: Hilti Fastening Systems “Kwik-Bolt Concrete Expansion Anchors” to concrete; Ramset “Dynabolt Sleeve Anchors” to masonry or approved equal.

PART 3 - EXECUTION

3.1 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assembly structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated to provide the flattest floor possible. The contractor shall coordinate member tolerances with finishes.

Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicted. Bolt field connections, except where welded connections or other connections are indicated.

C. Unless noted otherwise, make holes 1/16 inches larger than the nominal bolt diameter.

D. Welding, Shop and Field: Weld by shielded arc method, submerged arc method, flux cored arc method, or other method approved by AWS. Perform welding in accordance with AWS Code. All welders, both manual and automatic, shall be certified in accordance with AWS "Standard Qualification Procedure" for the Work to be performed. See paragraph "welding" herein, for detailed requirements. If sizes of fillet welds are not shown on drawings, use AWS minimum weld size but not less than 3/16 inch fillet welds.

E. Bolt Holes for Other Work: Provide holes required for securing other work to structural steel framing.

Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

Cut, drill, or punch holes perpendicular to metal surfaces and remove all burrs. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

F. AISC Group 4 and 5 shapes and built up members shall meet the requirements for joints in AISC Sections J1.5, J1.6, J2.7 and M2.2.

G. High Strength Bolts:
1. Installation and Tightening:
    a. Handling and Storage of Fasteners: Fasteners shall be protected from dirt and moisture at the job site. Only as many fasteners as are anticipated to be installed and tightened during a work shift shall be taken from protected storage. Fasteners not used shall be returned to protected storage at the end of the shift. Fasteners shall not be cleaned of lubricant that is present in as-delivered condition.
    b. Tension Calibrator: A tension measuring device shall be required at all job sites where bolts in slip-critical joints are being installed and tightened. The tension measuring device shall be used to confirm: (1) the suitability to satisfy the requirements of AISC for the complete fastener assembly, including lubrication if required to be used in the work, (2) calibration of wrenches, if applicable, and (3) the understanding and proper use by the bolting crew of the method to be used. The frequency of confirmation testing, the number of tests to be performed and the test procedure shall be as specified in 1.d. below, as applicable. The accuracy of the tension measuring device shall be confirmed through calibration by an approved testing agency at least annually.
    c. Joint Assembly and Tightening of Shear/Bearing Connections: Bolts in connections not within the slip-critical category shall be installed in properly aligned holes, but need only be tightened to the snug tight condition. The snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an

ordinary spud wrench. If a slotted hole occurs in an outer ply, a flat hardened washer or common plate washer shall be installed over the slot.

d. Joint Assembly and Tightening of Connections Requiring Full Pre-tensioning. Slip-critical connections shall be installed in properly aligned holes and tightened by one of the following methods.
   1) Turn-of-nut Tightening: When turn-of-nut tightening is used, hardened washers are not required except as specified in the AISC. A representative sample of not less than three bolts and nuts of each diameter, length and grade to be used in the work shall be checked at the start of work in a device capable of indicating bolt tension. The test shall demonstrate that the method of estimating the snug-tight condition and controlling turns from snug tight to be used by the bolting crews develops a tension not less than five percent greater than the tension required for slip-critical connections.
   2) Installation of Alternate Design Bolts: A representative sample of not less than three bolts of each diameter, length and grade shall be checked at the job site in a device capable of indicating bolt tension. The test assembly shall include flat hardened washers, if required in the actual connection, arranged as in the actual connections to be tensioned. The calibration test shall demonstrate that each bolt develops a tension not less than five percent greater than the tension required by AISC. Manufacturer's installation procedure shall be followed for installation of bolts in the calibration device and in all connections. When alternate design features of the fasteners involve an irreversible mechanism such as yield or twist-off of an element, bolts shall be installed in all holes of the connection and initially brought to a snug tight condition. All fasteners shall then be tightened, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened fasteners prior to final twist-off or yielding of the control or indicator element of the individual fasteners. In some cases, proper tensioning of the bolts may require more than a single cycle of systematic tightening.

e. Mark bolts that have been completely tightened with an identifying symbol.

3.2 WELDING

A. General: Quality of materials and design and fabrication of all welded connections shall conform to AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Building," "AWS Code for Welding in Building Construction," and requirements of this section. Where members and connections are noted in the construction documents as being part of the seismic lateral force resisting system (LFRS), the requirements of AWS D1.8 Structural Welding Code – Seismic Supplement shall apply.

Location and type of all welds shall be as shown. Make no other welded splices, except those shown on drawings, without prior approval of the architect.

B. Automatic Welding: Use electrode wire and flux for automatic and semi-automatic welding acceptable to Structural Engineer. All methods, sequences, qualification and procedures, including preheating, and post heating if necessary, shall be detailed in writing and submitted to the Structural Engineer for review.

C. Qualification of Welders:
   1. Structural steel welding: Manual and automatic welds for structural steel construction shall be made only by operators who have been previous qualified by tests, as prescribed in AWS D1.1 to perform type of work required.

2. Welders shall be checked by welding inspector. Those not doing satisfactory work may be removed, and may be required to pass qualification tests again. All qualification testing shall be at the Contractor's expense.
3. Only welders whose weld procedures and pre-qualification by testing that have passed shall be considered qualified for such welds.

D. Control cooling process after weld is completed by either step down post heat or thermal blankets as determined by procedures and prequalification.

E. Box columns and built-up members shall have ultrasonic testing before and after welding.

F. Flame cut surfaces shall be ground to remove contaminated steel layer to provide welds proper fusion without impurities.

G. Preparation of surface: Surfaces to be welded shall be free of loose scale, slag, rust, grease, paint, and any other foreign material.

H. Welding equipment: Welding equipment to be used in each case shall be acceptable to welding inspector. Use equipment with suitable devices to regulate speed, and manually adjust operating amperage and voltage. The amperage capacity shall be sufficient to overcome line drop, and to give adequate welding heat.

I. Remove runoff tabs and grind surfaces smooth where the tabs would interfere with fireproofing and architectural finishes.

J. End-welded studs:
1. Automatic end-welded studs: Automatically end-weld in accordance with the manufacturer's recommendations in such a manner as to provide complete fusion between the end of the stud and the plates. There shall be no porosity or evidence of lack of fusion between the welded end of the stud and the plate. The stud shall decrease in length during welding approximately 1/8 inch for 5/8 inch, and 3/16 inch for 3/4 inch diameter. Stud sizes indicated on drawings represent the finish stud height.
2. Fillet-end welded studs: Studs may be welded using prequalified FCAW, GMAW, or SMAW processes provided the requirements of the AWS D1.1.

K. Provide mill camber as shown on the construction documents within AISC tolerance. Place mill tolerance upward for all beams specified no camber.

3.3 ERECTION

A. Structural steel erection: Comply with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Building", latest edition.

B. Erection Sequence: Erect steel in accordance with special erection sequences where special erection sequences are indicated on the contract documents.

C. Before and during erection, keep all structural steel clean. Ship, handle and store steel in manner to avoid injury to members. Steel members showing evidence to rough handling or injury will be rejected.

D. Mark each member with erection identification corresponding to mark shown on erection drawings. Carefully plan erection of structural steel so that no cutting and removal of material will be necessary. Do not torch burn in the field, unless specifically permitted by Engineer.

E. Provide sufficient bracing, shoring and guys to effect safe and satisfactory erection. Provide bracing and shoring capable of holding steel work plumb and properly aligned while field connections are being made, and until lateral force resisting elements are deemed by Architect capable of bracing structure. Temporary bracing shall be adequate to resist lateral forces from wind or seismic prior to the completion of the lateral resisting system.

F. Set bearing and base plates with extreme care. Bring level, to line and grade with leveling plates or by leveling nuts and bolts. Grout solid under plates with a flowable non-shrink grout per Section 03 30 00 prior to applying vertical load.

G. Field Assembly: Set structural framing accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces which will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

   Shimming or other adjustments not indicated on drawings shall be approved by the Engineer prior to installation. Level and plumb individual members of the structure within specified AISC tolerances except as noted herein. Column shimming shall be 1/4 inch.

H. All welds shall be full and clean, and conform to AISC and AWS specifications.

I. Erection Tolerances: Individual pieces shall be erected so that the deviation from plumb, level and alignment shall not exceed 1 to 500 plus:
   1. The maximum displacement of the center line of columns adjacent to elevator shafts, from the established column line, shall not be more than 1 inch at any point.
   2. In order to provide a true, flat plane for the exterior elevations, install all steel framing at the exterior walls of the building, so that the center lines of such framing does not vary by more than 1 inch for the length of the building. Also install each vertical member on such grids so that its vertical center line does not vary by more than 1/2 inch from a vertical line for each story and 1 inch for its full height.
   3. All columns and beams shall adhere to Section M2.7 of the referenced "Specification for Structural Steel for Buildings" which states that completed members shall be free of twists, bends, and open joints. Take special care that column base plates are parallel and perpendicular to faces of columns and that bolt holes are accurately placed.

J. Temporary Flooring:
   1. Provide planking and scaffolding necessary in connection with erection of structural steel, support of erection machinery, and construction materials. Temporary floors and use of steel shall be as required by applicable regulatory requirements.
   2. If steel decking is used as a working platform, it shall be temporarily tack-welded to supports to extent necessary for such use in accordance with applicable regulatory requirements. The concentrated loading from welding machines and other heavy machinery required for steel erection shall be distributed by planking or other approved means. Metal decking that becomes damaged as the result of being used as a working platform shall be replaced at no additional cost to the Owner.

K. Tower Crane: The design for the support and bracing for a tower crane shall be the responsibility of the General Contractor. The design shall be prepared by a structural engineer licensed in the state of California. Drawings and calculations shall be stamped and signed by the structural engineer. Concentric, torsional, and/or eccentric loading to the main structure shall be resolved by the addition of structural steel for shear tabs, stiffeners, drag ties, bracing struts, etc., Such items shall be designed, detailed, furnished and installed by the contractor.

3.4 PAINTING AND CLEANING

A. Prior to prime coat application, clean all loose rust, mill scale, oil, dirt, and all other materials from all steel to be left exposed. Use hand tool, power tool, sandblasting, chemical cleaning, and any other method necessary to provide a smooth, sound surface for painting.

B. Shop prime all steel except the following:
   1. Steel encased in concrete.
   2. Contact surfaces for slip-critical (sc) high strength bolts.
   3. Areas within 4 inches of field welds.
   4. Tops of members to receive metal decking.
   5. Steel to be fireproofed.
   6. Surfaces to be galvanized.

C. Use the following Type A shop painting systems on all normal environment interior steelwork:
   1. Surface Preparation: SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning. Where jobsite exposure is expected to exceed 6 months, SSPC-SP6 Commercial Blast Cleaning is required.
   2. Application: Follow coating manufacturer's printed directions.
   3. Material: Type A Tnemec Company, Inc., Series V10; Sherwin Williams Steel Spec Universal; Metal Case 94-231 Series or approved equal
   4. Number of Coats: One
   5. Dry Film Thickness: 2.0 mils minimum.
   6. Volume Solids: 56.0 +/- 2.0% minimum
   7. Generic Description: Modified Alkyd.

D. Unless noted otherwise in subsection H, use the following Type B shop painting systems on all exterior steelwork and interior steelwork subjected to wet conditions or fumes (see subsection H for additional requirements)
   1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning
   2. Application: Follow coating manufacturer's printed directions.
   3. Material: Type B Tnemec 90-97 Tneme-Zinc primer or approved equal
   4. Number of Coats: One
   5. Dry Film Thickness: 2.5 to 3.5 mils
   6. Volume Solids: 63% +/- 2%
   7. Generic Description: Zinc-Rich Urethane

E. Unless noted otherwise in subsection H, use the following finish painting systems on all exterior steelwork and interior steel work subjected to wet conditions or fumes (see subsection H for additional requirements):
   1. Application: Follow coating manufacturer’s printed directions. Apply over Type B primer system above.
   2. Material: Tnemec Series 750 UVX paint or approved equal
   3. Number of Coats: One
   4. Dry Film Thickness: 2.5 to 5 mils
   5. Volume Solids: 72% +/- 2%
   6. Generic Description: Polyfunctional Hybrid Polyurethane

F. Primers and paints shall meet all federal and state environmental and air quality requirements.

G. Apply two shop prime coats to areas which will be inaccessible after erection.

H. All exterior steelwork and all interior steelwork subjected to wet conditions or fumes, including all welds, bolts, washers and other connection components, shall be primed and painted or hot-dip galvanized, as specified by the Architectural finish specifications. In the absence of Architectural finish specifications, all exterior steelwork and all interior steelwork subjected to wet conditions and fumes, including all welds, bolts, washers and other connection components, shall be hot-dip galvanized, conforming to the requirements set forth in ASTM A123/A123M and ASTM A153/A153M.

I. Clean contact surfaces of high strength bolts of all burrs and material which might prevent solid seating of the parts. Steel to receive bolts shall be primer painted except beneath the contact area of slip-critical bolts.

J. After erection, field touch up all welded areas, high strength bolts and damaged areas. For all steel to remain exposed, remove all blemishes, paint drips, and touch up prime coat.

3.5 HOISTING AND BRACING

A. Provide all hoisting and erecting equipment and power.

B. Provide and maintain any and all safety railings, toe boards, etc., required for the erection of steel framing and metal decking.

C. Brace the erected frame in a manner which will assure safety and proper alignment to receive the metal decking and until the concrete slabs have been poured and have set.

D. Erect building frame true and level. Erect columns in a manner to allow for movement due to welding shrinkage and thermal expansion and contraction of framing. Check plumbness after erection of each level. Maintain structural stability of frame during erection. Provide temporary bracing where necessary to maintain frame stability and to support required loads, including equipment and its operation.

END OF SECTION 05 12 00

05 30 00
METAL DECKING
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The requirements of Division 1 apply to all Work of this Section.

1.2 SCOPE

A. Provide all steel decking, accessories and cutting and reinforcing of all holes as indicated on Drawings and specified here.

1.3 RELATED WORK (See also Table of Contents):

A. Cast-in-place concrete: Section 03 30 00.

B. Structural Steel: Section 05 12 00.

C. Metal Fabrications: Section 05 50 00.

D. Holes for Mechanical and Electrical Work: Divisions 21, 22, and 26.
   1. Cutting and reinforcing of holes for plumbing and electrical conduits shall be part of this work providing holes are located by the mechanical and electrical contractors prior to or during installation. Cutting and reinforcing of holes after installation shall be the responsibility of those trades requiring them.
   2. Miscellaneous connection requirements for Mechanical and Electrical Work: Divisions 21, 22 and 26.

E. Supporting from Structure: Section 01 84 15

1.4 QUALITY ASSURANCE

A. Standards and References: (Latest Edition unless otherwise noted)
   1. California Building Code (CBC),
   2. American Iron and Steel Institute (AISI). "Specification for the Design of Cold-Formed Steel Structural Members."
   3. American Welding Society (AWS): AWS D-1.3 "Structural Welding Code - Sheet Steel".

B. Submittals: (Submit under Provisions of Section 01 33 00)
   1. Shop Drawings. Submittal required. Indicate deck sheet layout and all installation details. Contract documents may not be used as shop drawings.
   2. Manufacturer's specifications for each Deck Type. Submittal required.
   3. Certification: Provide affidavits from the manufacturer listing mill test certificates by number for each size and type of decking.
   4. Manufacturer shall provide affidavits of approval by the International Code Council Evaluation Service (ICC-ES) for the metal decking shapes proposed.
   5. Floor areas to receive concrete fill over metal deck: Provide a work plan detailing the means and methods to be used for placement of concrete, including screeding procedures and locations of any construction joints, which will achieve the performance criteria noted in Section 2.1. A pre-construction meeting shall be scheduled by the General Contractor, to include the concrete sub-contractor, Architect, Structural Engineer, and Owner’s Representative to discuss the work plan and performance objectives.

C. Tests and Inspections:
   1. Provide special inspections and testing as described in the “Statement of Structural Special Inspections and Testing” within the structural drawings and as required by this section.
   2. A testing program is required prior to start of construction. Testing program to be done In Compliance with the CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
   3. All materials, methods and equipment shall be subject to inspections by the Testing Laboratory at any time.
   4. Material Testing: Test reports establishing conformity to the specifications shall be furnished to the Owner for each heat prior to installation.
   5. Welding Inspection: Welding of metal deck shall be performed under the inspection of the Testing Laboratory. Inspection shall be in accordance with SDI QA/QC.
   6. Power-Actuated Fasteners (shotpins): Where decking is attached with shotpins, the pins shall be inspected for proper installation by a special inspector. Twenty-five percent (25%) of all pins shall be verified using the inspection tool supplied by Hilti Inc.

1.5 PRODUCT HANDLING

A. Protect metal decking before installation and protect the installed work and materials of other trades.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS - DECK SYSTEMS

A. Acceptable Manufacturers:
   1. Verco Manufacturing Co. or approved equal.
   2. Manufacturers of materials are indicated to set a standard for design and product performances.
   3. Subject to the requirements of Division 1, products of manufacturers not indicated may be proposed for substitution, provided that they are equal in design, product performance and warranty to the products specified and have ICC approval.
   4. The burden of proof of equality of proposed products is on the Contractor.

B. Provide deck sections, type and gage as indicated on the drawings. Other manufacturers producing deck complying with these Specifications, and having equivalent properties and dimensions will be subject to the Architect’s review upon submission of substantiating data, and may be used only if equivalent to deck sections specified, in the Architect’s opinion.

C. All deck units shall be approved by International Code Council Evaluation Service (ICC-ES) for use as a diaphragm.
   1. Diaphragm shear capacities shall be comparable (within 5%) to those listed on the drawings for the deck, welding, and spans indicated.

D. Units shall be in lengths to span two or more supports. Where steel layout does not permit two-span minimums, notify the Structural Engineer prior to fabrication.

E. For limitations of loads to metal decking see Section 01 84 15.

F. All deck units shall have male and female interlocking side joints.

G. All deck units with concrete or insulating concrete shall be vented to provide 1% open area.

H. Prior to covering or filling with insulation, roofing, or placing concrete over metal decking, verify and coordinate installation requirements of suspended metal framing, suspended acoustical ceiling systems, mechanical and electrical work or other items as required. Provide inserts, clips, anchors or fasteners as indicated or as otherwise required to provide for the complete and proper installation of suspended items from the metal deck.
   1. Verify and coordinate locations, patterns, spacing, etc. of suspension members and connectors required by other Sections of the Specifications and as shown on drawings.
   2. Where suspension or hanger wires are required under other Sections, verify and coordinate locations, patterns, spacings, etc. with the appropriate trade. Drill holes at bottom of deck flutes of sufficient size to pass support wires. Wire supports shall be looped and secured with a minimum of three (3) tight turns around a minimum 1-1/2" x 8" long furring channel or No. 3 x 12" long reinforcing bar centered above the hole and laid in the deck flutes. Pig-tail loops into the concrete will not be permitted unless approved by the General Contractor. Place no wires in flute with side lap.
   3. At unfilled metal deck or as otherwise indicated, required or shown, provide individual 18 gauge by 1-1/2" wide galvanized hanger tabs 6" long and having 2" round holes for attaching tie wires. Tabs shall be hooked over male portion of each edge joint at 16" on center before female joint of next sheet is placed over it. As an alternate, #3x12" long reinforcing bars centered above the hole and laid in the deck flutes may be used. No loading other than suspended ceilings may be suspended from metal deck without concrete fill. Suspend all piping, ducting, conduit and equipment from steel beams.

I. Structural Properties: Deck shall have minimum structural properties as indicated on Structural Drawings.

J. Accessories to be furnished shall include the following:
   1. Cell closures where shown on Drawings.
   2. Light gauge plate fillers attached to deck to provide an uninterrupted roof plane.
   3. Drain sumps and/or roof drain mounting plates as detailed.
   4. Cell end closures column flashing and miscellaneous closures to prevent concrete leakage.
   5. Miscellaneous accessories incidental to erection of deck.

K. At concrete filled metal deck floors:
   1. The final top of concrete elevation shall not deviate by more than 3/8” above or below the top of concrete elevation noted on plan.
   2. Floor flatness for concrete over metal deck shall conform to ACI 117. Unless stricter requirements are specified by the Architect, floor flatness for the completed overall floor area shall meet the following minimum values:

      Specified Overall Value for Flatness (SOF_F): 25
      Minimum Local Value for Flatness (MLF_F): 17

      Areas of non-compliance shall be reviewed by the Owner and Architect and may require additional floor leveling or grinding. The cost of any remedial action shall be borne by the Contractor.
   3. In no case shall the depth of concrete over metal deck be less than that specified on plan. Note that the concrete depth will vary due to deck and beam deflections during concrete placement, and shall be considered in the estimating of concrete volume, cost and placement strategies.

L. At concrete filled metal deck roofs:
   1. Concrete over metal deck at roofs shall be placed to maintain the design thickness specified on plan at all locations within the roof area. Additional concrete (ponding) which increases the thickness above the design thickness to achieve flatness, levelness or maintain roof slope should not be provided.

2.2 MATERIALS

A. Provide deck of type and gage shown on the drawings. Deck units and all necessary items shall be formed from steel sheets conforming to ASTM-A653, structural quality. The steel sheets shall have received, before being formed, a metal protective coating of zinc conforming to ASTM-A653 Class G60 coating.

B. Power-Actuated Fasteners (shotpins): Where decking is attached with shotpins, they shall be by Hilti Inc., of the type indicated on the drawings and ICC-ES approved for use in a diaphragm.

C. Welding rods: E60XX minimum.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas to receive work specified. Do not begin work until underlying work is complete, all required inspections have been made, and all conditions which might prevent proper installation or impair performance of work have been corrected.

B. Beginning installation means accepting conditions of underlying work.

C. If supporting steel work is not properly aligned or sufficiently level to permit proper bearing of metal decking, such deficiency shall be corrected by the Contractor before placing units.

3.2 ERECTION

A. Deck shall be laid true to line, shall conform to profile shown on Drawings, and shall be without deformations, creases, wrinkles or noticeable defects.

B. Connections: Deck shall be secured to structural frame by use of 15/16" visible diameter (1/2" effective diameter) fusion welds. Minimum number and spacing of connections shall be as indicated on Structural Drawings.

C. The metal deck shall be fastened to all structural members both parallel and perpendicular. Spread deck and modify layout where structural members are parallel to the metal deck ribs.

D. Bend decking to conform to slopes and warps as required for solid contact to framing that allows proper welding.

E. Shoring for metal decking shall be provided by the contractor as required and as indicated in the corresponding ICC-ES report. Coordinate shoring requirements for construction live load (and concrete placement) with the manufacturer.

F. All deck units shall break over beams.

G. Provide low ribs at all beams parallel to deck. As an alternate, the deck may be broken and infilled with a flat pan to provide deck welding to parallel beams.

H. Butt deck units tight over steel beams.

I. Provide ¾" clear concrete cover around all welded studs.

3.3 DEFECTIVE DECK

A. Units of decking that become deformed or damaged to such extent that they are weakened or unsuitable for use shall be removed and replaced at no cost to the Owner.

3.4 TOUCH UP AND CLEANING

A. All welds and abrasions on deck surfaces not covered by concrete shall be touched up using a zinc dust-zinc oxide primer.

B. Burn spots on supporting exposed steel shall be touched up with same primer as used on adjacent surface.

C. Clean surfaces of installed deck by effective means to receive sprayed-on fireproofing or finish painting as indicated.

END OF SECTION 05 30 00

05 40 00
COLD-FORMED METAL FRAMING
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The requirements of Division 1 apply to all Work in the Section.

1.2 SCOPE

A. Furnish and install all components and related items pertaining to cold-formed metal framing systems.

1.3 RELATED WORK SPECIFIED ELSEWHERE (See also Table of Contents)

A. Cast-in-place concrete: Section 03 30 00.

B. Structural Steel: Section 05 12 00.

C. Metal Deck: Section 05 30 00.

1.4 QUALITY ASSURANCE

A. General:
   1. Welders: Qualified for welding in horizontal, vertical, and overhead positions in accordance with AWS D1.3.
   2. Wall system shall provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperatures.
   3. Wall system shall accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

B. Standards and References: (Latest Edition unless noted otherwise)
   1. California Building Code (CBC),
   2. ASTM A653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process..
   3. Framing components shall conform to Standards of the Steel Stud Manufacturers Association (ICC-ES ER-3064P).

C. Submittals: (Submit under provisions of Section 01 33 00).
   1. Manufacturers catalog with sizes to be used indicated.
   2. ICC-ES report.
   3. Mill certificates verifying steel properties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect metal framing units from rusting and damage.

B. Deliver to Project site in manufacturer's unopened containers or bundles, identified with name, brand, type and grade.

C. Store off ground in a dry ventilated space or protect with suitable waterproof covering.

PART 2 - PRODUCTS

2.1 ACCEPTED MANUFACTURERS

A. Members of the Steel Stud Manufacturer's Association (SSMA), or approved equal.

2.2 METAL FRAMING

A. System Components: Provide steel studs, joists, tracks, straps, runners, blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as shown on the Drawings for applications indicated. All studs, joists, tracks, and blocking shall conform to ICC-ES ER-3064P.

B. Materials and Finishes:
   1. 54 Mils (16 Gauge) and Thicker: Fabricate metal framing components of structural quality (SQ) steel sheet with a minimum yield point of 50,000-psi, conforming to ASTM A653, SS Grade 50 Class 1 or ASTM A1003, Grade 50 Type H (ST50H).
   2. 43 Mils (18 Gauge) and Thinner: Fabricate metal framing components of structural quality (SQ) steel sheet with a minimum yield point of 33,000-psi, conforming to ASTM A653, SS Grade 33 or ASTM A1003, Grade 33 Type H (ST33H).
   3. Finish: Galvanized complying with ASTM A653, G60. Finish accessories to match main framing components.

C. See drawings for section properties and details.

D. Studs and joists shall be of the size, shape, and gauge indicated, with a flange and flange return lip as shown on the Structural Drawings.

E. Welding Electrodes: E60XX (43 Mil material and thinner), E70XX (54 Mil material and thicker)

F. Galvanizing Repair Paint: High zinc-dust content paint for repair of galvanized surfaces damaged by welding.

G. Material Thickness: All sections are to be roll formed in various depths with the following minimum bare metal thicknesses:

Minimum Thickness (inch)	Minimum Design Thickness (inch)	Gauge	Mils
0.0179	0.0188	25	18
0.0329	0.0346	20	33
0.0428	0.0451	18	43
0.0538	0.0566	16	54
0.0677	0.0713	14	68
0.0966	0.1017	12	97
0.1180	0.1240	10	118

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install metal framing systems in accordance with the Structural Drawings. Where drawings conflict with manufacturer's recommendations, the Structural Drawings will govern.

B. Runner Tracks:
   1. Install continuous tracks sized to match studs. See Structural Drawings.
   2. Align at base and tops of studs.
   3. Attach tracks with screws, welding, bolting or shot pins as indicated on the Structural Drawings.
   4. Fasten corners and ends of tracks as shown.

C. Studs:
   1. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces.
   2. Where studs abut structural columns or walls, anchor ends of stiffeners to supporting structure.
   3. Secure studs to top and bottom runner tracks by screw fastening at both flanges.
   4. Install studs in one piece for full height; splicing of studs is not permitted.
   5. Provide deflection allowance of 1/2" minimum in stud track, directly below horizontal building framing for all non-bearing wall framing. See Structural Drawings.
   6. Install ends of studs tight to web of track at all bearing wall framing. Compress track against end of stud as required to achieve tight fit prior to installation of stud to track screw attachments. See Structural Drawings.
   7. Install supplementary backing and bracing wherever walls or partitions are indicated to support equipment, services, casework, heavy trim and furnishings and similar work requiring attachment to wall or partition. Comply with stud manufacturer's instructions and industry standards.
   8. See Structural Drawings for opening framing.
   9. Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of stud system.
   10. Install one row of metal blocking or bridging at mid-height of all studs over 10'-0" in height in addition to bracing that may be required at studs that do not receive sheathing (see item 11 below).
   11. Install strapping to all sides of studs that do not receive sheathing as indicated on the structural drawings.

3.2 TOUCH-UP PAINTING

A. Touch-up shop-applied protective coatings damaged during handling and installation.

B. Use compatible primer for prime coated surfaces; use galvanizing repair paint for galvanized surfaces.

END OF SECTION 05 40 00

05 50 00
METAL FABRICATIONS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions at the job site.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Shop fabricated metal items and miscellaneous metal work, refer to as herein scheduled.
   2. Painting finish

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society for Testing and Materials (ASTM)
   1. ASTM A36 - Specifications for Structural Steel
   2. ASTM A53 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
   3. ASTM A120 – Welded Steel Pipes, Galvanized Threaded and Coupled
   4. ASTM A123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   5. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   6. ASTM A307 – Standard specification for carbon steel bolts and studs, 60 ksi tensile strength
   7. ASTM A500 - Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
   8. ASTM A513 - Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
   9. ASTM A569 - Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality
   10. ASTM A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
   11. ASTM A653 – Hot Dip Galvanized Coils & Sheets - quality norms
   12. ASTM A780 - Specification for Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
   13. ASTM E303 - Method of Measuring Surface Frictional Properties Using the British Pendulum Tester
E. American Institute of Steel Construction (AISC)
   1. AISC - ASD Manual of Steel Construction
   2. AISC - Manual of Steel Construction
F. American Welding Society (AWS)
   1. AWS - D1.1 Structural Welding Code - Steel
   2. AWS - D1.3 Structural Welding Code - Sheet Steel
   3. Welding Procedure and Performance Qualification
G. National Ornamental and Miscellaneous Metals Association (NOMMA)
   1. NOMMA - Guideline 1 - Joint Finishes

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.

3. Job site inspections shall be done as herein specified and as listed in drawings.
4. Testing shall be done as herein specified and as listed in drawings.

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1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
   1. Submit complete shop drawings indicating profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories for all fabricated items included hereunder. Include erection drawings, elevations and details where applicable. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
   2. Descriptive data: Submit complete data for manufactured items.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **Five (5)** years providing/installing/finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **Five (5)** years providing/installing/finishing similar size projects and complexity.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver all parts ready for erection; store in close proximity to final locations.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to, the following:
   1. Asphalt Concrete
   2. Cast-in-Place Concrete
B. Related Sections include, but are not limited to, the following:
   1. Division 1
   2. Section 03 30 00 – Cast in Place Concrete
   3. Section 09 90 00 – Paintings and Coatings

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:

1. Complete instructions regarding operation of any operable equipment or assemblies.
2. Complete instructions regarding maintenance of the equipment, materials, and finishes, etc.
3. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturer and fabricator shall be one of the following and as herein listed and in Drawings:
   1. Refer to documents and as herein specified.
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. General:
   1. Steel sections: ASTM A36, unless otherwise noted on drawings.
   2. Galvanizing: Hot-dip process ASTM A123 typical and ASTM A153 for threaded fasteners performed after fabrication into largest practical section. Weight of coating not less than 2 oz. per sq. ft. of surface. Where damaged, repair surface with one coat of hot process galvanizing repair compound, "Galvalloy", "Galvweldalloy", or approved equal.
   3. Hot-dipped, zinc-coating on assembled steel products: ASTM A653, galvanized in accordance with G90 coating designation.
   4. Steel pipe: ASTM A53 or ASTM A120, size per drawings, hydrostatic tests not required; or standard ASTM A36 steel pipe, size per drawings.
   5. Steel bolts, nuts, and washers: ASTM A307
   6. Welding materials: AWS D1.1, type required for materials being welded
   7. Primer: Comply with Section 09 90 00 – Paintings & Coatings
   8. Painted finish: Comply with Section 09 90 00 – Paintings & Coatings

B. Schedule:
   1. General:
      a. The following Schedule lists principal items only; refer to drawings for items not specifically scheduled herein.
         1. Provide, design, provide shop drawings and install items listed in Schedule and shown on Construction Drawings with anchorage and attachments necessary for installation.
         2. Provide Steel support angles and channels not included in other section.
         3. Provide Steel angle edge protection not included in other section.

4. Provide corner, ledge and shelf angles, channels and plates not attached to structural steel; complete with anchorage for embedment in concrete where required. Hot dip galvanized items embedded in concrete or masonry.

2. Bollards - Traffic Barriers:
   a. Extra Strong galvanized steel pipe, typical; size and height as noted on drawings.
   b. Fill traffic barriers with 3000 psi concrete with domed finished top.
   c. Prime & paint steel - custom finished color to match **Architect's** sample after fabrication; refer to Section 09 90 00 – Paintings & Coatings.

2.03 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions.
   1. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.
   2. Examine areas and conditions under which work is to be performed.
   3. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Obtain **Architect's** approval prior to site cutting or making adjustments not scheduled.
B. Clean and strip primed steel items to bare metal where site welding is scheduled.
C. Make provision for erection loads with temporary bracing. Keep work in alignment.
D. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation under appropriate Sections.

3.04 FABRICATION

A. General:
   1. Verify dimensions on site prior to shop fabrication.
   2. Fabricate items with joints tightly fitted and secured.
   3. Fit and shop assemble in largest practical sections, for delivery to site.
   4. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
   5. Exposed mechanical fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
   6. Make exposed joints butt tight, flush, and hairline.
   7. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.
   8. All exterior assemblies & members shall be fabricated watertight.
   9. All steel tube and pipe connections shall be continuously welded water tight and ground smooth.
   10. All aluminum tube and pipe connections shall be continuously welded water tight and ground smooth.
B. Install items plumb and level, accurately fitted, free from distortion or defects.

C. Field Welding:
   1. Perform field welding in accordance with AWS D1.1.
   2. Where field welding is applied to existing flexural members involving application of significant amounts of heat to member, provide temporary shoring to prevent deflections.

D. Finishing
   1. Clean surfaces of rust, scale, grease, and foreign matter.
   2. Touch-up field welds, scratched or damaged surfaces with primer, except repair exposed galvanized work with hot process field galvanizing, in accordance with manufacturer's published directions.
   3. Prepare, prime and paint in accordance with Sections 09 90 00 – Paintings and Coatings unless product comes pre-finished from manufacturer.
      a. Do not prime surfaces in direct contact bond with concrete or where field welding is required, these areas will be primed and field painted after completion of work.
      b. All exposed fabrications shall be primed and finish painted.
      c. All semi-exposed fabrications shall be primed at a minimum.

3.05 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer’s recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor’s NOTICE** of “Certificate of Substantial Completion”.

END SECTION

05 52 00
METAL RAILINGS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work in this Section with related trades.
C. Verify applicable dimensions at the jobsite prior to generation of shop drawings and prior to fabrication.
D. Provide under this specification, materials, design, fabrication and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work for:
    1. Furnish all labor, materials, equipment and services required to complete the fabrication of a welded and seamless custom metal railings & guardrails assemblies including but not limited to:
        a. Railings
        b. Brackets
        c. Guardrails
        d. Infill **[Specifier, select the appropriate type and reference appropriate sections]**
            1. In-fill Glass panels
            2. In-fill cable railing, refer to Section 05 52 16 – Lateral Steel Cable Railing Assembly
            3. In-fill metal panels
        e. Attachment to varied substrates including but not limited to;
            1. Stringers
            2. Steel Beams
            3. Misc. Structural Framing
            4. Concrete and/or work as indicated on the drawings and as herein specified.
        f. Skate Deterrents

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. Title 24, California Code of Regulations, California Building Standards Commission
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. CBC Energy Code, California Code of Regulations, Title 24, Part 6, California Building Standards Commission
E. Title 24, Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
F. Leadership in Energy and Environmental Design (LEED), www.usgbc.org/LEED (United States Green Building Council (USGBC)
    1. Refer to Division 1 for version of LEED Rating System and Reference Guide applicable to project.
G. Collaborative for High Performance Schools (CHPS), www.chps.net
H. Aluminum Association (AA)
    1. Aluminum Standards and Data
    2. Designation System for Aluminum Finishes
I. American Architectural Manufacturers Association (AAMA)
    1. AAMA 605.1 Specification for High Performance Organic Coatings on Architectural Extrusions and Panels
    2. AAMA 605.2 Specification for High Performance Organic Coatings on Architectural Extrusions and Panels
    3. AAMA 606.1 Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
    4. AAMA 607.1 Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
    5. AAMA 608.1 Voluntary Guide Specification and Inspection Methods for Electrolytically

Deposited Color Anodic Finishes for Architectural Aluminum

J. American Concrete Institute (ACI)
   1. ACI 347-78 Recommended Practice for Concrete Formwork

K. American Institute of Steel Construction (AISC)
   1. Manual of Steel Construction
   2. ASD Manual of Steel Construction
   3. Manual of Steel Construction

L. American Iron and Steel Institute (AISI)
   1. Steel Products Manual
      a. Carbon Steels
      b. Stainless and Heat Resisting Steels

M. American National Standards Institute (ANSI)
   1. ANSI A117.1 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People
   2. ANSI A1264.1 Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems
   3. ANSI Z97.1 Safety Performance Specifications & Methods of Test for Safety Glazing Material Used in Buildings. Amended by Supplement Z97.1

N. American Society of Civil Engineers (ASCE), www.asce.org
   1. ASCE – 7 Minimum Design Loads for Buildings and Other Structures

O. American Society for Testing and Materials (ASTM)
   1. ASTM A36-81a Specification for Structural Steel.
   2. ASTM A47-77 Malleable Iron Castings.
   3. ASTM A48-76 Gray Iron Castings.
   4. ASTM A53-82 Black and Hot-Dipped, Zinc-Coated, Welded and Seamless Steel Pipe.
   5. ASTM A123-78 Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Shapes, Plates, Bars, and Strip
   6. ASTM A167-82 Stainless Steel & Heat Resisting Chromium-Nickel Steel for Plate, Sheet & Strip
   7. ASTM A269-82 Seamless & Welded Austenitic Stainless Steel Tubing for General Service
   8. ASTM A312-82 Seamless and Welded Austenitic Stainless Steel Pipe.
   9. ASTM A473-82 Stainless and Heat-Resisting Steel Forgings.
   10. ASTM A500-82 Cold-Formed Welded & Seamless Carbon Steel Tubing in Rounds & Shapes
   11. ASTM A501-81 Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
   12. ASTM A743-82b Corrosion-Resistant Iron-Chromium, Iron-Chromium-Nickel, and Nickel Base Alloy Castings for General Application.
   13. ASTM B26-82b Aluminum-Alloy Sand Castings.
   14. ASTM B43-80 Standard Sizes of Seamless Red Brass Pipe.
   15. ASTM B62-82a Composition Bronze or Ounce Metal Castings.
   16. ASTM B209-83 Aluminum Alloy Sheet and Plate.
   17. ASTM B210-82a Aluminum Alloy Drawn Seamless Tubes.
   18. ASTM B221-83 Aluminum Alloy Bars, Rods, Wires, Shapes and Tubes.
   19. ASTM B241-83a Aluminum Alloy Seamless Pipe and Seamless Extruded Tube.
   20. ASTM B247-82a Aluminum Alloy Die and Hand Forgings.
   21. ASTM B429-82 Aluminum Alloy Extruded Structural Pipe and Tube.
   22. ASTM B455-83 Copper-Zinc-Lead Alloy (Leaded Brass) Extruded Shapes.
   23. ASTM B584-83 Copper Alloy Sand Castings for General Applications.
   24. ASTM C595-83 Blended Hydraulic Cements.
   25. ASTM E894 Test Method for Anchorage of Permanent Metal Railing Systems and Rails
   26. ASTM E935 Test Method for Performance of Permanent Metal Railing Systems and Rails
   27. ASTM E985 Specification for Permanent Metal Railing Systems and Rails

28. ASTM E1481 Terminology of Railing Systems and Rails for Buildings

P. American Welding Society (AWS)
1. AWS A5.10 Aluminum and Aluminum Alloy Bare Welding Rods and Electrodes.
2. AWS A5.3 Aluminum and Aluminum Alloy Covered Arc Welding Electrodes.
3. AWS A5.7 Copper and Copper Alloy Bare Welding Rods and Electrodes.
4. AWS A5.6 Covered Copper and Copper Alloy Arc Welding Electrodes.
5. AWS A5.9 Corrosion-Resisting Chromium & Chromium-Nickel Steel Bare & Composite Metal Cored and Stranded Arc Welding Electrodes & Welding Rods.
6. AWS A5.4 Corrosion-Resisting Chromium & Chromium-Nickel Steel Covered Electrodes.
7. AWS A5.22 Corrosion-Resisting Chromium & Chromium-Nickel Steel Electrodes, Flux Cored
8. AWS A5.14 Nickel and Nickel-Alloy Bare Welding Rods and Electrodes.
9. AWS A5.11 Nickel and Nickel-Alloy Covered Welding Electrodes.
10. AWS At.1 Steel, Carbon, Covered Arc Welding Electrodes.
11. AWS A5.20 Steel, Carbon, Electrodes for Flux Cored Arc Welding.
12. AWS A5.18 Steel, Carbon, Filler Metals for Gas Shielded Arc Welding.
13. AWS D1.1 Structural Welding Code – Steel
14. AWS D1.3 Structural Welding Code - Sheet Steel
15. AWS Welding Procedure and Performance Qualification

Q. Copper Development Association (CDA)
1. Standards Handbook, Wrought Copper and Copper Alloy Mill Products, Part 2 – Alloy Data.
2. Standards Handbook, Cast Copper and Copper Alloy Products, Part 7 – Alloy Data.
3. Copper, Brass and Bronze Design Handbook for Architectural Applications.

R. General Services Administration (GSA), Federal Specifications (FS)
1. TT-P-641G (1) Primer Coating; Zinc Dust Oxide (for Galvanized Surfaces).
2. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.

S. National Association of Architectural Metal Manufacturers (NAAMM)
1. Metal Finishes Manual
2. Metal Stairs Manual
3. Pipe Railing Manual

T. National Fire Protection Association (NFPA)
1. 101 Life Safety Code

U. National Ornamental and Miscellaneous Metals Association (NOMMA)
1. Guideline 1 - Joint Finishes

V. Steel Structures Painting Council (SSPC)
1. Steel Structures Painting Manual, Volume 11

W. Steel Structures Painting Council (SSPS)
1. SP2 Specification for Hand Tool Cleaning.
2. SP3 Specification for Power Tool Cleaning.

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
1. Comply with manufacturer's standards.
2. Comply with Building Code.
3. Job site inspections shall be done as herein specified and as listed in drawings.
4. Testing shall be done as herein specified and as listed in drawings.
5. Refer to Division 1 for additional requirements for DSA projects

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Welds	Type	Ornamental Quality, Type 1	NAAMM AMP 521-01
Welding personnel	Qualifications	Welding: All welding shall be done by certified welders per AWS	AWS D1.1

Assembly	Welded connections / assembly	Comply	NAAMM AMP 521-01
	Structural Design		ASTM E894, E935, E985 & E1481 ASCE 7 ANSI A117.1 & A1264.1 NFPA 101
Railing assembly	Allowable vertical and horizontal loading	**Handrail: (top rail)** • Lateral load: The mounting of the handrail shall be such that the completed handrail and supporting structure are capable of withstanding a load of at least **200** pounds applied in any direction at any point on the rail. These loads shall not be assumed to act cumulatively with loading on intermediate rails. • Vertical load: The mounting of the handrail shall be such that the completed handrail and supporting structure are capable of withstanding a load of at least **200** pounds applied in any direction at any point on the rail. These loads shall not be assumed to act cumulatively with loading on intermediate rails. **Guardrails: (top rail)** • Lateral Load: The mounting of the guardrail shall be such that the completed guardrail and supporting structure are capable of withstanding a load of at least **50** pounds per linear foot applied horizontally at right angles to the top rail. These loads shall not be assumed to act cumulatively with loading on intermediate rails. **Intermediate rails:** • Lateral load: Intermediate rails, panel fillers & their connections shall be capable of withstanding a load of **25** pounds per square foot applied horizontally at right angles over the entire tributary area, including openings and spaces between rails. Reactions due to this loading need not be combined with those of the top rail.	Building Code

Refer to drawings and as herein specified			

C. **Sustainability:**
1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

D. **Construction Testing:**

Item	Name of Test	Performance Results	Testing Std.
Handrails, Intermediate rails and Guardrails	Loading	As herein specified	Building code and as herein indicated

E. **Construction Monitoring/Observations by others:**

Item	Name of Test	Performance Results	By Whom
Metal	Const. Waste Management	Comply	Refer to Division 1 for construction waste management and disposal/recycling requirements

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
1. Dimensioned erection drawings, elevations, and details which clearly show:
a. Indicate locations of all railing systems in relationship to building components
b. Indicate all railing materials and provide finish samples with appropriate finish
c. Provide all shop drawings at ¼" scale including 3"=1'-0" scale details
d. Elevations which indicate:
1. Profiles, sizes, connection attachment, reinforcing, anchorage, openings, size and type of fasteners, and accessories.
e. Connecting and joining methods and the relationship to adjoining work by others for railing system and material.
f. Indicate welded connections using standard AWS welding symbols.
g. Indicate net weld lengths.
h. Show locations for anchor and bolt installation.
i. Structural Engineering calculations.
j. All sheets of the drawings shall be stamped and wet signed by a Professional Engineer; including the cover sheet of the design calculations.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid
E. Stipulations:
1. All loading conditions resulting in eccentricities or torsion to beams and/or columns shall be resolved by the installation of stiffeners and diagonal struts, designed, supplied, and installed by the **General Contractor** & engineered by Professional Engineer licensed in the State of California.

F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
   1. Agenda for meeting shall include, but not be limited to;
      a. Substrates
      b. Layout
      c. Finishing
   2. **General Contractor** shall request meeting 5 days in advance of construction.

G. Miscellaneous criteria:
   1. All the work shall be designed and approved with written certification and structural calculations prepared and wet signed by a Professional Engineer, registered to practice in the State where project is located.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver all parts ready for erection; store in close proximity to final locations.
C. Deliver materials to the job site in good condition and properly protected against damage to finished surfaces.
D. Storage on site:
   1. Store material in a location and in a manner to avoid damage.
      a. Stacking shall be done in a way which will prevent bending.
   2. Store aluminum, bronze and stainless steel components and materials in clean, dry location, away from uncured concrete and masonry.
      a. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that will permit circulation of air inside the covering.
E. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of materials.
   1. For carbon steel, comply with the Code of Practice, Sections 6 and 7 of the AISC Manual of Steel Construction on delivery and erection.

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 SYSTEMS DESCRIPTION

A. Performance requirements:
   1. Handrails, guardrail and railing assemblies shall be constructed & installed from listed materials & misc. items as required to complete assemblies.
   2. Complete engineering shall be designed & provided along with shop drawings.
   3. Handrails, guardrail and railing assemblies shall be installed such that they comply with, but not limited to the requirements of the following and all applicable local codes.

1.10 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.11 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Cast in Place Concrete
   2. Misc. Steel
   3. Painting

B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 03 30 00 – Cast-In-Place Concrete
   3. Section 03 20 00 – Concrete Reinforcing
   4. Section 09 90 00 – Paintings & Coatings

C. Related Documents include, but are not limited to the following:
   1. Division 1 Supplementary Conditions

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Single source responsibility, specified items shall be from one manufacturer for each product type.

B. Acceptable manufacturers fabricator shall be one of the following and as herein listed and in Drawings:
   1. Refer to documents and as herein specified
   2. Reviewed Equivalent by **Architect.**
      a. Substitutions and Deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.

D. Refer to drawings, details, and other related specification section whether listed or not.

E. Details shall set basic requirements for size and configuration of systems.

A. **MATERIALS AND FINISHES**
   1. Structural Plate: ASTM A36.
   2. Structural Shapes and Bars: ASTM A36.
   3. Structural Pipe: ASTM A53.
      a. Black and Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe.
   4. Structural Tubing: ASTM A500.
      a. Cold Formed Welded and Seamless Tubing in Rounds and Shapes.
   5. Castings:
      a. ASTM A47 Malleable Iron Castings (Grade 32510).
      b. ASTM A48 Gray Iron Castings (Class 30) where applicable.
   6. Finishes
      a. Surface Preparation: Remove loose scale, rust, grease, oil, moisture or other foreign materials to properly prepare the surface for subsequent coating application.
         1. Remove mill scale, rust and dirt following SSPC-SP2 for hand cleaning and SSPC-SP3 for power tool cleaning.
      b. Galvanizing:
         1. Products fabricated from shapes, plates, bars and strips shall be galvanized in accordance with ASTM A123.
      c. Paint: Minimum one coat of rust-inhibitive primer in addition to field applied sprayed painting provided under Section 09 90 00 – Paintings & Coatings.
         1. Select primer for drying time and compatibility with finish coat. Primer must be lead free.
            a. Touch-up for Galvanized Surfaces: Use paint primer meeting FS-TT-P-645.

2.02 OTHER MATERIALS

A. Recommended by manufacturer and subject to **Architect's** and **Structural Engineer's** review and acceptance. Provide all materials required to complete and make system operational.

2.03 RAILING SYSTEM

A. Railing system shall be permanently anchored.
B. Rails and Posts
   1. Fabricate rails and posts from indicated material and size, conforming to finish herein indicated. Provide reinforcements compatible with the metal used for posts.
   2. Steel Tubing: Cold formed, ASTM A500-B & A513
   3. Steel Pipe: ASTM A53, Type & grade selected by fabricator as required by design loads, design and applicable codes.
   4. Rail diameter = 1.5 inches o.d. max. (1.25" o.d. min)
   5. All connections, joints, splices, elbows and T-shapes shall be pre-manufactured constant section and radius fittings with sleeve connector inside shoulders.
   6. All mechanical fasteners used in the assembly to structure shall be 1/4" thick steel galvanized plate as indicated, pre-drilled for mechanical mounting, or welding as required.
   7. Refer to drawings for handrails and railing configuration and elevation.
   8. Perforated metal panels.
C. Reinforcing Bars:
   1. ASTM A-615, Grade 40, deformed
D. In-fill:
   1. Steel Pipe: ASTM A53, Type & grade selected by fabricator as required by design loads, design and applicable codes.
   2. Rail diameter = 1.5 inches o.d. max. (1.25" o.d. min)
E. Posts
   1. Fabricated posts from indicated material and sizes, conforming to finish herein indicated. Provide reinforcements compatible with the metal used for posts.
F. Fittings
   1. Fabricated elbows, tees, splice-connections, end caps, etc. from indicated material, sizes and finishes to match railing type.
      a. All connections shall be welded.
G. Sleeves and Inserts
   1. Furnish only, for installation by others, all necessary sleeves and inserts fabricated from materials compatible with specific railing system.
H. Mounting Flanges and Anchor Plates
   1. Fabricate mounting flanges and anchor plates where indicated from indicated materials, sizes and finish to match railing type.
I. Handrail Brackets
   1. Metal: Match specific railing system material and finish.
   2. Type: Extruded.
   3. Style: as shown on **Architect's** details.

2.04 FILLER METAL

A. Carbon steel: AWS [A 5.1-] [A 5.18-] [A 5.20-].
   1. **AWS A5.18** Carbon Steel Electrodes and Fluxes for Submerged Arc Welding, E70S-X or E70U-1 Electrode
   2. **AWS A5.20** Carbon Steel Electrodes for Flux Cored Arc Welding, E70T-X Electrode
B. Carbon and low alloy steel
   1. **AWS A5.1** Covered Carbon Steel Arc Welding Electrodes
   2. **AWS A5.5** Low Alloy Steel Covered Arc Welding Electrodes

2.05 FASTENINGS

A. Mechanical types:

1. Exposed fasteners allowed at concealed locations only. Seamless welds required at all exposed conditions.

B. Adhesive: Structural adhesive, as approved by railing manufacturer. Submit product information for review.
C. Cement: Hydraulic, quick-setting, factory prepared with accelerator.

2.06 FINISH

A. All exposed surfaces shall be smooth.
B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
C. **Painted surfaces**: Primer paint two coats at items indicated to be painted. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
   1. Finish coats of paint (2 coats min.), field applied to achieve smooth finish
      a. Color as selected by **Architect**.

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.
B. The **General Contractor** shall provide recesses, anchorage and back-up blocking in sizes and in locations as shown on approved Shop Drawings. Coordinate with other trades where necessary to make provisions for installation.
C. Securely anchor all items in place in locations and at mounting heights indicated. Where specified dimensions are not noted, install as directed by **Architect**.

3.04 FABRICATION

A. GENERAL:
   1. Verify dimensions on site prior to shop fabrication.
   2. Fabricate items with joints tightly fitted, secured, true to line and level with accurate angles & surfaces and with straight sharp edges.
   3. Fit and shop assemble sections in largest practical sizes for handling through building openings.
   4. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius. (Comply with NAAMM Guideline 1 - Joint Finishes for Finish #3)
   5. Make exposed joints butt tight, flush, and hairline.
   6. Accurately form components required for anchorage to each other and to building structure.
   7. Remove burrs from all exposed cut edges.
   8. Blend in color discrepancies on anodized aluminum areas, due to welding, exposed fasteners, etc., using approved lacquer.
   9. Touch up welds and abraded areas on galvanized pipe with zinc-rich paint as herein specified.
B. RAILINGS, HANDRAILS & GUARDRAILS:

1. General:
   a. Maintain uniform curvature & cylindrical cross-section at all bends of pipe rails.
   b. Provide continuous welds that are all ground smooth prior to finishing.
   c. Vertical posts shall be spaced and located per contract documents.
   d. Railing outside diameter shall be 1-1/4”dia.min - 1-1/2”dia.max.
   e. Provide such that top *Handrail* design provides a continuous grip surface in accordance with State of California Title 24 & ADA (Americans with Disability Act)
   f. System shall be designed to accommodate lateral & vertical loading as directed by California Building Code and Uniform Building Code & as listed within these specifications.
   g. Sample of railing system shall be fabricated to indicate typical conditions for Custom railing.
   h. Form elbow bends and wall returns to uniform radius, free from buckles and twists, with smooth finished surfaces (prefabricated bends are acceptable provided all connections are seamless).
   i. Locate intermediate rails equally spaced between top rail and finish floor or center line of tread.
   j. Close exposed ends of pipe and tube by welding metal closure in place or by use of prefabricated fittings.
   k. For posts set in concrete, furnish matching sleeves or inserts not less than 5 in. long.
   l. Provide pressure relief holes at closed ends of pipe and/or tube.
   m. Fabricate joints which will be exposed to the weather so as to exclude water, or provide weep holes where water may accumulate.
   n. Removable railings: Provide slip-fit sleeves.
   o. On posts set on stair stringers, field weld bottom of post directly to top center of metal stringer flange.
   p. For aluminum, use 3/8 in. thick plate welded to bottom of post and fastened to top flange of stringer.
   q. Design railing systems in accordance with contract documents and as specified herein but not limited to:
      1. Railing and/or Guardrail system
         a. Provide system that matches contract document details, plans & elevations.
         b. Design such that railing system does not extend more than 3-1/2" into stair width measured from inside of stringer.
         c. Vertical plate posts and or tube post shall be fully welded to stringer.

3.05 INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommendations & **Structural Engineer’s** design as reviewed by the **Architect**.
B. Coordinate & confirm that items installed by others or prior to rails including stairs and landings are level and plumb, free from distortion or defects detrimental to appearance or performance.
C. Provide embed items, anchors, plates, angles, hangers, and struts required for connecting railing & guardrail assemblies to stairs, structures, etc.
D. Verify alignment with adjacent construction. Coordinate related work.
E. Field cutting and/or altering of members of the railing & guardrail assemblies shall only be made when approved by **Structural Engineer** & **Architect**.
F. Exposed to view field welding & shop welding shall be ground smooth prior to finishing.
G. All bolts, screws and rough welding shall be concealed from view. Where not hidden, use flush countersunk fastenings.
H. Fasten joints butted tight, flush, and hairline.
I. Grind welds smooth and flush.
J. Railing & guardrail relationships to stairs & landings shall be as follows:
   1. Stairs shall have continuous handrails on both sides that extend a minimum of 12 inches on one side beyond the top riser and 12 inches plus the width of one tread on one side beyond the bottom riser. At the top, the 12 inch extension shall be parallel with the floor. At the

bottom, the handrail shall continue to slope for a distance of one floor tread width from the bottom riser with the 12 inch remainder being horizontal and parallel with the floor. Care should be used so the extension itself does not present a hazard.

2. At all landings, between sets of risers and at top landing an angle with lop minimum 4" above landing slab as OSHA toe kick strip from wall to post stringer.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END SECTION

07 19 00
WATER REPELLANT / ANTI-GRAFFITI COATINGS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable extents of work at the jobsite and coordinate with **General Contractor**.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Field application of clear water repellant/anti-graffiti coating applied in two coats to protect above-grade, vertical and horizontal surfaces of exterior and interior surfaces of all exposed, and semi-exposed surfaces.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. Title 24, California Code of Regulations, California Building Standards Commission
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. CBC Energy Code, California Code of Regulations, Title 24, Part 6, California Building Standards Commission
E. Title 24, Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
F. American Association of State Highway and Transportation Officials (AASHTO)

1.03 PERFORMANCE, TESTING, AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Water Sealant	Effects of accelerated weathering on Silicone Rubber	After 4000 hours, no signs of weathering (Accelerated weathering is equivalent of 30 years actual weathering in field)	ASTM 793-75
	Effects of hydrostatic pressure on Water Sealant	Withstand up to 2.8 atmospheres of hydrostatic pressure before compromise	ASTM D751-95
	Surface frictional properties of concrete treated with Water Sealant	No significant change in the frictional properties of concrete	ASTM E-303
	Permeability of Water Sealant	Permeance between 10 and 14 perms	
		Comply	21 CFR 177.2600
Masonry	Water penetration and leakage through masonry surfaces treated with Water Sealant	Allow no water penetration through masonry	ASTM E-514
Carib Brick & S	Water penetration and leakage through carib brick and S	Allow no water penetration through carib brick and S	ASTM E-514-90

Mortar	mortar treated with Water Sealant	mortar	
Brick	Water vapor permeability of brick treated with Water Sealant	Retain 86% of water vapor permeability capabilities	ASTM E-96
Concrete	Permeability of concrete sealed with Water Sealant	Retain 41% of original water vapor transmission capability	
	Cured compressive strength of freshly poured concrete treated with Water Sealant	13.7% increase in compressive strength over untreated concrete after a 28 day curing cycle	N/A
	Changes in gas permeability and water transmission of concrete treated with Water Sealant	“Breathe” or pass water vapor through the sealant (91.7% less than that of untreated concrete)	
	Changes in gas permeability and water transmission of concrete treated with Water Sealant	Chloride Ion content 15 times less than untreated concrete	AASHTO T-259
Refer to drawings and as herein specified			

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer’s data and shop drawings.
E. Submit: Manufacturer’s data: Including Manufacturer’s technical information including product label analysis with application instructions for each material proposed for use.
   1. List each material and cross-reference to specific finish system and application. Identify by manufacturer’s catalog number and general classification.
F. Samples:
   1. Install mock up test panels for each substrate, refer to Heading 1.07.
   2. Provide listing of material and application for each finish sample.
G. Product Data: Submit manufacturer’s product data sheets on all products to be used for the work.
   1. Submit description for protection of surrounding areas and non-masonry surfaces, surface preparation, application, and final cleaning.
H. Applicator Qualifications: Submit qualifications of applicator.
   1. Certification stating applicator is experienced in the application of the specified products and has done this work for a minimum of (3) years.
   2. List of recently completed concrete cleaning products used and substrates, applicable local environmental regulations, and application procedures.
I. Environmental Regulations: Submit description for testing, handling, treatment, containment collection, transport, disposal, and discharge of hazardous wastes and cleaning effluents. Describe any hazardous materials to be cleaned from substrates. Submit applicable local environmental regulations.
J. Protection: Submit description for protecting surrounding areas, landscaping, building occupants, pedestrians, vehicles, and non-concrete and non-masonry surfaces during the work from contact with concrete cleaners, residues, rinse water, fumes, wastes, cleaning effluents and Water Repellents.

K. Surface Preparation: Submit description for surface preparation of substrates to be completed before application of water repellents.
L. Application: Submit description for application procedures of water repellents.
M. Applicator Qualifications: Submit qualifications of applicator
   1. Certification stating applicator is experienced in the application of the specified products.
   2. List of recently completed water repellent projects, including project name and location, names of **Owner** and **Architect**, and description of products used substrates, applicable local environmental regulations, and application procedures.
N. Environmental Regulations: Submit applicable local environmental regulations
O. VOC Certification: Submit certification that water repellents furnished comply with regulations controlling use of volatile organic compounds (VOC).

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Applicator shall meet or exceed the following Qualifications:
   1. Experienced in the application of the specified products for a period of not less than (3) years.
   2. Employs persons trained for the application of the specified products with a minimum of (2) years experience with work per this specification.
C. Pre-Application Meeting: Convene a pre-application meeting (2) weeks before the start of application of water repellents. Require attendance of parties directly affecting work of this section, including the **General Contractor**, **Architect**, applicator, and product manufacturers' representative. Review environmental regulations, test panel procedures, protection of surrounding areas and non-masonry surfaces, surface preparation, application, field qualify control, final cleaning, and coordination with other work. *
D. Water repellant/anti-graffiti coating will not significantly alter the appearance or vapor transmission of treated surfaces.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage, and handling requirements.
B. Deliver materials to site in manufacturer's original, tightly sealed, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
C. Verify that the product matches that of the original sample applied on the test panel.
D. Store containers upright in a cool, dry, well-ventilated place, out of the sun.
   1. Store away from all other chemicals and potential sources of contamination.
   2. Keep lights, fire, sparks, and heat away from containers.
   3. Do not drop containers or slide across sharp objects.
   4. Keep containers tightly closed when not in use.
   5. Store and handle materials in accordance with manufacturer's written instructions.
E. Use product within (8) hours of opening container.

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.
B. Surface Preparation: **General Contractor** or Applicator shall be responsible for providing a clean, dry substrate free from oil, dirt, grease, efflorescence, or any other coating, which may inhibit penetration and adhesion of water repellent. This requirement applies to new construction, renovation, or remedial projects. Substrate must be completely dry prior to applying product.
C. Environmental Requirements:
   1. Temperature: Product may be applied at any temperature providing that there is no frozen moisture present in the substrate. When applied at temperatures below 40ºF the product may cure at a slower rate. Optimal temperatures should be above 40ºF (5ºC) or below 95ºF (35ºC).
   2. Do not apply material if the substrate is wet or contains frozen moisture.
      a. Allow substrate to dry for a minimum of 48 hours after rain or 96 hours after power washing.

3. Do not apply material during inclement weather or if precipitation is expected within 12 hours.
4. Do not use spray methods of application under windy conditions.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.
D. Special precautions shall be taken to avoid fumes from entering the building being treated. Ventilation systems and fresh air intakes shall be turned off and covered.
E. Protect shrubs, metal, glass, vehicles, and other building hardware from overspray.

1.09 ENVIRONMENTAL REGULATIONS

A. Comply with applicable federal, state, and local environmental regulations & contact product manufacturer for additional information.

1.10 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.
C. Furnish manufacturer's additional five (5) year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

1.11 RELATED WORK/SECTIONS

A. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 04 22 00 – Concrete Unit Masonry

1.12 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.13 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer.
B. Acceptable manufacturer shall be one of the following and as listed herein and in Drawings:
   1. Professional Products of Kansas, Inc., 4456 S. Clifton, Wichita, KS 67216, (800) 676-7346, (316) 522-9300, Fax (316) 522-9346, www.watersealant.com
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
         1. Products must be penetrating, permanent waterproofing treatment using a silicone rubber base and not contain any paraffin waxes, urethanes or polysiloxanes.

2. Silane and siloxane based products will not be considered because of their lack of elongation (400%), allowing for thermal expansion and contraction.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 WATER REPELLANT / ANTI-GRAFFITI COATING

A. General:
1. Refer to Professional® product data sheets & contact a Professional® representative to confirm the appropriate types and applications to be used prior to issuance of submittals.
2. Characteristics:
a. Material: Penetrating silicone rubber water repellant / anti-graffiti coating.
b. Coating can alter color, install on test panels to determine color change for review and approvals.
c. Will not form a surface film or gloss.
d. Inorganic, it is not affected by UV rays, salts, acid rain, etc.
e. Breathable, it allows moisture vapor to escape while preventing liquid penetration.
f. Flexible, it bridges hairline cracks and allows for building movement.
3. Submit to **Architect** the proposed material for final acceptance prior to purchasing and commencing with installation.
4. Application procedure and coverage rates must be in conformance with effectiveness of testing samples submitted, recommendation of application rates suggested, approved manufacturers standards and as a minimum, that specified herein.

B. Products/Schedule:
1. First Coat @ all Vertical and Horizontal surfaces:
a. Professional® Water Sealant Super Strength
1. Composition:
a. Form: Liquid
b. Color: Clear
c. Active Substance: RTV Silicone Rubber
d. Percent Active Material: 15%
e. Flash Point: 105º

2. Second Coat @ Vertical Surfaces:
a. Professional® Water Sealant Super Strength **[**
1. Composition:
a. Form: Liquid
b. Color: Clear
c. Active Substance: RTV Silicone Rubber
d. Percent Active Material: 15%
e. Flash Point: 105º
2. Application: Split Faced Block

2.03 CURED PROPERTIES

A. Sealant must penetrate the surface of the material to which it is applied to be effective. The solvent portion evaporates. The active ingredients react to form silicone rubber, which remains below the surface and prevents water from penetrating while permitting water vapor transmission. The silicone rubber retains its characteristic 400% elongation, which allows for bridging of hairline cracks, expansion and contraction, building movement and extremes of temperature.
B. Sealant is unaffected by ultraviolet light, ozone, water, deicers and acids. It allows moisture vapor to escape while preventing liquid penetration. It cures to a clear, flat finish, which is extremely durable.

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

C. Verify by examination the following:
   1. That surfaces are acceptable to receive the specified water repellant / anti-graffiti coatings.
   2. The required joint sealants have been installed.
   3. New masonry, mortar and concrete have cured a minimum of 28 days.
   4. Surface to be treated is clean, dry, and contains no frozen moisture.
   5. Environmental conditions are appropriate for application.

D. Notify the **Architect** if surfaces are not acceptable to receive the specified products.

E. Comply with State & local agencies having jurisdiction, that conditions are acceptable to receive the water repellant / anti-graffiti coatings.

3.02 COORDINATION

A. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

B. Apply water repellant / anti-graffiti coatings after installation of windows, doors, sealant, etc.
   1. Install when possible prior to installation of items which overlap onto substrate including, but not limited to flashing.

3.03 PREPARATION

A. Refer to Division 1 for project coordination requirements.

B. Clean all dirt, dust, oil, grease, mold, mildew, efflorescence, or any other coating or material from surfaces that interfere with penetration, performance, adhesion, or aesthetics of water repellents.
   1. Use appropriate cleaners approved by the water repellents manufacturer where necessary. Rinse thoroughly, using pressure water spray to remove cleaner residues.
   2. Allow surfaces to dry completely before application of water repellents.

C. Repair, patch, and fill all cracks, voids, defects, and damaged area in surface as approved by the **Architect**. Allow repair materials to cure completely before application of water repellents.

D. Apply specified sealants and caulking and allow to cure completely before application of water repellents.

E. Seal all open joints.

F. Allow new masonry and concrete construction and repointed surfaces to cure for minimum of 28 days before application of water repellents.

3.04 MOCK UP - TEST PANELS

A. Before full-scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces.

B. Apply water repellant/anti-graffiti coating to test panels (mock-ups) to determine appropriate strength, number of applications, coverage rates, compatibility, effectiveness, surface preparation, application procedures, and desired results.

C. Apply water repellant/anti-graffiti coating to test panels (mock-ups) in accordance with manufacturer's written instructions.
   1. Allow 120 hours (5 days) or until test panels are thoroughly dry before applying graffiti paint.
      a. Allow graffiti paint to dry for 24 hours prior to removing with cleaner.
         1. Professional Phase II Cleaner
      b. Repeat cycles of cleanings and document until all graffiti paint is removed.
   2. Do not begin full-scale application until test panels are inspected and approved by the **Architect**.

D. Test Panel Requirements:
   1. Size: Minimum 4 feet by 4 feet each.
   2. Locations: Adjacent to job trailer.
   3. Number: As required to completely test each water repellent with each type of substrate to be protected.

E. Retain and protect test panels approved by the **Architect** in undisturbed condition during the work of this section, to be used as standard for judging the water repellent work.

3.05 SCHEDULE

A. Provide a schedule indicating building locations, substrates, water repellents to be used and sequence of water repellent work.

3.06 INSTALLATION

A. Apply water repellant/anti-graffiti coating to substrates in accordance with manufacturer's written instructions, environmental regulations, and application procedures determined from test panel results approved by the **Architect**.
   1. Graffiti protection requires a two-coat application.
B. Apply to clean, dry cured, and properly prepared surfaces approved by the **Architect**.
C. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.
D. Do not dilute or alter water repellents, unless otherwise specified.
E. Do not apply to below-grade surfaces.
F. Do not apply to asphalt, or polystyrene, which may be affected by the solvent carrier.
G. Do not apply to painted surfaces.
H. Do not apply to compensate for structural or material defects in substrates.
I. Avoid overspray, wind drift, and splash of water repellant/anti-graffiti coating.
J. Apply material as shipped by the manufacturer and do not dilute.
K. Apply material using a high-volume, low pressure, pump-up sprayer (between 40-50 psi), with solvent resistant fittings, foam roller, or brush of natural bristle or foam.
   1. Vertical Applications: Apply in a flood coat, from top to bottom, being sure to obtain a 4 to 6 inch rundown of product from the point where the spray makes contact with the surface. Work all the way down the building covering the rundown as you go. Avoid excessive overlapping.

3.07 FIELD QUALITY CONTROL

A. Inspections: Inspect the water repellant/anti-graffiti coating work with the **General Contractor** , **Architect**, applicator, and Professional Products of Kansas representative after a test area in an inconspicuous location has been applied, and compare with test panel results approved by the **Architect**. Determine if the substrates are suitably protected by the water repellant/anti-graffiti coating.
B. Manufacturer's Field Services: Provide the services of a manufacturer's authorized field representative to verify specified products are used, and protection, surface preparation and application of water repellant/anti-graffiti coating are in accordance with the manufacturer's written instructions and the test panel results approved by the **Architect**.

3.08 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Protect surrounding areas, landscaping building occupants, pedestrians, vehicles, and non-masonry surfaces during the work from contact with water repellents, masonry or concrete cleaners if used, residues, rinse water, fumes, wastes, and effluents in accordance with manufacturer's written instructions.
C. Divert and protect pedestrian and auto traffic.
D. Comply with State & local agencies having jurisdiction, requirements for protecting the surrounding areas and all non-masonry surfaces during the water repellant/anti-graffiti coating.
E. Special precautions shall be taken to prohibit fumes from entering the building being treated. Ventilation systems and fresh air intakes shall be turned off and covered.
F. Clean site of all unused water repellant/anti-graffiti coating, residues, rinse water, wastes, and effluents in accordance with environmental regulations.
G. Remove and dispose of all materials used to protect surrounding areas and non-masonry surfaces, following completion of the work of this section.
H. Repair, restore, or replace to the satisfaction of the **Architect**, all materials, landscaping, and non-masonry surfaces damaged by exposure to water repellents.

I. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
J. Provide record drawings in accordance with Division 1 closeout submittal procedures.
K. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

07 21 00
BUILDING INSULATION
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this section with related trades.
C. Verify applicable dimensions, clearances, and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Thermal, Rigid and Acoustical insulation at, but not limited to: exterior & interior walls, soffit framing, and ceilings, and as indicated on the documents & as specified herein.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society for Testing Materials (ASTM)
   1. ASTM E84 Surface Burning Characteristics of Building Materials
   2. ASTM E96 Water Vapor Transmissions of Materials
   3. ASTM E136 Behavior of Materials in a Vertical Tube Furnace at 750°C
   4. ASTM C423 Sound Absorption and the Sound Absorption Coefficient by the Reverberation Room Method
   5. ASTM C553 Specification for Mineral Fiber Blanket and Felt Insulations
   6. ASTM C612 Specification for Mineral Fiber Block and Board Thermal Insulation
   7. ASTM C665 Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.

B. **Standards:**
   1. Insulation Manufacturer test data shall be in compliance with ASTM C1289 US Test method to determine LTTR (Long Term Thermal Resistance) R-Values.

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements.
D. Submit Manufacturer's data and MSDS sheets for each product intended for use.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing projects of similar size and complexity.

C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Stipulations:
   1. Comply with insulation requirements as herein specified and as indicated in drawings.
E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
   1. Agenda for meeting shall include extent of insulation for all insulation types specified for project.
   2. **General Contractor** shall request meeting 5 days in advance of construction.
F. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site periodically during installation work to review installation procedures.
   1. Manufacturer's representative shall review and certify in writing all phases of construction to verify the complete work meets specification requirements.
   2. Written certification of all phases of construction shall be sent to the **Architect** by the manufacturer's representative.
G. Miscellaneous criteria:
   1. Insulation shall be placed and secured in place as herein specified, indicated in drawings and in compliance with manufactures instructions, most restrictive shall apply.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.
C. Label insulation packages to include material name, production date and/or product code.
D. Deliver insulation to site in original, unbroken and unopened containers. Store material off ground in dry, protected areas.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Wall Construction
   2. Ceiling and Soffit Construction
   3. Roof Construction
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 05 40 00 – Cold-Formed Metal Framing
   3. Section 07 84 00 – Fire Stopping
   4. Section 09 22 16 – Non-Structural Metal Framing
   5. Section 09 29 00 – Gypsum Board & Sheathing Substrates

6. Section 13 34 19 - Pre-Fabricated Metal Building

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 DEFINITIONS

A. "Friction Fit" implies that insulation is installed full height fully within the wall cavity and in complete contact with all surfaces within the cavity.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
   1. Thermal and Acoustical Insulation:
      a. Owens Corning, www.owenscorning.com
      b. KNAUF Insulation, www.knaufinsulation.us/
      c. Certain Teed, www.certainteed.com
      d. Dow Building Solutions, www.building.dow.com/en-us/
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.

2.02 MATERIALS – BUILDING ENVELOPE

A. Thermal Batt Insulation
   1. General:
      a. Provide at all exterior walls, furring walls at inside face of exterior walls, roofs, ceilings, soffits, and inside header assemblies, to provide complete and continuous building thermal envelope.

   2. Concealed Conditions:
      a. Manufacturer: Owens Corning
      b. Type: Unfaced fiberglass batt insulation
         1. Meets ASTM C665 Type I, Class A
         2. Meets ASTM C1338 Mold/mildew resistant
         3. Meets ASTM E136 Non-Combustible
         4. UL File #BKNV 3576 (Fire Rated Assemblies)
      c. Product: EcoTouch® Pink® Fiberglas™ Insulation with PureFiber® Technology
      d. Installation: Friction Fit to fill cavity
      e. Application: Fully enclosed and concealed within wall, ceiling, soffit or header cavities
      f. R-Value, ASTM C518:
         1. Metal stud framing, 16" and/or 24" width:
            a. 6" walls: R-19 6-1/4" thick
            b. 8" walls: R-25 8" thick
            c. 10" walls: R-30 9-1/2" thick
            d. 12" walls: R-38 12" thick

2. Wood stud framing:
    a. 2x4 walls: R-15 3-1/2" thick
    b. 2x6 walls: R-21 5-1/2" thick
    c. 2x8 walls: R-22 6-3/4" thick
    d. 2x10 walls: R-30 9-1/2" thick
    e. 2x12 walls: R-38C 10-1/4" thick

g. Surface Burning Characteristics, ASTM E84:
    1. FlameSpread: 10
    2. Smoke Developed: 10

h. Do not install on top of or within 3" of recessed light fixtures unless the fixtures are approved for such use.

3. Semi-Exposed Conditions (walls, ceilings, soffits, headers, etc.):
    a. Manufacturer: Owens Corning
    b. Type: FSK (Foil) Faced fiberglass batt insulation
        1. Meets ASTM C665 Type III, Class A
        2. Meets ASTM C1338 Mold/mildew resistant
        3. Meets ASTM E136 Non-Combustible
    c. Product: EcoTouch® Flame Spread 25 Fiberglas™ Insulation with PureFiber® Technology
    d. Application: Exposed above ceilings / within interstitial spaces but not visible in finished, occupied space
    e. Installation: Friction Fit to fill cavity
        1. Provide extended flanges as required for proper installation within wall and/or ceilings where insulation has greater depth than stud cavity
    f. R-Value, ASTM C518:
        1. Metal stud framing, 16" and/or 24" width:
            a. 4" walls: R-11 3-1/2" thick
            b. 4" walls: R-13 3-1/2" thick (16" width only)
            c. 6" walls: R-19 6-1/4" thick
            d. 8" walls: R-22+ Multiple layers of R-11 or R-13 to fill cavity
            e. 10" walls: R-30 9-1/2" thick
            f. 12" walls: R-38 12" thick
        2. Wood stud framing, 16" and/or 24" width:
            a. 2x4 walls: R-13 3-1/2" thick
            b. 2x6 walls: R-21 5-1/2" thick
            c. 2x8 walls: R-22+ Multiple layers of R-11 and/or R-13 to fill cavity
            d. 2x10 walls: R-30 Multiple layers of R-13 and/or R-21 to fill cavity
            e. 2x12 walls: R-38 Multiple layers of R-13 and/or R-19 to fill cavity
    g. Surface Burning Characteristics, ASTM E84:
        1. FlameSpread: 25
        2. Smoke Developed: 50
    h. Do not install on top of or within 3" of recessed light fixtures unless the fixtures are approved for such use.
    i. Where multiple layers are required, install concealed second layer using un-faced product.

4. Exposed Conditions (walls, ceilings, soffits, headers, etc.):
    a. Manufacturer: Owens Corning
    b. Type: PSK (white polypropylene) Faced fiberglass batt insulation
        1. Meets ASTM C665 Type II, Class A
        2. Meets ASTM C1338 Mold/mildew resistant
        3. Meets ASTM E136 Non-Combustible
    c. Product: EcoTouch® Flame Spread 25 Fiberglas™ Insulation with PureFiber® Technology
    d. Application: Exposed and visible in finished, occupied space

e. Installation: Friction Fit to fill cavity
   1. Provide extended flanges as required for proper installation within wall and/or ceilings where insulation has greater depth than stud cavity
f. R-Value, ASTM C518:
   1. Pre-Manufactured Metal Building Walls, 16" and/or 24" width:
      a. R-30 8-1/4" thick
   2. Pre-Manufactured Metal Building Roof 16" and/or 24" width:
      a. R-30 8-1/4" thick
g. Surface Burning Characteristics, ASTM E84:
   1. Flame Spread: 25
   2. Smoke Developed: 50
h. Light Reflectance: 0.80
i. Do not install on top of or within 3" of recessed light fixtures unless the fixtures are approved for such use.
j. Where multiple layers are required, install concealed second layer using un-faced product.

2.03 MATERIALS – INTERIOR

A. Acoustic Insulation:
   1. General:
      a. Provide acoustic batt insulation at all interior walls, framed ceilings, framed soffits, and inside header assemblies, unless otherwise noted.
   2. Concealed Conditions
      a. Manufacturer: Owens Corning
      b. Type: Unfaced Fiberglass Acoustic Batt Insulation
         1. Meets ASTM C665 Type I, Class A
         2. Meets ASTM E136 Non-Combustible
      c. Product: Sound Attenuation Batt Insulation
      d. Installation: Friction Fit to fill cavity
      e. Application: Fully enclosed and concealed within wall, ceiling, soffit or header cavities
      f. Surface Burning Characteristics, ASTM E84:
         1. FlameSpread: 10
         2. Smoke Developed: 10
      g. Do not install on top of or within 3" of recessed light fixtures unless the fixtures are approved for such use.

2.04 OTHER MATERIAL

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

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
B. Remove, or protect against, projections in construction framing which may damage or prevent proper installation of insulation.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.

B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Coordinate installation of insulation that needs to be installed prior to the erection of wall and/or ceiling framing.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 INSTALLATION

A. General:
   1. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as submitted to and reviewed by the **Architect**, anchoring all components as indicated into position.
   2. Install thermal insulation with snug fit at sides and firmly butted ends with no open space existing at perimeter or in between.
   3. ANCHOR AND INSTALL LOCATIONS AS REQUIRED BY CONSTRUCTION TYPE & IN ACCORDANCE WITH MFGR'S RECOMMENDATIONS:
      a. For additional installation methods & details of installation, refer to manufacturer's standard details & specifications.
      b. Install insulation product such that insulation fits full width between framing members.
      c. At enclosed roof / ceiling structures install in compliance with CBC
      d. Provide insulation with extended nailing flanges where framing members are shallower than insulation.
   4. Where wall framing width differs, install sufficient insulation thickness (or combination of multiple layers) to entirely fill cavity and header by width and height.
   5. Install insulation full cavity fill inside all metal stud headers and jambs.
   6. For additional installation information, refer to Part 2 schedule of materials as herein specified.

3.05 FIELD QUALITY CONTROL

A. Monitor work to insure installation and assembly are in accordance with applicable standards.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

07 62 00
SHEET METAL FLASHING & TRIM
Shakori Garage Replacement`
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

1. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
2. Coordinate the work of this Section with related trades.
3. Verify applicable dimensions at the jobsite.
4. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
    1. Flashing
    2. Transition flashing
    3. Copings
    4. Perimeter edge flashing

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. Aluminum Association (AA), www.aluminum.org
E. American Architectural Manufacturers Association (AAMA), www.aamanet.org
F. American Society For Testing and Materials (ASTM), www.astm.org
G. American National Standards Institute (ANSI), www.ansi.orgAmerican Welding Society (AWS), www.aws.org
H. American Society of Mechanical Engineers (ASME) www.asme.org
I. American Welding Society (AWS), www.aws.orgNational Coil Coating Association, www.**coil**coating.org
J. National Coil Coating Association, www.**coil**coating.org
K. Sealant, Waterproofing and Restoration Institute (SWRI), www.swrionline.org
L. Sheet Metal and Air Conditioning Contractors, Association (SMACNA), www.smacna.org
    1. Architectural Sheet Metal Manual

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
    1. Comply with manufacturer's standards.
    2. Comply with Building Code.
    3. Job site inspections shall be done as herein specified and as listed in drawings.
    4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Flashing - premanufacturerd	Installation	Comply	Specific manufacturers recommendations
Flashing – custom shapes	Installation	Comply	SMACNA and as detailed, comply with most restrictive
Refer to drawings and as herein specified			

C. **Sustainability:**
    1. Refer to Division 1 sustainability requirements.
    2. Refer to product criteria identified herein.

D. Construction Monitoring/Observations by others:

Item	Name of Test	Performance Results	By Whom

Pre-manufactured Copings	Installation compliance	Comply	Manufacturer's representative
Flashing	Waste and recycling	Comply	Refer to Division 1 for construction waste management and disposal/recycling requirements

1.04 SUBMITTALS AND MOCK-UPS

1. Refer to Division 1 for substitution, deviation and/or submittal procedures.
2. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
3. Refer to Division 1 for sustainability requirements
4. Submit Manufacturer's data and shop drawings.
    1. Data:
        a. Manufacturers data for each specific pre-manufactured flashing components
        b. Fasteners
        c. Sealants
        d. Adhesives
    2. Shop Drawings;
        a. Provide detailing with all dimensions and field verified dimensions and indicate on all these the applicable detail number from contract documents.
            1. Illustrating the following, but not limited to:
                a. Layout, joining, profiles, expansion joints and anchorage of fabricated work
                b. Layout, joining, profiles, expansion joints and anchorage of pre-manufactured components, copings, etc.
                b. Boot flashing
                c. Counter-flashings, trim/fascia units
                d. Wall to coping transition boot flashing assemblies
        b. All details shall be a minimum of 3" = 1'-0" scale
        c. All plan layouts shall be at 1" = 1'-0" scale
        d. Details shall be at numbered and referenced to match Architectural details.

E. Submit samples.
    1. Soldered boot flashing to illustrate welding

F. Site mock-up, refer to "Mock-Up" heading.

1.05 QUALITY ASSURANCE

1. Refer to Division 1 for quality control requirements.
2. Contractor /Installer/Fabricator shall have been in business for **five (5)** years minimum providing/installing/finishing projects of similar size and complexity.
3. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
4. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
    a. Agenda for meeting shall include, but not be limited to;
        1. Copings
        2. Roof flashing and counter flashing
        3. Boot flashings, i.e. wall to roof, wall to coping, etc.
5. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the pre-manufactured copings, etc. on-site periodically during installation work to review installation procedures.
    1. Manufacturer's representative shall review and provide written review that work meets specification requirements.
    2. Written reviews shall be sent to the **Architect** by the manufacturer's representative.
6. Miscellaneous criteria:

1. All work shall conform to the recommended practices of the most current adopted edition of the Architectural Sheet Metal Manual by SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc) and details whichever is most restrictive.
2. Oil – Canning in excess of that allowed by SMACNA is not acceptable, and all conditions shall be replaced and/or repaired prior to completion & review for acceptance.
3. All flashing conditions in direct contact with roofing material shall have homogeneous soldered seams, typical.
4. Fabricator shall be qualified fabricator whose work is in compliance with SMACNA guidelines and specifications as herein specified and in Drawings

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

1. Refer to Division 1 for product delivery, storage and handling requirements.

1.07 JOB CONDITIONS

1. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

2. Protect finish surfaces at all times from surfaces and material adjacent to them.
3. Finish work defaced with other materials on surface shall be replaced.
4. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

1. Refer to Division 1 for closeout submittal procedures.
2. Furnish initial one (1) year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
    1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.
3. Furnish manufacturer's additional [five] (5) year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
    1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**
4. Furnish installing contractors additional [five] (5) year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
    1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

1.10 RELATED WORK/SECTIONS

1. Related work includes, but is not limited to the following:
    1. Roofing
    2. Walls
    3. Openings
2. Related Sections include, but are not limited to the following:
    1. Division 1
    2. Section 07 92 00 – Sealants and Caulking
    3. Section 08 11 13 – Steel Doors & Frames
    4. Section 08 41 00 – Entrances, Window Wall, Storefront System & Curtain Wall
    5. Section 09 29 00 – Gypsum Board & Sheathing Substrates
    6. Section 09 90 00 – Paintings & Coatings
3. Related Documents include, but are not limited to the following:
    1. Division 1 Supplementary Conditions

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
    1. Complete instructions regarding maintenance of the materials, finishes, etc.
    2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.
C. Schedule work and sequence with other trades affected or affecting work under this specification.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS/FABRICATORS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturers shall be one of the following and as listed herein and in Drawings:
   1. Pre-manufactured copings, flashings, etc:
      b. Fry Reglet, www.fryreglet.com
      b. SBC Industries, Roof flashings, www.sbcflashings.com
      c. Metal-Era, www.metalera.com
      d. Lane-Aire Manufacturing Corp., www.lane-aire.com
   2. Flashing
      a. Refer to documents and as herein specified.
   3. Fasteners::
      a. Steeler, Inc., www.steeler.com
   4. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      a. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      b. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
B. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
C. Refer to drawings, details, and other related specification section whether listed or not.
D. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. General:
   1. Zinc-Coated Steel: Commercial quality with 0.20% copper, ASTM A 525 except ASTM A 527 for lock forming, G90 hot-dip galvanized, mill phosphatized where indicated for painting; 0.0239" thick (24 gage) except as otherwise indicated.
   2. Metal Accessories:
      a. Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed non-corrosive, size and gage required for performance.
      b. Solder: ASTM B32, Class A1
      c. Flux: Muriatic acid. Asphaltic primer: ASTM D41
   3. General Accessories:
      a. Plastic cement: Asphaltic, FS SS-C-153, Type I
      b. Sealant: Refer to Section 07 92 00

   4. Flashing Reglets:
      a. Comply with flashing requirements: Gauge as required by SMACNA.
      b. Flashing:
         1. Galvanized Steel: 22 gauge min. and as required by SMACNA
            a. 16GA at gutter straps
         2. Copper:
            a. 16 ounce min and as required by SMACNA, coordinate with Specific section for siding and roofing.
         3. Aluminum:

a. 0.040 gauge min and as required by SMACNA, coordinate with Specific section for siding and roofing and Storefront.

4. Stainless Steel:
   a. 26 gauge min. and as required by SMACNA
5. Zincalume:
   a. 22 gauge min and as required by SMACNA, coordinate with Specific
      1. section for siding and roofing.
   b. 16GA at gutter straps
6. Lead:
   a. 6lb per ft. squared (+/- 1/8" thick)
   b. Roll goods

c. Waterproof membrane and flexible flashing – roll goods:
   1. Material: Cold-applied self-adhering high density, cross laminated polyethylene film coated on one side with a layer of butyl rubber adhesive sheet membrane

B. Schedule:
1. **Flashing**
   a. General:
      1. Flashing typically shall be designed and installed as herein specified, and indicated on Drawings unless noted and/or specified otherwise.
      2. Flashing shall typically be provided under this specification section, unless noted and/or specified otherwise.
      3. Flashing shall be repaired prior to finishing.
      4. Flashing shall be prepared to be painted.

   b. <u>Aluminum Entrance and Window Wall Systems – Section 08 41 00:</u>
      1. Flashings shall be aluminum break shapes to match mullion material, finish and color.
         a. Provide and install under "Aluminum Entrance, Window Wall and Window wall Systems" section.
         b. Fabricate in accordance with this specification and "Aluminum Entrance, Window Wall and Window wall Systems" section.
         c. Install in accordance with this specification section and "Aluminum Entrance, Window Wall and Window wall Systems" section.

2. **Wall penetration flashing, window & door flashing & counterflashing**
   a. General:
      1. Flashing typically shall be designed and installed as herein specified, and indicated on Drawings unless noted and/or specified otherwise.
      2. Flashing shall typically be provided under this specification section, unless noted and/or specified otherwise.
      3. Flexible cold applied waterproof membrane and flexible flashing, refer to Section 07 13 26

         a. Provide and install under "Aluminum Entrance, Window Wall and Window wall Systems" section.
         b. Fabricate in accordance with this specification and "Aluminum Entrance, Window Wall and Window wall Systems" section.
         c. Install in accordance with this specification section and "Aluminum Entrance, Window Wall and Window wall Systems" section.

3. **Wall and Parapet: roofing to wall transition - Reglets & Counterflashing**
   a. General:
      1. Flashing typically shall be designed and installed as herein specified, and indicated on Drawings unless noted and/or specified otherwise.
      2. Flashing shall typically be provided under this specification section, unless noted and/or specified otherwise.

3. Snap in type reglets and flashing skirts shall be supplied as a two piece unit, but just the reglet, typ.

4. **Waterproof Membrane**
   a. Shall be provided and installed by who is responsible for the specific components; Gutters and Downspouts, Copings, etc.
   b. **General Contractor** will need to coordinate products and application of membranes.

5. **Fasteners/Soldering**
   a. General:
      1. Fasteners typically shall be installed as herein specified, and indicated on Drawings unless noted and/or specified otherwise.
      2. Fasteners shall typically be provided under this specification section, unless noted and/or specified otherwise.
      3. Fasteners shall be compatible with all material they penetrate and/or come in contact with.
   b. Fasteners shall be provided by and installed under the scope of work as herein listed.
   c. Solder where indicated and when required by assembly.

2.03 SCHEDULE

A. General:
   1. Flashing type shall be compatible with metals that it is in contact with and installed to eliminate galvanic corrosion.
   2. Flashing shall match finish of adjacent metal, U.N.O.
   3. Coordinate material, finish and color with wall, roof and parapet conditions.
   4. Dissimilar materials shall be isolated from each other.

B. Material Types: **[Specifier, select which apply]**
   1. Flashing, u.n.o.
   2. Typical, u.n.o.: Galvanized Steel
   3. Pre-Fabricated Metal Building Roofing: Pre-Fabricated Metal Building metal roofing material
   4. Pre-Fabricated Metal Building Siding: Pre-Fabricated Metal Building siding material
   5. Specific conditions not included in a specific associated Specification Section: as noted

C. Fasteners:
   1. Install type as approved by product manufacturer whose material is being fastened through and material type that is compatible with flashing and other materials which fastener comes in contact with.
   2. Exposed conditions, fasteners shall include neoprene washers, typical.
   3. Solder in accordance with materials requirements.

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Coordinate application of all flexible waterproof membrane flashings
    1. Refer to Section 07 13 26 – Cold Applied Self-Adhering Waterproof Membrane

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 FABRICATION

A. General:
    1. Fabricate in compliance with SMACA guidelines and contract documents
        a. Most restrictive shall govern
B. Assemblies:
    1. Flashings and counter flashings:
        a. Install wherever detailed and as necessary to make building watertight. Lap joints at least 6 inches and fill with sealant. Coordinate installation with other trades involved. Attach with material compatible screws, neoprene washers and cap with bead of sealant.
    2. Caps and closures:
        a. Provide miscellaneous caps and closures; profiles and gauges as shown on Drawings.
    3. Expansion joints:
        a. Per SMACNA Standards.
        b. Locate per SMACNA standards & details. (Coordinate with joints indicated on documents.)
    4. Gutters and downspouts:
        a. All joints at gutters & downspouts shall be secured by means of continuous soldering, unless at expansion joint condition.
    5. All flashing and counterflashing at inside & outside corners shall be continuously soldered for watertight assembly.
        a. At pre-manufactured assemblies such as Transition Flashing, the specifiedtwp piece 'Springlok' - reglet and snap in skirt flashing,shall be installed with manufacturers pre-manufactured inside and outside corners.
    6. Roof drains, overflow drains and rainwater piping
        a. When concealed within the construction of the building; shall be tested in conformity with the provisions of the applicable building code . for testing drain, waste and vent system.
    7. Lead flashing
        a. Shall be coated with a bituminous coating prior to direct contact with uncured concrete or mortar.
    8. All connections to lead shall be soldered.
        a. Soldering:
            1. Use appropriate flux and solder
            2. Neutralize flux after soldering
    9. Waterproof flexible flashings and membranes
        a. Cold-applied self-adhering waterproof membrane shall be installed in accordance with manufacturer's instructions.
        b. Install membrane in shiplap fashion such that membrane overlaps substrate barrier material.
        c. Insure that Waterproof Membrane is compatible with other materials it comes in contact with and notify **Architect** of any compatibility problems.
        d. Insulate, separate sheet metal work and install approved fasteners that will be in contact with dissimilar metals or other material that would produce electrolytic action.

3.05 MOCK-UP

A. Erect at location approved by **Architect**.
    1. Mock-up shall not be part of final construction once approved by **Architect**.
        a. When approved by **Architect** some mock-ups can be part of final construction

2. Mock-up shall comprise of all components and finishes as specified and indicated in Drawings.

B. Assembly:
   1. Mock-up shall comprise of all components and finishes as specified and indicated in Drawings and as herein specified to include;
      a. Boot flashing
      b. Coping(s)
      c. Roof flashing and skirt counter flashing, inside & outside corners
      d. Refer to drawings
   2. Size:
      a. Boot flashing:
         1. One installed and can be part of final construction
      b. Coping:
         1. 10'-0" section with outside corner
      c. Roof flashing and skirt counter flashing, inside & outside corners:
         1. 3'- 0" minimum with an inside and outside corner

3.06 INSTALLATION

A. General:
   1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
   2. Fabricate in compliance with SMACA guidelines and contract documents.
      a. Most restrictive shall govern

B. Workmanship
   1. Specifications herein are minimum required; provide such extra materials and workmanship as necessary to obtain required results. Install work in accordance with recognized standards and best trade practices.
   2. Finish shapes true and straight as shown or as required to match existing adjoining sheet metal.
   3. Where members intersect each other, cope to precise fit and securely solder; solder slowly with well-heated coppers; neat and with full flowing joints; thoroughly clean materials at joints before soldering; scrape exposed soldering on finished surfaces smooth; make lock seam work flat and true to line and sweated full of solder; thoroughly wash acid fluxed work with soap suds and water solution after soldering.
   4. Install sheet metal work to provide allowances for expansion and contraction and weather tightness throughout and as hereinafter specified.
   5. Clean and coat with asphaltic primer all surfaces that will be in contact with roofing materials or that will not be exposed after installation.
   6. Allow to dry thoroughly before installation.
   7. Touch up painting
      a. Where new or existing galvanizing is damaged by fabrication or installation, repair surfaces with "Galvalloy" or "Galvweldalloy," or Zincalume compatible material, applying in accordance with manufacturer's printed directions.
         1. Float full, grind, and buff smooth.
      b. Touch up material shall be compatible with substrate.

3.07 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
   2. The Applicator shall be responsible for the proper application of the materials.

B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

C. Touch up:

1. Where new or existing galvanizing is damaged by fabrication or installation, repair surfaces with "Galvalloy" or "Galvweldalloy," or Zincalume compatible material, applying in accordance with manufacturer's printed directions. Float full, grind, and buff smooth.
2. Touch up material shall be compatible with substrate.

3.08 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END SECTION

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Verify applicable dimensions at the jobsite.
C. Furnish materials and perform labor required per this specification to execute this work as indicated on the drawings, as specified, as required by local and state codes and regulations and as necessary to complete the work and fireproofing including the following but not limited to:
   1. Through penetration, edge treatment and other firestop and smoke stop treatment for all fire-rated walls, floors and roofs, including, but not limited to:
      a. HVAC duct penetrations
      b. Pipe penetrations
      c. Conduit penetrations
      d. Structural member penetrations
      e. Slab edge
      f. Roof edge
   2. Edge bonding and core material for fire-resistant/fire rated door and window assemblies.
   3. Bottom of wall fire stopping and top of wall firestopping
      a. Fire stopping at fire rated walls below access flooring
      b. Construction joint firestops within walls, or the intersection of top of walls to structure

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC), www.bsc.ca.gov current edition at time of permit issuance.
   1. Including, but not limited to;
      a. CBC Chapter 7 including but not limited to;

1. Wall penetrations	Section 712 and its sub sections
2. Fire resistive Joint Systems	Section 713 and its sub sections
3. Opening Protectives	Section 715 and its sub sections
4. Ducts and Air Transfer Openings	Section 716 and its sub sections
5. Concealed spaces	Section 717 and its sub sections
6. Thermal and Sound-insulating Materials	Section 719 and its sub sections
7. Prescriptive Fire Resistance	Section 720 and its sub sections
8. Calculated Fire Resistance	Section 721 and its sub sections

B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society For Testing and Materials (ASTM), www.astm.org
   1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Bldg Materials
   2. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Firestops
   3. ASTM E119 - Standard Test Method for Fire Tests of Building Construction Materials
   4. ASTM E1399 - Standard Test Method for Cyclic Movement and Measuring of Joint Systems
   5. ASTM E1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems Electrical Systems Components
   6. ASTM E1966 - Standard Test Methods for Fire Tests of Joints
   7. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale Multi-Story Test Apparatus
E. International Fire Council guidelines for evaluating Firestop Systems Engineering judgments.
F. National Fire Protection Agency (NFPA), www.nfpa.org
   1. NFPA 80 Standard Fire Door and Window Assembly Tolerances
   2. NFPA 252 Standard Fire Test for Fire Rated Doors (not specified for positive or negative furnace test pressure)
   3. NFPA 257 Standard Fire Test for Fire Rated Windows (not specified for positive or negative furnace test pressure)
   4. NFPA 101 Life Safety Code
   5. NEC 70 National Electrical Code
G. Underwriters Laboratory (UL), www.ul.com

1. UL 723 - Surface Burning Characteristics of Building Materials
2. UL 1479 - Fire Tests of Through-Penetration Firestops, including optional air leak test
3. UL 2079 - Fire Tests of Building Joint Firestop Systems
4. UL Fire Resistance Directory (Component Listing Test Criteria)
   a. HW designs: Volume 2A
5. F – Ratings, UL designs: ASTM E 814 & UL 1479
6. T – Ratings, UL designs: ASTM E 814 & UL 1479
7. L - Ratings, UL designs: ASTM E 814 & UL 1479

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
1. Comply with manufacturer's standards.
2. Comply with Building Code.
3. Job site inspections shall be done as herein specified and as listed in drawings.
4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Firestopping design	F-Rated Systems: (fire)	Provide firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance ratings of the construction assemblies listed.	ASTM E814
	T-Rated Systems: (temperature)	Provide firestop systems with T-ratings indicated, where systems protected penetrating items exposed to potential contact with adjacent materials in occupiable floor areas.	ASTM E814 and ASTM E119,
	L-Rated Systems	Provide firestop systems with L-ratings indicated, where systems maintain a barrier to cold smoke at all: penetrations, connections with other surfaces, separations required to permit building movement, sound or vibration absorption, and other construction gaps	UL2079,ASTM EB99 and ASTM E814,
	Flame Spread	25 or less	ASTM E84
	Smoke developed	450 or less	
Construction joint/gap systems	cyclic movement	meet or exceed 500 cycles at 10 cycles per minute.	UL 2079 and ASTM E1399
Refer to drawings and as herein specified			

C. **Sustainability:**
1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

D. **Construction Testing / Inspection by others:**

Item	Name of Test	Performance Results	By Whom
Firestopping systems and assemblies	Design compliance	Comply	Special Inspector Inspection service as approved by agency having jurisdiction
Cost for independent inspections shall be borne by **General Contractor**			

E. **Construction Monitoring/Observations by others:**

Item	Name of Test	Performance Results	By Whom

Fitestopping systems and assemblies	Const. Waste Management	Comply	Refer to Division 1 for construction waste management and disposal/recycling requirements

1.04 SUBMITTALS AND MOCK-UPS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified
C. Refer to Division 1 for sustainability requirements Submit Manufacturer's data and shop drawings.
   1. Manufacturer's product literature for each type of firestop material as follows:
      a. Product characteristics, typical uses, installation procedures, performance and limitation criteria
      b. Material Safety Data Sheets (MSDS)
      c. Firestop system products bear classification marking of qualified testing and inspecting agency
      d. Firestop systems correspond to those indicated by reference to firestop system designations listed in these specifications and/or in the drawings by the following:
         1. Assembly type
         2. UL in "Fire Resistance Directory"
         3. ITS (Warnock Hersey) in "Directory of Listed Products"
         4. Omega Point Laboratories
         5. Factory Mutual
      e. Local and State regulatory requirements: Submit forms of acceptance for proposed assemblies not conforming to specific UL Firestop System numbers or UL classified devices.
   2. Submit manufacturer's installation procedure for each type of product.
      a. For each firestop system show construction conditions, relationships to adjoining construction, dimensions, description of materials and finishes, component connections, anchorage methods, hardware and installation procedures, plus the following:
         1. Firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that confirms compliance with requirements for each condition indicated.
      b. Documentation, including illustrations, from a qualified testing and inspection agency that is applicable to each firestop system configuration for construction and penetrating items. Factory 2nd/ or manufacturer furnished installation details are not acceptable in lieu of published documents by approved testing agencies (UL, OPL, Warnok Hersey, etc).
      c. Where Project conditions require modification of a qualified testing and inspecting agency's illustration to suit a particular firestop condition, submit illustration, with modifications marked, approved by firestop system manufacturer's fire-protection engineer.
      d. Submit manufacturer's drawings for all non - standard applications where no UL tested system exists. All drawings must indicate the "Tested" UL system upon which the judgment is based so as to asess the relevance of the judgment to some known performance.
      e. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.
   3. List of 3M supplied assembly Identification labels
D. Submit samples.
   1. Coordinate with Inspector
E. Site mock-up, refer to "Mock-Up" heading.
F. Certification:
   1. For firms and persons specified in "Quality Assurance" Section to demonstrate their capabilities and experience, include a list of names and addresses of completed projects, **Architects** and **Owners** and other information specified.
   2. **Product Certificates:** Signed by manufacturers of firestop system products certifying that products furnished, comply with requirements.

3. **Product Test Reports:** From a qualified testing agency indicating that firestop system complies with requirements, based on comprehensive testing of current products.
4. **Engineering Judgments:** Submit manufacturer's drawings for all non-standard applications where no UL tested system exists. All drawings must indicate the "Tested" UL system upon which the judgment is based so as to assess the relevance of the judgment to some known performance.
5. **Approved Applicator:** Submit document from manufacturer wherein manufacturer recognizes the installer as qualified or submit a list of past projects to demonstrate capability to perform intended work.
6. Certification upon completion, installer shall provide written certification that materials were installed in accordance with the manufacture's installation instructions and details.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing projects of similar size and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Stipulations:
   1. **Firestopping systems (materials & design)**:
      a. Shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions. The (F) rating must be a minimum of one (1) hour but not less than the fire rating of the assembly being penetrated.
      b. Shall conform to assembly rating per UL2079
      c. Firestopping materials shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.
      d. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
      e. Firestopping materials shall be moisture resistant, and shall not dissolve in water after curing.
      f. Provide firestop systems that are produced and installed to resist the spread of fire according to requirements indicated, resist passage of water, smoke and other gasses, and maintain original fire-resistance rating of constructed assembly.
   2. **Fire Protection Installer's Qualifications:** Engage an experienced installer, (including individual traded people such as: electrical, mechanical, insulators, etc.) who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements, plus the following:
      a. Acceptable to or licensed by manufacturer, state or local authority
      b. Established a record of successful in-service experience with firestop systems or completion of manufacturer's certified product installation training.
      c. Installation of firestopping systems shall be performed by a contractor (or contractors) trained or approved by the firestop manufacturer.
      d. Submit document from manufacturer wherein manufacturer recognizes the installer as qualified or submit a list of past projects to demonstrate capability to perform intended work.
   3. **Source Limitations:**
      a. Obtain firestop systems for each kind of penetration and construction condition indicated, from a single manufacturer.
   4. **Fire-Test-Response Characteristics:** Provide firestop systems that comply with the following requirements and those specified in "Performance Requirements".
      a. Firestopping tests and follow-up inspection services for firestop systems are performed by qualified testing and inspection agency acceptable to authorities having jurisdiction.
      b. Firestop systems are identical to those tested as herein listed and comply with the appropriate requirements:
      c. Firestop system products shall bear classification marking of a qualified testing and inspecting agency

1. Firestop systems correspond to those indicated by reference to firestop system designations listed by the following:
   a. UL in “Fire Resistance Directory”
   b. ITS (Warnock Hersey) in “Directory of Listed Products”
   c. Omega Point Laboratories
   d. Factory Mutual

d. Local and State regulatory requirements: Submit forms of acceptance for proposed assemblies not conforming to specific UL Firestop System numbers or UL classified devices.

E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
Agenda for meeting shall include, but not be limited to;
1. All locations to receive protection assemblies and/or treatment
2. Assemblies that have been altered from design
3. Inspection schedule

General Contractor shall request meeting 5 days in advance of construction.

F. Manufacturer’s Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site periodically during installation work to review installation procedures.
1. Manufacturer’s representative shall review and certify in writing all phases of construction to verify the complete work meets specification requirements.
2. Written certification of all phases of construction shall be sent to the **Architect** by the manufacturer’s representative.

G. Miscellaneous criteria:
1. For firestop systems exposed to view, traffic, moisture, sunlight and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
2. Firestopping materials shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.
3. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
4. Firestopping materials shall be moisture resistant, and shall not dissolve in water after curing.
5. Installation of firestopping systems shall be performed by a contractor (or contractors) trained or approved by the firestop manufacturer.
6. All top of wall conditions, penetrations, etc. will need to be installed to withstand vertical and lateral movement.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver firestop system products to project site in original, unopened containers or packages with intact and legible manufacturer’s labels identifying product and manufacturer, date of manufacture, lot number, shelf life, qualified testing and inspection agency’s classification marking, curing time, and mixing instructions.
C. Store and handle materials for firestop systems to prevent their deterioration or damage according to manufacturer’s instructions.
D. All firestop materials shall be installed prior to expiration of shelf life.
E. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

1.07 JOB CONDITIONS

A. Existing Conditions:
1. Verify the condition of the substrates and correct unsatisfactory conditions before installing firestop system products; follow manufacturer’s instructions.

B. Environmental Limitations:
1. Comply with manufacturer’s recommendations for temperature and humidity conditions before, during and after installation of firestop systems.

C. Ventilation:
   1. Ventilate firestop systems during installation per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
   1. Provide masking and drop clothes to prevent contamination of surfaces by firestop system materials.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.
D. Provide masking and drop clothes to prevent contamination of surfaces by firestop system materials.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Wall construction
   2. Floor construction
   3. Roof construction
B. Related sections include, but are not limited to the following:
   1. Division 1
   2. Section 07 21 00 – Building Insulation
   3. Section 07 92 00 – Sealants and Caulking
   4. Section 09 22 16– Non-Structural Metal Framing
   5. Section 09 29 00 - Gypsum Board and Sheathing Substrates

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

1.13 GENERAL SYSTEM DESCRIPTION

A. This Section Includes, but not limited to these as typical conditions and installations;
   1. Firestop systems for **through-penetrations** of the following fire-resistance-rated assemblies, including both empty openings and openings containing penetration items:
      a. Walls and partitions
   2. Firestop systems for **containment of fire, heat and smoke for pipes and conduits** passing through the following fire-resistance-rated areas:
      a. Occupied rooms and storage spaces
      b. Mechanical/electrical rooms, shafts and closets

1.14 DEFINITIONS

A. Including the following, but not limited to:
   1. **Assembly**: Particular arrangement of materials specific to a given type of construction defined in referenced documents.
   2. **Barrier:** Any bearing or non-bearing floor, wall, or ceiling assembly that has an hourly fire or smoke rating.

3. **Construction Gap:** Any joint or opening, whether static or dynamic, within or between adjacent sections of interior or exterior walls, floors, ceilings or roof decks.
4. **Engineering judgment:** Evaluations that are developed by a manufacturer for a new firestop system that complies with similar UL approved designs or tests that are acceptable to the code enforcing authorities.
5. **Drawings:** Must follow requirements set forth by the International Firestop Council, most current edition.
6. **Firestopping:** Methods and materials applied in penetrations and unprotected openings to limit the spread of heat, fire, gasses, water and smoke.
7. **Firestop Systems:** The use of a specific firestop material or combination of materials in conjunction with a specific wall, floor, or ceiling construction type and a specific penetrating material(s) to achieve a rated fire barrier.
8. **Intumescent:** Materials that expand with heat to seal around objects threatened by fire.
9. **Penetration:** Opening or foreign material(s) is breached either in total or in part. Any item passing completely through a wall or floor.
10. **Sleeve:** Metal fabrication or pipe section that is part of a system that extends through a barrier.
11. **Annular Space:** The distance between a penetrating item and the surrounding opening.
12. **Percent Fill:** The cross-sectional area of an opening that is occupied by a penetrating item.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer.
B. Acceptable manufacturer's fabricator shall be one of the following and as herein listed and in Drawings:
   1. 3M Fire Protection Products/Dow Corning, St. Paul, MN www.3m.com
   2. Hilti, Inc., Tulsa, OK (800) 879-8000 www.us.hilti.com
   3. Specified Technologies Inc. / GE Pensil (STI), Somerville, NJ 08876, (800) 992–1180 www.stifierstop.com
   4. Passive Fire Protection Partners (PFPP), www.firestop.com
   5. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIAL

A. General
   1. Firestopping materials and systems shall meet the requirements specified herein.
   2. Conditions are typical for all project conditions regardless if specifically noted or not.
   3. All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrations are subsequently removed.
   4. **Owner** must approve in writing any alternates to the firestop systems and materials specified herein.
   5. Compatibility: Provide firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through the firestop system, under conditions of service and application, as demonstrated by the firestop system manufacturer based on testing and field experience.
   6. Accessories: Provide components for each firestop system that is needed to install fill materials and to comply with "Performance Requirements". Use only components specified by firestop

systems manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

a. Permanent forming/damming/backing materials, including the following:
   1. Slag/rock-wool-fiber insulation
   2. Sealant used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state
   3. Fire-rated form board
   4. Fillers for sealant
b. Temporary forming materials
c. Substrate primers
d. Collars and steel sleeves

2.03 MATERIAL - THROUGH-PENETRATION FIRESTOP SYSTEMS

A. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR (firestop devices) and XHEZ (firestop systems) may be used, providing that they conform to the separate instance, and that the system symmetrical for wall applications.
B. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or devise, and designed to perform this function.
C. All through-penetration firestop system products must be from a single manufacturer.
   1. All trades will use products from the same manufacturer.
D. **Acceptable products:** Those listed in the UL Fire Resistance Directory for the UL System involved and defined in the attached Systems and Applications Schedule or approved equal.
E. Design Schedule:
   1. **1 & 2 Hour walls:**
      a. <u>Pipe penetrations - metallic</u>
         1. Size: 12” dia or smaller
         2. Material:
            a. Schedule 10 or heavier
            b. Service weight or heavier cast iron soil pipe
            c. Class 50 or heavier ductile iron pressure pipe
         3. Design Number: W-L-1001
         4. Mfgr: 3M
         5. Product: CP 25WB+

      b. <u>Conduit penetrations – metallic</u>
         1. Size: 6” dia. or smaller
         2. Material:
            a. Steel conduit
            b. Type L or heavier copper tubing
         3. Design Number: W-L-1001
         4. Mfgr: 3M
         5. Product: CP 25WB+

      c. <u>Conduit penetrations – metallic</u>
         1. Size: 4” dia. or smaller
         2. Material:
            a. Steel electrical metallic tubing
         3. Design Number: W-L-1001
         4. Mfgr: 3M
         5. Product: CP 25WB+

      d. <u>Conduit penetrations – metallic</u>
         1. Size: 1” dia. or smaller
         2. Material:
            a. Flexible steel conduit

3. Design Number: W-L-1001
4. Mfgr: 3M
5. Product: CP 25WB+

e. Pipe penetrations – non metallic
1. Size: 6” dia. or smaller
2. Material:
   a. Schedule 40 PVC pipe
   b. solid- core polyvinyl chloride
3. Design Number: W-L-2002
4. Mfgr: 3M
5. Product: FS – 195+, PPDs

f. Pipe penetrations – non metallic
1. Size: 4” dia. or smaller
2. Material:
   a. Schedule 40 PVC pipe
   b. Cellular core polyvinyl chloride
3. Design Number: W-L-2002
4. Mfgr: 3M
5. Product: FS – 195+, PPDs

g. Pipe penetrations – non metallic
1. Size: 4” dia. or smaller
2. Material:
   a. Schedule 40 ABS pipe
   b. Solid core acrytonitrile-butadiene-styrene (ABS)
3. Design Number: W-L-2002
4. Mfgr: 3M
5. Product: FS – 195+, PPDs

h. Pipe penetrations – non metallic
1. Size: 4” dia. or smaller
2. Material:
   a. Schedule 40 ABS pipe
   b. Fire retardant polypropylene (FRPP)
3. Design Number: W-L-2002
4. Mfgr: 3M
5. Product: FS – 195+, PPDs

i. Conduit penetrations – non metallic
1. Size: 4” dia. or smaller
2. Material:
   a. Rigid non-metallic conduit formed of PVC
3. Design Number: W-L-2002
4. Mfgr: 3M
5. Product: FS – 195+, PPDs

j. Tubing penetrations – non metallic
1. Size: 1” dia. or smaller
2. Material:
   a. Electrical non-metallic tubing formed of PVC
3. Design Number: W-L-2002
4. Mfgr: 3M
5. Product: FS – 195+, PPDs

k. Pipe penetrations – non metallic
   1. Size: 6” dia. or smaller
   2. Material:
      a. Schedule 40 CPVC
      b. Chlorinated polyvinyl chloride pipe (CPVC)
   3. Design Number: W-L-2002
   4. Mfgr: 3M
   5. Product: FS – 195+, PPDs

l. Duct penetrations –metallic
   1. Refer to mechanical documents and details for Fire/Smoke damper at this location.

m. Cable Tray penetrations –metallic
   1. General:
      a. Refer to pipe penetrations and electrical drawings.
      b. Cable trays stop short of wall below access floor and continue thru wall via pipes.
   2. Design No.: [Fill in]
   3. Mfgr: 3M
   4. Product: [Fill in]

n. Top of wall
   1. Design Number:
      a. Wall design: Gypsum Association, GA File No. ASW 1100
      b. Top of Wall: As herein specified

o. Bottom of wall
   1. Design Number:
      a. Wall design: Gypsum Association, GA File No. ASW 1100
      b. Bottom of Wall: Fire caulk between floor deck and gypsum board edge, refer to documents and details.

p. Wall Box protection
   1. Size: 4” x4” max.
   2. Material: Steel box
   3. Design Number: CLIV
   4. Mfgr: 3M
   5. Product: Fire Putty

2.04 MATERIAL - CONSTRUCTION JOINT/GAP FIRESTOP SYSTEMS FOR FIRE-RATED ASSEMBLIES

A. General:
   1. Fill, void or cavity materials listed in the UL Fire Resistance Directory under category XHHW may be used, providing it conforms to the construction type and fire rating involved in each separate instance.
   2. Forming materials listed in the UL Fire Resistance Directory under category XHKU may be used, providing it conforms to the construction type and fire rating involved in each separate instance and meets UL 2079, ASTM E1966 and ASTM E2307.
   3. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or devise, and designed to perform this function.
   4. All construction joint/gap firestop system products must be from a single manufacturer. All trades will use products from the same manufacturer.
   5. Acceptable products: Those listed in the UL Fire Resistance Directory for the UL System involved and defined in the attached Systems and Applications Schedule or approved equal.

B. Schedule of Top of Wall and Bottom of Wall, refer to heading 2.03.

2.05 MATERIAL - FIRESTOP SYSTEMS FOR ELECTRICAL POWER/LOW VOLTAGE PASSING THOUGH FIRE-RESISTANT-RATED WALLS.

A. General:
1. Electrical systems protection material listed in UL-classified systems UL-classified systems UL 1709, ASTM E119, ASTM E1529 and ASTM E1725.
2. All electrical firestop system products must be from a single manufacturer.
   a. All trades will use products from the same manufacturer.
3. **Acceptable products:** Those listed in the UL Fire Resistance Directory for the UL System involved and defined in the material schedule below:
   1. Fire resistive mats: 3M Interam Endothermic Mats, .3" or .4" thick, 24.5" or 49" wide x 16'. 20', or 25; long rolls, foil encapsulated with 3M logo
   2. Smoke and Flame Sealant: 3M FireDam 150 Caulk or Hilti FS-One Firestop sealant
   3. Foil tape: 3M Interam T-49 Aluminum Foil Tape – used as a vapor barrier, radiant heat reflector, and installation aid
   4. General Purpose Tape: Scotch 898 Filament Tape – used as installation aid
   5. Composite Sheet: 3M Fire Barrier CS-195+ Composite Sheet – used to cover openings and as a collar at the termination of the fire protection envelopes
   6. Firestoppoing Caulk: 3M Fire Barrier CP 25WB+ Caulk – used as a smoke and flame sealant
   7. Firestopping Blocks: Hilti FS675 Fire Blocks

B. Schedule of Wall Penetrations, refer to heading 2.03

2.06 MATERIAL - WALLS SYSTEMS FOR FIRE-RATED ASSEMBLIES

A. General:
1. Assemblies:
   a. Top of Walls
   b. Bottom of Walls
   c. Construction Joints
   d. Construction Gaps
   e. Firestopping
2. Forming Material – Mineral Wool Fire Safing materials listed in the UL Fire Resistance Directory which conform to the construction type and fire rating involved in each separate instance.
   a. Density of material as dictated by UL Design requirements.
3. Forming materials listed in the UL Fire Resistance Directory under category XHKU may be used, providing it conforms to the construction type and fire rating involved in each separate instance and meets UL 2079 and ASTM E1966.
4. Fill, void or cavity Material – Spray applied "Fire Spray" material listed in the UL Fire Resistance Directory which conform to the construction type and fire rating involved in each separate instance and in accordance with listed product and manufacturer.
5. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or devise, and designed to perform this function.
6. Acceptable products: Those listed in the UL Fire Resistance Directory for the UL "HW-D" System involved and defined in the attached Systems and Applications Schedule or approved equal.

B. Schedule:
1. Top of wall
   a. Wall design:
      1. 1 Hour: Gypsum Association, GA File No. WP 1072
   b. Schedule: **[Specifier, select design and coordinate with drawings. UL designs are in Volume 2A of UL books]**

1. UL Design:		Sealant	Mineral Wool:	Firespray:
a.	HW-D-0024	PFPP, 4100NS, 4800DW, 3600EX	None	None
b.	HW-D-0077	Hilti CP606	None	None
c.	HW-D-0103	SpecSeal ES	None	None
d.	WH-D-0111	3M FD-150+	None	None

e.	HW-D-0144	WR Grace FS 900+	None	None
f.	HW-D-0144	WR Grace FS 1900	None	None
g.	HW-D-0256	TREMCO TREMstop	None	None
h.	HW-D-**[Fill** in]	3M[Fill in]	None	[Fill in]

2. Bottom of Wall
   a. Design Number:
   b. Wall design:
      1. 1 Hour: Gypsum Association, GA File No. WP 1072
      2. 2 Hour: Gypsum Association, GA File No. WP 1522
   c. Schedule: **[Specifier, select design and coordinate with drawings. UL designs are in Volume 2A]**
      1. UL Design:
         a. BW-S-0004 – PFPP sealant
         b. BW-S-0007 – 3M sealant
      2. Sealant/Caulking:
         a. Passive Fire Protection Partners (PFPP)
            1. 4100NS
            2. 4800DW
            3. 3600EX
         b. 3M
            1. FB 1000 NS
            2. FB-2000
            3. FB-2000+
            4. FB-3000 WT sealant
            5. FireDam 150+
            6. IC 15WB+
            7. CP 25WB+
   d. Bottom of Wall: Fire caulk between floor deck and gypsum board edge, refer to documents and details.

2.07 MATERIALS- SCHEDULE GENERAL

A. General:
   1. Comply with design criteria.
B. Schedule:
   1. Materials including these and as indicated in specific designs including, but not limited to;
      a. Intumescent Firestop Sealants and Caulks:
         1. 3M Fire Barrier Caulk CP25WB+
         2. Hilti FS-One Firestop Sealant
         3. STI SpecSeal S100 and S500 Sealant
      b. Latex/Acrylic Firestop Sealant: (CP606 is an acrylic based firestop sealant)
         1. STI SpecSeal LC150 Sealant
         2. Hilti CP606 Flexible Firestop Sealant
      c. Silicone Firestop Sealants and Caulks:
         1. 3M Fire Barrier Silicone Sealant
         2. Hilti CP601S Elastomeric Firestop Sealant
         3. STI SpecSeal Pensil 100 and 300
      d. Firestop Putty:
         1. 3M Fire Barrier Moldable Putty
         2. Hilti CP617/CP618 Putty Pads & Putty Stick
         3. STI SpecSeal Firestop Putty Bars and Pads
      e. Firestop Spray (head of wall joint):
         1. Hilti CP 672 Firestop Joint Spray
            a. Color: White
            b. Paintable: yes

2. STI SpecSeal Elastomeric Acrylic Firestop Spray

f. Firestop Collars:
   1. 3M Fire Barrier PPD's
   2. Hilti CP642/643 Firestop Collars
   3. STI SpecSeal Firestop Collars

g. Wrap Strips:
   1. 3M Fire Barrier FS195 Wrap Strip
   2. Hilti CP 645 Firestop Wrap Strip
   3. STI SpecSeal Pensil 200

h. 2- Part Silicone Firestop Foam:
   1. 3M Fire Barrier 2001 Silicone Foam
   2. STI SpecSeal Pensil 200
   3. CP 620

i. 2-Part Polyurethane Firestop Foam
   1. Hilti CP 620 Fire Foam

j. Firestop Mortar:
   1. STI SpecSeal Mortar
   2. Hilti CP 637 Firestop Mortar

k. Composite Board:
   1. 3M Barrier Sheet Material

l. Accessories:
   1. Forming / Damming Materials: Mineral fiberboard or other type as per manufacturer recommendations.

m. Fire Safing and clip fasteners (Use Weight "pcf" as required by fire rated design)
   1. Owens Corning, Safing Insulation, Mineral Wool

n. Hilti, Speed Plugs, CP 772 x 2" and/or CP 777 x 3" (Fire Safing at metal deck flutes)Firestop Blocks/Bags/Pillows
   1. Hilti FS657 Fireblock

o. Cast-in-Place Firestop Devices
   1. Hilti CP 680 Cast-in-Place Firestop Devices

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

C. Examine areas and conditions under which firestop system is to be installed and notify the **Architect** of conditions detrimental to proper or timely completion of the work.

D. Examine substrates to determine they are satisfactory to receive firestop system materials.
   1. Conduct tests according to firestop systems manufacturer's written recommendations to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt or other foreign substances capable of impairing bond of fire-resistive materials.
   2. Verify objects penetrating firestop materials, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
   3. Verify substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive materials.

E. Do not proceed with installation of firestop system until unsatisfactory conditions have been corrected by the **General Contractor** in a manner acceptable to the **Architect**.

F. Where necessary, cleaning of surfaces to receive firestopping shall be the responsibility of the **General Contractor**.
   1. Remove incompatible materials, which affect bond.

G. Insure that all clips, hanger supports, and other attachments for items that affect the firestopping material have been placed in their final position.
H. Verify that environmental conditions are safe and suitable for installation of firestop products.
I. Verify that all pipe, conduit, cable, and other items, which penetrate fire - rated construction, have been permanently installed prior to installation of firestops.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Coordinate construction and sizing of sleeves, openings, core-drilled holes, cut openings and penetrating items to ensure that firestop systems are installed according to specified requirements.
D. Notify **Owner,** inspecting agency, General Contractor, and subcontractor at least seven days in advance of firestop system installations; confirm dates and times on days preceding each series of installations.
E. Do not cover-up or conceal firestop system installations behind other construction until **Owner,** inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.
B. Clean and repair substrates that could impair the adhesion or proper fitting of firestop materials, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.
C. Secure all pipes, conduit, cable and other items, which penetrate firestop materials.
D. Provide masking and temporary covering, as required, to prevent contamination of adjacent surfaces by firestop materials.

3.04 CONDITIONS REQUIRING FIRESTOPPING - GENERAL

A. General:
   1. Provide and install firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.
B. Through - Penetrations:
   1. Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-bearing fire - rated barrier.
C. Construction Joints / Gaps:
   1. Firestopping shall be provided and installed:
      a. Between the head of walls and the underside of structure above.
      b. At intersection of rated wall partitions and walls.
D. Smoke - Stopping:
   1. As required per ASTM E-814 testing and in accordance with building and fire codes:
      a. As required by the other Sections, Smoke - Stops shall be provided for Through - Penetrations, Membrane - Penetrations, Construction Gaps and edge of floor to wall conditions with a material/system approved.

3.05 INSTALLATION

A. General:
   1. Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer.
   2. Installation shall be performed in strict accordance with manufacturer's detailed instruction procedures.
   3. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
   4. Unless specified and approved and retested, all insulation used in conjunction with through - penetrations shall remain intact and undamaged and may not be removed.
   5. In high traffic, protect firestopping materials from damage.

a. If the opening is large, install firestopping materials capable of supporting the weight of a human.

6. All combustible penetrates (e.g. non - metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field conditions.

B. Dam Construction:
1. When required to properly contain firestopping materials within openings, damming or packing materials may be utilized.
   a. U.L. approved combustible backer rod material may be used when part of tested assembly.
   b. Noncombustible damming materials may be left as permanent component of the firestop system.

C. Extend firestop material in full thickness over entire area of each substrate or opening to be protected.

D. Protect firestop material from damage on surfaces subject to traffic/construction.

E. Consult with mechanical engineer, project manager and damper manufacturer prior to installation of UL Firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

3.06 INSTALLATION -THROUGH-PENETRATION FIRESTOP SYSTEMS

A. General:
1. Install through-penetration firestop systems to comply with “Performance Requirements” and firestop systems manufacturer’s written installation instructions and published drawings for products and applications indicated. (See “Through-penetration Firestop Systems Schedule”)
2. Install forming/damming/backing materials and other accessories or types required to support fill material during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
   a. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop system.
3. Install fill materials for firestop systems by proven techniques to produce the following results:
   a. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items as required to achieve fire-resistance ratings indicated.
   b. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   c. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining surfaces.

B. Field Quality Control
1. Proceed with inclosing through-penetration firestop systems with other construction only after inspection and approval by code authorities.
2. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
3. Inspection Agency: If required, **Owner** will engage a qualified independent inspecting agency to inspect through-penetration firestop systems comply with or deviate from requirements.

C. Identification
1. Typical:
   a. Type: Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels.
   b. Installation: Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems.
   c. Supplied by: Label shall be as supplied by 3M
   d. Exposed conditions shall be coordinated with **Architect** and **Owner** for application.
2. FM 4911 Insurance conditions: **[Specifier, only required if Owner is FM insured]**
   a. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels.
      1. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems.

D. Cleaning and Protection

1. Clean off excess fill materials adjacent to openings as work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop systems manufacturer and that do not damage materials in which openings occur.
2. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.07 INSTALLATION OF CONSTRUCTION JOINT FIRESTOP SYSTEM

A. General:
   1. Install construction joint firestop systems to comply with “Performance Requirements” and firestop systems manufacturer’s written installation instruction and published drawings for products and applications.
   2. Install forming/damming/backing materials and other accessories of types required to support fill material during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
      a. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop system.
   3. Install fill “Forming Materials” for firestop systems by proven techniques to produce the following results:
      a. Fill voids and cavities formed by openings, forming materials, and accessories as required achieving fire-resistance ratings indicated.
      b. Apply materials so they contact and adhere to substrates formed by openings.
      c. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining surfaces.

B. Field Quality Control
   1. Proceed with enclosing construction joint firestop systems with other construction only after inspection and approval code authorities.
   2. Where deficiencies are found, repair or replace construction joint firestop systems so they comply with requirements.
   3. Inspection Agency: If required, **Owner** will engage a qualified independent inspecting agency to inspect construction joint firestop systems comply with or deviate from requirements.

C. Cleaning and Protection
   1. Clean off excess fill materials adjacent to openings as work progresses by methods and with cleaning materials that are approved in writing by construction joint firestop systems manufacturer and that do not damage materials in which openings occur.
   2. Provide final protection and maintain conditions during and after installation that ensure constriction joint firestop systems are without damage or deterioration at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated construction joint firestop systems immediately and install new materials to produce construction joint firestop systems complying with specified requirements.

3.08 FILL AND FORMING MATERIALS

A. Installation
   1. Forming Material:
      a. Install and repair endothermic mats in accordance with manufacturer’s published installation guidelines and drawing packages
      b. Compression fit in accordance with UL Design and product manufacturer’s recommendations.
      c. Fit between flutes for tight fit prior to application of Fill Material – Fire Spray.
   2. Fill Material:
      a. Install in accordance with product manufacturer’s recommendations.
      b. Spray applied products shall be install in accordance with UL Design and product manufacturer’s recommendations.

c. Install with proper overlap onto gypsum wallboard and metal deck and/or concrete deck in accordance with UL Design and manufacturer's recommendations.

3. General:
   a. See Through Penetration Firestop System Schedule for penetrating items for UL approved systems

3.09 FIELD QUALITY CONTROL

A. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.
B. Follow safety procedures recommended in the Material Safety Data Sheets.
C. Finish surfaces of firestopping, which are to remain exposed in the completed work to a uniform and level condition.
D. All areas of work must be accessible until inspection by the applicable Code Authorities.
E. Correct unacceptable firestops and provide additional inspection to verify compliance with this section.

3.10 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END SECTION

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
    1. Furnish and install primers, sealant, caulking and back-up material where required, as indicated and as herein specified to provide a weather-tight building, including, but not limited to**:**
        a. Sealant joints
        b. Lap joints
        c. Troweled sealant bed below thresholds, sill flashings, etc.
        d. Sealant bed under door thresholds
        e. Sealant at wall to floor and wall to deck / structure, acoustical and non-acoustical assemblies
            1. Rated conditions; refer to Section 07 84 00 – Firestopping
        f. Sealant around all wall penetrations, acoustical and non-acoustical assemblies
            1. Rated conditions; refer to Section 07 84 00 – Firestopping
    2. Furnish and install two side adhesive tapes and primers.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Architectural Manufacturers Association (AAMA)
    1. AAMA 850 - Voluntary Specifications and Test Methods for Sealants
E. American Concrete Institute (ACI)
    1. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
F. American Society for Testing and MATERIALS (ASTM):
    1. ASTM C412 - Standard Specification for Concrete Drain Tile
    2. ASTM C510 - Multi Component Joint Sealants
    3. ASTM C603 - Standard Test Method for Extrusion Rate and Application Life of Elastomeric Sealants
    4. ASTM C639 - Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants
    5. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
    6. ASTM C719 - Adhesion & Cohesion of Elastomeric Joint Sealants under Cycle Movement
    7. ASTM C790 - Guide for Use of Latex Sealants.
    8. ASTM C792 - Effects of Heat Aging on Weight Loss, Cracking & Chalking of Elastomeric Sealants
    9. ASTM C794 - Adhesion and Peel of Elastomeric Sealants
    10. ASTM C804 - Practices for Use of Solvent - Release Type Sealants.
    11. ASTM C834 - Specifications for Latex Sealing Compounds.
    12. ASTM C881 - Specifications for Epoxy - Resin Bonding Systems for Concrete.
    13. ASTM C919 - Practices for Use of Sealants in Acoustical Applications.
    14. ASTM C920 - Specification for Elastomeric Joint Sealants.
    15. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants
    16. ASTM C1184 - Specification for Structural Sealants.

17. ASTM C1193 - Standard Guide for Use of Joint Sealants.
18. ASTM C1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
19. ASTM C1248 - Staining of Porous Substrates by Joint Sealants
20. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
21. ASTM D614 - Tear strength
22. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
23. ASTM D1149 - Standard Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber
24. ASTM D1850 - Specification for Concrete Joint Sealer Cold-Application Type
25. ASTM D2240 - Standard Test Method for Rubber Property - Durometer Hardness
26. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
27. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

G. Federal Specifications (FS):
1. SS-S-200E Sealants, joint, Two - Component, Jet - Blast - Resistant, Cold - Applied, for Portland Cement Paving
2. TT-S-001657 Sealing Compound: Single Component, Butyl Rubber Based, Solvent Release Type (For Buildings and Other Types of Construction)
3. TT-S-00227E All multi-component, cold applied formulations for sealing, glazing, etc. in buildings
4. TT-S-1543A One-part silicone based cold applied non-sag formulations for sealing, glazing, etc. in buildings

H. Sealant, Waterproofing and Restoration Institute (SWRI) - Sealant and Caulking Guide Specification. www.swrionline.org

I. Underwriters Laboratories (UL):
1. UL 263

J. Dow Corning:
1. Technical Manual
2. Accelerated Weathering and Heat Stability of Various Perimeter Sealants
3. Application and Maintenance Guide, ALLGuard Silicone Elastomeric Coating
4. Waterproofing Sealant Guide

K. Laticrete installation instructions and literature for System Warranty assemblies and sealant applications.

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
1. Comply with manufacturer's standards.
2. Comply with Building Code.
3. Job site inspections shall be done as herein specified and as listed in drawings.
4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	**Name of Test**	**Performance**	**Testing Std.**
Sealant	Refer to Materials Heading(s)	Refer to Materials Heading(s)	Refer to Materials Heading(s)
Primers	Refer to Materials Heading(s)	Refer to Materials Heading(s)	Refer to Materials Heading(s)
Refer to drawings and as herein specified			

C. **Sustainability:**
1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

D. **Construction Monitoring/Observations by others:**

Item	Name of Test	Performance Results	By Whom
Sealant and backer rod	Const. Waste Management	Comply	Refer to Division 1 for construction waste management and disposal/recycling requirements

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit the following items for **Architect's** review; **refer to Section 01 33 00 – Submittal Procedures for definitions, specific requirements for each type of submittal, and minimum quantities.**
   1. Manufacturer's Product & Technical Data
   2. Manufacturer MSDS Sheets
   3. Manufacturer Installation Instructions
   4. Samples:
      a. Digital samples will not be accepted for any product requiring color selection by **Architect**.
      b. When indicate by these specifications, drawings or associated specifications, provide sample of required Custom color for **Architect's** review.

1.05 MOCK-UPS:

A. Erect an Assembly Mockup at Project site at location acceptable to **Owner** and **Architect**.
   1. Refer to individual specification sections for coordination with other Assembly components.
   2. Refer to Section 01 33 00 – Submittal Procedures for additional information relating to Mock-Ups.

1.06 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer shall have been in business for **five (5)** years providing/installing/finishing similar size projects and complexity.
C. **Manufacturer** shall have been in business for **ten (10)** years providing/installing/finishing similar size projects and complexity.
D. Sealants, which come in contact with each other, shall be of same manufacturer and sealant type to ensure that materials, which come in contact with one another, will be compatible. Installer shall supply a letter from the manufacturer certifying the compatibility of all sealants with one another, and with all construction materials with which they will come in contact on the project.
E. Lead Times**:**
   1. **General Contractor** shall coordinate with supplier to verify product lead times during bids and at award of contract, and account for such lead times in their costs and schedules.
   2. **General Contractor** shall provide an itemized list of materials which might have or are confirmed to have a lead time problem and what the anticipated lead time is.
   3. **General Contractor** shall certify in writing that all materials have acceptable lead times as they relate to availability for sub-contractor and **General Contractor** to meet construction schedule and sequence of construction.
F. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid
G. Stipulations:
   1. All work must be installed in accordance with SWRI Guide Specifications and ASTM C1193.
   2. Perform acoustical sealant application work in accordance with ASTM C919.

H. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
Agenda for meeting shall include, but not be limited to;
1. Substrate preparation
2. Colors and where applied
3. Sequence of sealant installation and other paints, sealers, etc.
4. **General Contractor** shall request meeting 5 days in advance of construction.

I. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site periodically during installation work to review installation procedures.
Manufacturer's representative shall review and certify in writing all phases of construction to verify the complete work meets specification requirements.
Written certification of all phases of construction shall be sent to the **Architect** by the manufacturer's representative.

J. Miscellaneous criteria:
1. Manufacturer to instruct applicator in procedure for intersecting sealants.
2. Workmanship shall be of the highest quality in accordance with the best practice, an in strict

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver materials in factory sealed containers with manufacturer's original labels attached.

1.08 JOB CONDITIONS

A. Field verify that all components, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.
B. Do not apply sealants at temperatures below 40ºF (4ºC) unless additional steps are taken to prevent freezing and frost buildup.
C. Apply waterproofing, water repellents, and preservatives after application of sealants unless manufacturer's approval is obtained prior to applying sealant.

1.09 PROTECTION

A. Protect finish surfaces at all times from concrete adjacent to them.
B. Inspect forming against such work and establish tight leak proof seal before concrete is placed within or against the forming.
C. Finish work defaced with concrete on surface shall be replaced.
D. Concrete to be left exposed: Do not place materials such as Visqueen or Burlap, etc. on concrete, which might leave a pattern and/or imprint.

1.10 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

C. Furnish manufacturer's additional **twenty (20)** year "Weather Seal" warranty/warrant agreeing to replace sealant material work which has failed as a result of defects in materials or workmanship.
1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

1.11 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to, the following:
1. Water tight wall penetrations
2. Air tight wall penetrations
3. Wall construction
4. Floor construction

5. Ceiling construction
6. Roof construction
7. Windows, doors, etc.
8. Site work / flatwork and paving
9. Flashing
10. Door thresholds

B. Related sections include, but are not limited to the following:
1. Division 1
2. Section 07 84 00– Firestopping

1.12 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
1. Complete instructions regarding maintenance of the materials, finishes, etc.
2. Refer to Division 1 for closeout submittal procedures.

1.13 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

1.14 EXTRA MATERIAL

A. Submit as part of project closeout:
1. Provide extra material for each product type, color, finish, etc. in same lot as installed product.
a. Furnish written certification that extra materials supplied have been inspected and Re-confirmed to be the same as those used in the work.
2. Provide extra material in unopened fully labeled containers.
a. Do not supply anything less the full carton containers.
b. Furnish in factory packaged and labeled cartons and identify cartons with Project name.
c. Deliver materials to project premises just prior to substantial completion, and store in the location directed by the **Owner**.
3. Provide the following:
a. 6 tubes/ sausages of each type and color of sealant used.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturer shall be one of the following and as herein listed and in Drawings:
1. Exterior: Dow Corning, www.dowcorning.com
2. Interior at specific locations: Pecora Corporation, www.pecora.com
3. Interior typical unless indicated otherwise: Dow Corning, www.dowcorning.com
4. Interior Tile installation, Typical Laticrete, www.laticrete.com or Merkrete
a. Refer to Section 09 30 00 – Tile and Stone for warranty criteria for assembly
5. Two sided adhesive tapes: 3M, http://solutions.3m.com
6. Mastic / Sealant to set door thresholds in: Tremco, www.trimcosealants.com
7. Reviewed Equivalent by **Architect**.
a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
b. Refer to Division 1 for substitution, deviation and/or submittal procedures
c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
d. No acceptable substitutions for exterior 100% silicone sealants, unless herein otherwise indicated.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS – SEALANT JOINT SCHEDULE

A. **Sealant- Exterior Joints:**
1. General:
   a. Intent is that buildings be rendered weathertight in every respect.
   b. Intent is that wall and roof assemblies be rendered watertight at sealant joints.
   c. Render wall penetrations airtight.
   d. Render bottom of wall conditions airtight.
   e. Workmanship shall be of the highest quality in accordance with the best practice, an in strict compliance with the recommendations of the manufacturer of the material being used.
2. Horizontal and Vertical joints, typ. u.o.n., including but not limited to:
   a. Concrete, Masonry, Natural Stone, Simulated Stone, Terra Cotta and Wood:
      1. Dow Corning: 795 Type 3
   b. Painted Metals, Anodized Aluminum, Mill Finish Aluminum, PVC, Glass, Ceramic and/or Porcelain Tile, Glazed Terra Cotta, Glazed Ceramic and/or Porcelain tile:
      1. Dow Corning: 795 Type 3
   c. Concrete Flatwork:
      1. Dow Corning SL (Self Leveling) Type 6 – Level Conditions
      2. Dow Corning NS (Non Sag) Type 6 – Sloped conditions
3. Metal Coping: (Cross joints)
   a. Dow Corning: 795 Type 3
4. Vertical concealed joints in:
   a. Metal curtain wall, lapped joints, and metal building panels:
      1. Dow Corning: 795 Type 3
   b. Exterior Gypsum Sheathing:
      1. Dow Corning: 795 Type 3
   c. Vehicular drives and parking garages: \
      1. Dow Corning FC (Fast Cure) Type 5 – Extreme movement conditions
         a. Dow Corning SL (Self Leveling) Type 5 – Level conditions
         b. Dow Corning NS (Non Sag) Type 6 – Sloped conditions
5. Windows:
   a. Wet seal glazing:
      1. Dow Corning: 791 Type 2
6. Forklift traffic areas:
   a. Pecora Urexpan NR-200 Type 11

B. **Sealant - Interior Joints – Horizontal and Vertical:**
1. Expansion and control joints, typ. u.o.n.:
   a. Non – Sanitary conditions:
      1. Pecora Dynatred 40+ Type 10
   b. Horizontal traffic surfaces
      1. Pecora Dynatred 40+ Type 10
   c. Subject to heavy traffic loads or point loading:
      1. Pecora Dynatred 40+ Type 10
   d. Warehouse Floors
      1. Sonneborn EPOLITH - P Type 12 Horizontal applications
      2. Sonneborn EPOLITH - G Type 12 Vertical applications
2. Trim or finish joints subject to minimal movement:
   a. Pecora AC-20 + Silicone Type 9
3. Concealed applications:

a. Requiring acoustical seal:
   1. Pecora AC-20 + Silicone Type 9
   2. Pecora AC-20 FTR Type 9 (Rated conditions)
b. Base of wall between gypsum board and concrete floor:
   1. Pecora AC-20 + Silicone Type 9
   2. Pecora AC-20 FTR Type 9 (Rated conditions)
c. Wall penetrations seal:
   1. Pecora AC-20 + Silicone Type 9
   2. Rated conditions: refer to Section 07 84 00 – Firestopping

4. Horizontal and vertical joints exposed to harsh chemicals:
   a. Pecora GC-2 Synthacalk Type 13
5. Warehouse floors:
   a. All except forklift traffic:
      1. Pecora Dynatread +40 Type 10
   b. Forklift traffic
      1. Pecora Urexpan NR-200 Type 11

2.03 MATERIALS – SEALANT SPECIALTY SCHEDULE

A. Below Door Thresholds:
   1. Application: Set threshold in full bed of sealant also indicated as mastic
   2. Product options:
      a. Mfgr: Tremco
      b. Type: One part polyurethane
      c. Model: Vulkem 116
      d. Color: Black
      e. Application: ½" thick maximum bed prior to compressing down with threshold

B. Below Storefront and/or Curtainwall Sill Mullions:
   1. Application: Set sill in full bed of sealant also indicated as mastic
   2. Product options:
      a. Mfgr: Tremco
      b. Type: One part polyurethane
      c. Model: Vulkem 116
      d. Color: Black
      e. Application: ½" thick maximum with bed prior to compressing down with threshold

2.04 MATERIALS - SEALANTS / CAULKING TYPES

A. Schedule and Data:

1. **Sealant Type 2:**
   a. Type: Single component, medium modulus, elastomeric silicone sealant;
   b. Standards
      1. ASTM: C603, C639, C679, C794, C1135, C1248, D624, D2240, D3960
      2. VOC: 46g / liter max.
   c. Movement capability: 50% extension, 50% compression.
   d. Manufacturer: Dow Corning
   e. Product: **791** Silicone Perimeter Sealant
   f. Features: Appropriate for End-dams and Internal seals
   g. Primer: Confirm with sealant manufacturer and test surface for adhesion
   h. Backer rod / tape:
      1. Closed-cell polyethylene foam
      2. Open-cell Polyurethane
      3. Polyethylene tape
      4. Open-cell polyurethane required at nonporous substrates
      5. Open-cell polyurethane required at double joint conditions

i. Color:
   1. **Architect** to pick color(s) from mfgr's full line of colors.

2. **Sealant Type 3:**
   a. Type: Single component, silicone rubber sealant;
   b. Standards
      1. ASTM: C510, D412, D624, D1149, D2240, D3960, E119
      2. UL: 263
      3. VOC: 28g / liter max.
   c. Movement capability: 50% extension, 50% compression.
   d. Manufacturer: Dow Corning
   e. Product: **795** Silicone Building Sealant
   f. Features: Structural, non-structural and weatherproofing
   g. Primer:
      1. Confirm with sealant manufacturer and test surface for adhesion
      2. Use recommended primer
   h. Backer rod / tape types:
      1. Closed-cell polyethylene foam
      2. Open-cell Polyurethane
      3. Polyethylene tape
      4. Mineral Wool – Fire rated assemblies
      5. Compression Gasket
      6. Open-cell polyurethane required at nonporous substrates
      7. Open-cell polyurethane required at double joint conditions
      8. Color:
         a. **Architect** to pick color(s) from mfgr's full line of colors.

3. **Sealant Type 9:**
   a. Type: (Type II) Single component, acrylic latex sealant;
   b. Standards
      1. ASTM: C834, D3960
      2. VOC: 31g / liter
   c. Movement capability: 7.5% extension and 7.5% compression.
   d. Manufacturer: Pecora
   e. Product: **AC-20 + Silicone** (AC-20 FTR rated conditions)
   f. Features: Non-sag (FTR designation at fire rated conditions)
   g. Backer Rod: Soft Polyethylene or Denver Foam (Ultra block at fire rated conditions)
   h. Primer: Refer to manufacturer's product data
   i. Color:
      1. **Architect** to pick color(s) from mfgr's full line of colors.

4. **Sealant Type 10:**
   a. Type: (Type II) Two component, non-sag polyurethane rubber;
   b. Paintability: Yes
   c. Standards
      1. ASTM: C920, C1247, D1850, D3960
      2. VOC:
         a. Activator: 104g / liter
         b. Base: 14g / liter
   d. Movement capability: 25% extension and 25% compression.
   e. Manufacturer: Pecora
   f. Product: **Dynatread 40+**
   g. Features: Traffic sealant

h. Backer Rod: Closed-cell Polyethylene
i. Primer: Refer to manufacturer's product data
j. Color:
1. **Architect** to pick color(s) from mfgr's full line of colors.

5. **Sealant Type 11:**
a. Type: (Type I) Two component urethane
b. Standards
1. ASTM: C920, D1850, D3960
2. VOC: 0g / liter
c. Movement capability: 25% extension and 25% compression
d. Manufacturer: Pecora
e. Product: **NR-200 Urexpan**
1. Activator
2. Base
f. Features: Traffic grade sealant
g. Backer Rod: Closed-cell Polyethylene
h. Primer: Refer to manufacturer's product data
i. Color:
1. **Architect** to pick color(s) from mfgr's full line of colors.

6. **Sealant Type 12:**
a. Type: (Type II) Two component, 100% solids epoxy
b. Standards
1. ASTM: D638, D3960
2. VOC:
a. Epolith P: < 3g / liter
b. Epolith G: 0g / liter
c. Movement capability: 75% elongation.
d. Manufacturer: Sonneborn
e. Product
1. Horizontal: **Epolith-P**
2. Vertical: **Epolith-G**
f. Backer rod / tape: Refer to manufacturer's product data
g. Primer: Refer to manufacturer's product data
h. Color: Grey

7. **Sealant Type 13:**
a. Type: Two component, polysulfide rubber sealant;
b. Standards
1. ASTM: C920, C510, D3960
2. VOC: 20g / liter
c. Movement capability: 12.5% extension and 12.5% compression.
d. Manufacturer: Pecora
e. Product: **Synthacalk GC-2+**
f. Features: Not self leveling
g. Backer Rod: Closed-cell Polyethylene
h. Primer: Refer to manufacturer's product data
i. Color: Dark Grey

2.05 MATERIALS – TAPES

A. Schedule and Data:
1. **Tape:**
a. General:

1. Mfgr: 3M
2. Series: VHB and as noted
3. Reference: 3M Design Guide for Metal Fabrication
4. Coordinate with Section 10 14 00 - Signage

b. Schedule:

1. **Painted metal to painted metal:**
   a. Material: Closed cell acrylic foam
      1. Product: 4979F
         a. Width: 1”
         b. Thickness: 1.6 mm (± 1/16”)
         c. Adhesive: Acrylic
         d. Liner Type: B (5 mil clear polyethylene film)
         e. Color: Black
2. **Painted metal to bare painted metal:**
   a. Material: Closed cell acrylic foam
      1. Product: 5962
         a. Width: 1”
         b. Thickness: 1.6 mm (± 1/16”)
         c. Adhesive: Synthetic
         d. Liner Type: D (5 mil red polyethylene film)
         e. Color: Dark Grey
3. **Powder coated metal to powder coated painted metal:**
   a. Material: Closed cell acrylic foam
      1. Product: 4645
         a. Width: 1”
         b. Thickness: 1.6 mm (± 1/16”)
         c. Adhesive: Acrylic
         d. Liner Type: D (5 mil red polyethylene film)
         e. Color: Dark Grey
4. **Bare metal to bare metal:**
   a. Material: Closed cell acrylic foam
      1. Product: 4955
         a. Width: 1”
         b. Thickness: 2.0 mm (± 5/64”)
         c. Adhesive: Synthetic
         d. Color: White
5. **Plastics and powder coated metals:**
   a. Material: Closed cell acrylic foam
      1. Product: 5962
         a. Width: 1”
         b. Thickness: 62 mil
         c. Adhesive: Adhesive 300 Acrylic & polyester carrier
         d. Liner Type: Densified Kraft
         e. Colors:
            1. White
            2. Black
            3. Red

2.06 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the **General Contractor** subject to the approval of the **Architect**.
   1. Primers, Solvents and Backing Material
      a. General:
         1. Use acceptable type as recommended by each specific sealant used and the respective manufacturer.

2. Material shall be manufactured by manufacturer of sealant being used, unless approved otherwise by sealant manufacturer.
3. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached and associated installation instructions.
4. Materials shall be used according to manufacturer's printed instructions.

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. General:
   1. Prepare work, substrates, etc. in accordance with manufacturer’s recommendations.

B. Joint Preparation:
   1. Preparation, cleaning, priming and installation shall be performed in strict accordance with sealant manufacturer’s recommendations.
   2. Refer to REFERENCE STANDARDS heading for sealant manufacturers guidelines.

C. Surface Preparation
   1. Sealants
      a. General:
         1. Typically seal joints before painting, coordinate with wall finish type, material and manufacturer’s written recommendations for all exceptions.
         2. Joints and surfaces, which are to be caulked or sealed, shall be clean, dry, frost free, free of dust, loose mortar, and other foreign materials.
         3. Temperature Installation Requirements: 40ºF minimum application temperature for joint sealant installations because of the possibility of moisture and/or frost contamination on sealing surfaces: (Comply with sealant manufacturer’s written recommendations)
            a. However, it is recognized that applications may have to be made at lower temperatures. When this is necessary, steps must be taken to assure dry, frost-free surfaces and is the responsibility of the caulking subcontractor. Additionally these procedures must be in compliance with sealant manufacturer’s written recommendations.
         4. Clean ferrous metals of all rust, mill scale and temporary coatings by wire brushing, grinding, or sandblasting.
         5. Remove oil and grease with high performance cleaners as approved by sealant manufacturer.
         6. On joints adjacent to porous substrates install appropriate primer prior to application of sealant.

7. Joint dimensions for sealant should be reviewed and installed in accordance with sealant manufacturer's printed instructions. In no case should the sealant application be less than 1/4" wide and 1/2" deep, except in specific metal-to-metal curtainwall applications and then as recommended by the sealant manufacturer.
8. Precast concrete, cast-in-place concrete, or masonry joint surfaces shall be wire brushed, then brushed clean or blown clean with dry, oil free compressed air.
    a. The joint interface must be free of form release agents, curing and sealing compounds or chemical retarders which may interfere with sealant cure, adhesion and performance.
9. Sealants shall not be applied to masonry joints where a water repellent or masonry preservative has been applied prior to caulking.
    a. Waterproofing treatments shall be applied after caulking.
10. Do not caulk joints until they are in compliance with requirements of the approved manufacturers of the materials, the details as shown on the drawings, and the specific requirements of other sections of this Specification.

b. Silicone Sealants:
    1. Basic steps for proper joint preparation:
        a. Clean – Joint surfaces must be clean, dry, dust free, and frost free.
        b. Prime – If required, primer is applied to the surface(s). (Refer to Sealant Manufacturer’s written recommendations.
        c. Pack – Backer rod or bond breaker as required for sealant joint and in accordance with manufacturer’s written instructions.
        d. Shoot – Sealant is applied by “pushing the bead” into the joint cavity.
        e. Tool – Dry tooling techniques are used to strike a flush joint and make certain the sealant has the proper configuration and fully contacts the joint walls.
    2. Clean – Substrate Cleaning Procedures
        a. General procedures for porous and non-porous substrates key to good sealant adhesion is a clean surface. Always check with the supplier of the substrate to ensure that the cleaning procedures and solvents are compatible with the substrate.
            1. Organic Solvent Usage
                a. Not every contamination is effectively removed by every solvent, and some substrates can be seriously damaged by certain solvents. Please follow the solvent manufacturer’s safe handling recommendations and local, state and federal regulations regarding solvent usage.
            2. Non-Porous Substrates
                a. Non-porous surfaces must be cleaned with a solvent before the sealant is applied.
                b. Use the “two-cloth” cleaning method explained later in this section.
            3. Porous Substrates
                a. Building materials such as EIFS, cement board panels, concrete, granite, limestone and other stones or cementitious materials that absorb liquid are considered porous substrates.
                b. Dusting alone may be sufficient cleaning for new porous substrates. Depending on the condition of the surface, porous substrates may require abrasion cleaning, solvent cleaning or both. Laitance and surface dirt must be completely removed. Concrete form-release agents, water repellents and other types of surface treatments, protective coatings, and old sealant all affect sealant adhesion. Removal of these treatments, coatings or sealants by abrasion cleaning may be required to obtain acceptable adhesion.
                c. Abrasion cleaning involves grinding, saw cutting, sand or water blasting, mechanical abrading or a combination of these methods. Remaining dust and loose particles should be removed by dusting the surface with a stiff brush, vacuuming, or blowing the joints with oil-free compressed air.

Once the abraded surface is clean and dry, the sealant can be applied. If the surface is dirty, it must be solvent cleaned with the “two-cloth” method explained later in this section. Some porous materials will trap solvents after cleaning or priming. Allow this solvent to evaporate before sealant is applied.

d. Please note sealant recommendations for removal of existing sealants, substrate cleaning, joint preparation and installation of sealants are not intended and may not be appropriate for remedial work involving existing sealants and/or joints containing PCB’s, asbestos, or other potentially hazardous substances. If you know or suspect that the existing sealants and/or joints contain PCB’s or other hazardous substances, contact project Owner **General Contractor** and a knowledgeable authority on appropriate removal, handling and disposal procedures.

4. Masking
   a. Silicone primers and sealants cannot be removed with organic solvents. It is imperative that uncured silicone primers and sealants do not contact non-abradable surfaces where the silicone is not intended. Mask these surfaces or use extreme care to prevent any silicone contact with the surface during priming and sealant application.
5. “Two Cloth” Cleaning/Priming Method
   a. (Using DOW CORNING P5200 Cleaner/Primer)
      1. Clean, soft, absorbent, lint-free cloths must be used. The two-cloth cleaning method consists of a solvent wipe followed by a dry cloth wipe.
      2. Thoroughly clean all surfaces of loose debris. Mask or tape joints before applying Cleaner/Primer. If a bond breaker tape will be used instead of backer rod, the tape should be applied before the cleaner/primer.
      3. Clean and apply Cleaner/Primer product in accordance with manufacturer’s written recommendations.

2. Tapes
   a. Prepare per manufacturer’s recommendations.
   b. Prime as required by manufacturer for each specific tape.

3.04 INSTALLATION

A. Sealant
1. General:
   a. Clean, prime and apply materials in accordance with printed recommendations of manufacturer of material used.
   b. Insure that if two sealant-curing types are used which have different curing times, that the first installed sealant is fully cured prior to the application of the second sealant.
      1. Confirm application with sealant manufacturer.
   c. Insure that if two different sealant composition types are used, that the proper sealant is installed first to insure adhesion between the two different sealants.
      1. Confirm application with both sealant manufacturers.
   d. Install joint backing with a blunt instrument so as not to puncture the surface skin.
      1. Size of closed cell joint backing should be determined by adding 25% to the joint width to assure proper compression of the rod.
      2. With other types of joint backing, consult manufacturer's printed instructions for proper use.
   e. Apply sealant with a caulking gun, using proper nozzles. Use sufficient pressure to properly fill the joints with sealant to the backup material.
      1. After joints have been completely filled, they shall be neatly tooled to eliminate air pockets or voids and to provide a smooth, neat finish in intimate contact with interfaces. Dry tooling is preferred.

2. After tooling, surface of sealant shall be free from ridges, wrinkles, sags, air pockets and embedded impurities.

f. Immediately clean adjacent materials, which have been soiled. Leave work in a neat, clean condition.

g. Joint Dimensions
   1. Size and shape as shown on Drawings but not to exceed joint size recommended by sealant manufacturer.
      a. Typically install backer rod at all joints unless specified to be bond breaker tape, other material as specified and /or detailed or no backer material in accordance with sealant manufacturer's printed directions.
         1. Sealant depth to width ratio shall be installed in accordance with sealant manufacturer's written instructions.

2. Silicone:
   a. General:
      1. Apply materials in accordance with printed recommendations of manufacturer of material used.
   b. Schedule:
      1. Prime – Primer Application Procedure
         a. DOW CORNING P5200 Cleaner/Primer Coat should be applied as follows:
            1. Joint surfaces should be clean and dry.
            2. Apply masking tape to the surfaces next to the joint to keep excess primer and sealant off areas where they are not intended.
            3. Apply Cleaner/Primer in accordance with manufacturer's written recommendations.
      2. Pack – Packing with Backer rod / tape
         a. Moving Joint Considerations
            1. When designing moving joints, the following points also need consideration:
               a. A minimum ¼" joint width is recommended. Wider joints accommodate more movement than narrow joints. (Refer to Drawings for design intent joint widths)
               b. Three-sided adhesion limits the amount of movement that a joint accept without inducing a tear. Three-sided adhesion can be eliminated by the addition of a bond breaker tape or backer rod. With three-sided adhesion, no more than +15% movement can be accommodated.
               c. A thin sealant joint (1/4" + 1/8" depth) will absorb more movement than a thick joint. Sealants are designed to deliver optimum performance when the joints are shaped like an hourglass
               d. As a practical matter, as the sealant joint width becomes larger than 1", the depth should be held at approximately 3/8". There is no need to increase the depth beyond 3/8".
         b. Movement During Cure
            1. One-part sealants cure by taking moisture out of ambient air. Joint movement during cure can cause unsightly aesthetics due to joint wrinkling. Premature adhesion loss can also occur because the adhesive characteristics of the sealant are obtained after the sealant has cured. Adhesion loss due to movement during cure can be minimized by the use of a primer. Primers can decrease the adhesion cure time lag. Minimize wrinkling by following these suggestions:
               a. Use open-cell polyurethane backer rod / tape in non-EIFS or vertical applications.
               b. Seal when the joint surface is cool and will experience minimum temperature changes, typically in the late afternoon or early evening.
               c. Place no more than ¼" of sealant over the backer rod / tape at the center.
      3. Shoot – Sealant Application Procedure

a. It is critical that the sealant fills the entire joint or cavity and firmly contact all surfaces intended to receive sealant.
b. To obtain full adhesion, sealants require a clean, dry, frost-free surface.
c. Sealant shall be applied as follows:
    1. As previously indicated, masking tape should be used to keep excess sealant from contacting adjacent areas where it is not intended to ensure an aesthetically-pleasing job.
    2. Apply the sealant in a continuous operation using a caulking gun or pump. A positive pressure, adequate to fill the entire joint width, should be used. This can be accomplished by "pushing" the sealant ahead of the application nozzle. Care must be taken to ensure complete fill of the sealant cavity.

4. Tool
    a. Tool the sealant with light pressure before a skin begins to form (typically 10 to 20 minutes). Tooling forces the sealant against the back-up material and the joint surfaces. Do not use liquid tooling aids such as water, soap or alcohols; i.e. These materials may interface with sealant cure and adhesion and create aesthetic issues.
    b. Remove the masking tape before the sealant skins over (within about 15 minutes of tooling).

B. Polyurethane and Butyl Rubber:
    1. Storefront and/or Curtainwall Sills & Door Thresholds
        a. Clean substrate and underside of threshold
        b. Installation:
            1. 1st. Prime substrate with mfgr's approved primer
            2. 2nd. Install full bed of sealant to substrate x ½" maximum thickness
            3. 3rd. Install full bed of sealant to underside of threshold x 3/8" and set together.
            4. 4th. Trim sealant that pushes out from under threshold.
            5. 5th. Install mechanical fasteners.
C. Tape
    1. Clean surfaces as herein listed.
    2. Prime substrates per manufacturer's recommendations.
    3. Install per manufacturer's written instructions.

3.05 COMMISSIONING

A. Provide factory-certified field service engineer to a site visit to ensure proper system installation of exterior sealant.

3.06 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator.
    1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
    2. The Applicator shall be responsible for the proper application of the materials.
B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.
C. The sealant applicator shall certify in writing that the sealant application is in accordance with the sealant manufacturer's recommendations

3.07 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.

C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

08 11 13
STEEL DOORS AND FRAMES
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. STEEL DOORS: (fully welded assembly)
      a. Exterior:
         1. Non-rated
         2. Door vision panel frames
            a. Non-rated.
   2. STEEL DOOR FRAMES: (fully welded assembly)
      a. Exterior:
         1. Non-rated
         2. Fully grouted with mortar type grout
         3. Continuous watertight nail flange
   3. GLASS:
      a. Door lites: As herein specified
      b. Framed windows: Refer to Section 08 80 00 – Glass and Glazing
   4. Accessories:
      a. Sound deadening spray foam
      b. Fire rated mineral wool filler.
      c. Bituminous water base paint
      d. Grout

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American National Standards Institute (ANSI), www.ansi.org
   1. ANSI/SDI A250.3 Test Procedure & Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors & Frames
   2. ANSI/SDI A250.4 Test Procedure & Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors & Hardware Reinforcing
   3. ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors & Frames
   4. ANSI/SDI A250.7 Nomenclature for Standard Steel Doors & Steel Frames
   5. ASNI/SDI A250.8 SDI 100 Recommended Specifications for Standard Steel Doors & Frames
   6. ANSI/SDI A250.11 Recommended Erection Instruction for Steel Frames
E. American Society For Testing and Materials (ASTM), www.astm.org
F. Factory Mutual (FM), www.fmglobal.com
G. Hollow Metal Manufacturers Association (HMMA), www.naamm.org/hmma
   1. Hollow Metal Technical and Design Manual, latest edition of the following:
      a. Manufacturing: HMMA 802 Manufacturing of Hollow Metal Doors and Frames
      b. Doors: HMMA 810 Hollow Metal Doors
      c. Frames: HMMA 820 Hollow Metal Doors
      d. Hardware: HMMA 830 Hardware Preparation and Locations for Hollow Metal Doors and Frames

e. Installation Practices: HMMA 841 — Reserved for Tolerances and Standard for Hollow Metal Doors and Frames
f. Continuous Fully Welded Frames: HMMA 820-TN02-03
g. Defining Door Undercuts: HMMA-810 TN01-03
h. Grouting Hollow Metal Frames: HMMA-820 TN01-03
i. Guidelines for Glazing, windows & sidelights: HMMA-820 TN03-07
j. Painting Hollow metal frames: HMMA-840 TN01-07
k. Maintenance of Installed Hollow metal frames: HMMA-840 TN02-10
l. Grouting door frames: HMMA-862

H. National Association of Architectural Metal Manufacturers (NAAMM) www.naam.org
I. National Fire Protection Association (NFPA), www.nfpa.org
1. NFPA 80 Labeled Protective assemblies
2. NFPA 105 Installation of Smoke and Draft Control of 20 minute labeled door assemblies
3. NFPA 252 Smoke and Draft Control of 20 minute labeled door assemblies
4. NFPA 257 Glazing in Fire Rated Door Assemblies
5. NFPA 288 Floor Fire Door Assemblies
J. Steel Door Institute (SDI), www.steeldoor.org
1. Steel Door Institute Technical Data Series Guidelines
2. Steel Door Institute 110-09
K. Underwriters Laboratory (UL), www.ul.com
1. UL 10A
2. UL 14B
3. UL 14C
4. UL 1784 – Smoke and Draft control
5. Provide door assembly with “S” label

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
1. Comply with manufacturer’s standards.
2. Comply with Building Code.
3. Job site inspections shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Labeled Doors and Glazing:	Floor Fire Door Assemblies	Comply	CBC, Sections 715.3, 715.4 715.4.1, 715.4.2, 715.4.3, 715.4.5, 715.4.6, 715.4.6.2, 711.8 ASTM E152-81a
	Fire Door and Shutter Assemblies		CBC, Section 715.4
	Fire Door and Shutter Fire Protection Ratings		CBC, Section 715.4
	Door Assemblies in Corridors and Smoke Barriers		CBC, Section 715.4.3
	Smoke and Draft Control and Labeling		CBC, Section 715.4.3.1 & 715.4.6.3

	Doors in Exit Enclosures and Exit Passage ways		CBC, section 715.4.4
	Glazing in Doors		CBC, Sections 715.4.3.2 & 715.4.4.1
	Labeled Protective Assemblies		CBC, Sections 715.4.6, 715.4.6.1 & 715.4.5 & 715.4.5.1
	Fire Door Labeling Requirements & Identification		CBC Section 715.4.6.1, 715.4.5.3, 715.4.7.3, 715.4.7.3.1
	Door Closing	Self or automatic closing	CBC Sections 715.4.8 & 715.4.8.2
	Latching	Latch required	CBC, Section 715.4.8.1
	Smoke Activated Closing	Comply	CBC, Section 715.4.8.3
Door Frames	Anchorage	Jambs: Anchors shall be located on each jamb starting from 4” from top and 24” on center maximum on down with floor anchor at base	NAAMM Standards HMMA 840, 861 & 830
		Head: Provide anchors at head not more than 24 inches on center and not less than two per door head.	
	Anchors	Jamb and Head: Anchors shall be 14 gauge galvanized steel of size and length or shape required by construction.	HMMA 830 & 863
		Floor: 12 gauge galvanized angles welded to bottom of each door jamb and vertical mullions with two holes in bottom leg for ¼ inch wedge anchor each.	
		Concrete Block Wall: UL approved wedge anchor at dimpled holes centered on stop face of frame jambs and/or head.	
	Hardware Reinforcing	Comply	HMMA 830 Hardware Preparation Standard HMMA 861 Guide Specification
	Grout Slump	4” max. slump Pump into frame jambs and head	HMMA 820 TH01-03 HMMA 862
	Grout type	Mortar, not plaster	HMMA 862
Fire Door Frames with Transom Lights & Sidelights	Assembly	3/4 hour	CBC, Section 715.4.5

Frames	Labeling Requirements	Show mfgr's name & third party inspection agency	CBC, Section 715.4.7
Door Frames	Assembly	Non Rated	HMMA 820 & 861
		Rated, UL or FM Labeled	HMMA 850 & 861
	Types	Security	HMMA 862
		Detention	HMMA 863
		Acoustical (STC 44 min, u.n.o.)	HMMA 865
	Gauge/thickness	Typical: 0.053" / 16 gauge	NAAMM Standards
		4'-0" or greater opening: 0.067" / 14GA	
Door Glazing	Type	Safety & fire protected	CBC, Section 715.4.7.4
Door Frame Plinths (Splats)	Assembly	Shall be same thickness as frame and flush with all jamb surfaces. (not a wrap-around surface applied component)	NAAMM Standards HMMA 820
Window Frames	Assembly/ Installation	Comply	NAAMM Standards HMMA 820, 861 & HMMA-820 TH03-07
	Material Gauge	18 gauge	NAAMM Standards
	Air Infiltration	Comply	ASTM E283
	Static Water Penetration		ASTM E331
	Dynamic Water Penetration		AAMA 501.1
Doors	Core	22 gauge steel stiffeners with insulation core	NAMM Standards
	Assembly	Non Rated:	HMMA 810
		Rated, UL or FM Labeled	HMMA 850
	Types	Security	HMMA 862
		Detention	HMMA 863
		Acoustical (STC 44 min, u.n.o.	HMMA 865
	Face	Interior: 0.042" / 18 gauge	HMMA 861
		Exterior: 0.053" / 16 gauge	HMMA 861
	Edges		HMMA 861
	U-Value	0.18 max	SDI-113-79
HMMA 861 Guide Specification	HMMA 861 Guide Specification	HMMA 861 Guide Specification	HMMA 861 Guide Specification
Door Openings	Typical	Install 16 gauge channel within door body at all sides of opening	
	Vision panel frames	0.032" / 20gauge	
	Louver frames	0.0432" / 18 gauge	SDI-100-91
Steel Frames & Doors	Painting	Comply	HMMA-840 TN01-07 & Section 09 90 00
Steel Sheets	Hot Dipped Galvanized	Comply	ASTM A653-96 coating designation A60 mill phosphatized
Refer to drawings and as herein specified			

C. **Sustainability:**

1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements.
D. Submit Manufacturer's data and shop drawings.
   1. Indicate construction, configuration, jointing methods, reinforcements, and locations of cut-outs of steel doors and frames.
   2. Submit catalog cuts or other data indicating details of construction, gauges of metals, dimensions, hardware preparation, core, label compliance, profiles and specifications for shop priming.
   3. Label Construction Certification:
      a. For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.
   4. Identify each door and frame with Metal labels indicating similar applicable fire-rating.
   5. Schedule:
      a. Submit a schedule of doors and frames using the same reference numbers for details and openings as indicated on the Contract Drawings.
      b. Indicate coordination of glazing frames and stops with glass and glazing requirements.
   6. Secure templates from finish hardware supplier for specified hardware and mounting locations.
E. Submit samples.
   1. One 6" x 6" of each glass type
   2. Glazing tape
F. Certification:
   1. Fire rating of glass, doors, frames and glass lite frames

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for five (5) years providing / installing / finishing projects of similar size and complexity.
C. Manufacturer shall have been in business for five (5) years providing/installing/finishing projects of similar size and complexity.
D. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid
E. Stipulations:
   1. Manufacture all labeled frames in strict accordance with the specifications and procedures of Underwriters Laboratories, Inc. (UL).
F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
   1. Agenda for meeting shall include, but not be limited to;
   2. Preparation for hardware
   3. Electrified hardware, power supply, conduit and wiring
G. Miscellaneous criteria:
   1. Templates shall be furnished by hardware supplier for preparing shop drawings and for preparing and reinforcing hollow metal work to receive hardware.
   2. Where fire-resistance classification is shown or scheduled, provide fire-rated assemblies.
      a. Identify each door, frame and vision lite with UL labels, indicating applicable fire-rating.

b. Provide approved fill material within door frame at acoustically labeled door/frame assemblies.

3. Fire Rated Door Assemblies: Meet the requirements of CCR Title 24 Part 2, CBC Chapter 7 – Fire Resistant Materials and Construction for the fire resistive ratings indicated, and which are labeled by Warnock Hershey International. Fire doors and frames to comply with UBC 7-2-1997 (UL 10C) positive pressure part 1 and/or part 2 where applicable.
   a. Temperature Rise Rating: At stairwell enclosures, provide doors which are labeled for a maximum transmitted temperature end point not to exceed 250° above the ambient at the end of 30 minutes of fire exposure.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Store doors and frames at building site under cover. Place units upright on at least 4 inch high wood sills in a manner that will prevent rust and damage.
   1. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber.
   2. If cardboard wrapper on door or frames becomes wet, remove the carton immediately.
   3. Provide a space between stacked doors to promote air circulation.

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to, the following:
   1. Wall Construction and finish
   2. Hardware supplied by others
   3. Hardware preparation and installation
   4. Electrified hardware
B. Related Sections include, but are not limited to the following:
   1. Division 1]
   2. Section 04 22 00 – Concrete Unit Masonry
   3. Section 08 71 00 – Door Hardware
   4. Section 08 80 00 – Glazing
   5. Section 13 34 19 - Pre-Manufactured Metal Building Assembly
C. Related Documents include, but are not limited to the following:
   1. Division 1 Supplementary Conditions

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.
C. Preparation and painting of frames and doors

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
   1. Doors, Door frames and Window frames
      a. Metal Manufacturing Company, Sacramento, CA, 4 22 00 Concrete Unit Masonmary 916-922-3484
      b. Stiles Custom Metal, Inc., www.hollowmetal.com 209-538-3667
      c. Forderer Cornice Works, San Francisco, CA, (415) 431-4100
      d. Titan Metal Products, Inc., Sacramento, CA., www.titanmetalproducts.com 916-920-2555
      e. Door Components Inc., Fontana, CA, www.doorcomponents.com, 866-989-3667, 909-770-5700
      f. Security Metal Products Corp, www.seet.com 310-641-6601
   2. Window glazing
      a. Refer to Section 08 80 00 – Glass and Glazing
   3. Door Lite assembly frame & Glazing compound
      a. Anemostat, www.anemostat.com 213-775-7441
   4. Door Lite Assembly Frame Glazing
      a. TGP, Technical Glass Products, www.tgpamerica.com www.fireglass.com
   5. Sound Attenuation Fill – Door Frames
      a. Owens Corning, www.owenscorning.com
   6. Reviewed Equivalent by **Architect.**
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. General
   1. Hot Dip Galvanized Steel Sheets
   2. Honeycomb Core Material
   3. Polystyrene Core Material
   4. Mineral Fiberboard Core Material
   5. Shop Applied Primer: Rust-inhibitative enamel or paint, either air drying or baking, suitable as a base for specified finish paints.

B. **Doors**
   1. General:
      a. Comply with NAAMM Standards, most current published edition as herein specified.
         1. Unless otherwise indicated, provide fire ratings as indicated on the drawings, and as required by building code.

2. Glazing shall be as approved for rated assemblies and in accordance with glazing specifications.
3. Glazing shall be as approved for safety assemblies and in accordance with glazing specifications.

C. **Door Frames**
   a. Comply with NAAMM Standards, most current published edition as herein specified.
   b. Shop assembled where possible, size as scheduled or indicated, gauges as herein specified.
   c. Except at fire assemblies, furnish and install three rubber silencers for strike jambs of single frames and two for heads of double frames, u.n.o. in hardware groups.
   d. All glazing stops shall have miter corners as standard requirement.
   e. Fabricate as "fully & continuously" welded assembly.
   f. Fabricate with continuous watertight 2” wide nailing flange at jamb and head – exterior side of frame.
2. Comply with NAAMM Standards, most current published edition;
   a. Hollow metal frames: Refer to standards as herein specified
   b. Hardware prep for Hollow metal frames: Refer to standards as herein specified
   c. Guide Specifications – Commercial: Refer to standards as herein specified
3. Anchors:
   a. Comply with HMMA 861, including, but not limited to Article 2.05 A, B, C.
   b. Three at jambs, min. and one floor anchor per jamb, typical unless required differently per frame type application.

D. **Hardware reinforcement**
1. Comply with NAAMM Standards, most current published edition;
   a. HMMA 830 Hardware Preparation Standard
   b. HMMA 861 Guide Specification

E. **Glass lites in doors**
1. **Glazing:**
   a. Mfgr: TGP, Technical Glass Products, www.tgpamerica.com www.fireglass.com
   b. Size: Maximum size, refer to frame maximum lite size criteria
   c. Color: Clear
   d. Tempered: Yes
   e. Testing: ANSI Z97.1 – 2004
   f. Schedule:

	Rating:	Product:	Thk:	Description:
1.				
2.	None.	Fireglass20	¼”	Impact/safety rated
3.				

2. **Frame:**
   a. Mfgr: Anemostat
   b. Material: 20ga. Cold rolled steel
   c. Color: Factory grey primer for field painting – as selected by **Architect**
   d. Attachment: Self attaching
   e. Profile: Low profile
   f. Door thickness:
      1. Typical: 1-3/4”
      2. LoPro-IS-G: Refer to door schedule for door thickness
   g. Ratings Schedule: Rating as required, refer to drawings and door schedule.

	Rating:	Maximum visible lite size
a.	20 min.	3204 sq.in
b.	45/60 min.	2772 sq.in
c.	90 min.	1296 sq.in.

d. 180 min. 100 sq.in.

h. Schedule:

1. Profile:	Product:	Size:	Glass thk:
2. Rectangular	LoPro	Refer to drawings	¼", 3/16" & 5/16"

3. **Tape:**
   a. Glazing tape:
      1. Mfgr: Anemostat
      2. Product: Fire Rated Glazing Tape
      3. Series: GT
      4. Rating: 20/45/60/90/180 minute
      5. Listing: UL, WHI, BS-476.22 & EN-1634
      6. Material:
         a. Use thickness as required for frame opening and glass thickness
         b. Schedule:
            1. GT-132: 1/32" thick x 3/8" wide
            2. GT-116: 1/16" thick x 3/8" wide
            3. GT-18: 1/8" thick x 3/8" wide

F. **Grout Frame Fill: (Exterior door Frames)**
   1. Schedule:
      a. Material: Mortar
      b. Type: Non shrink which cures via chemical reaction
      c. Agents: Anti freeze in cold weather
      d. Barrier coating: Inside of frame shall be treated with barrier coating

2.03 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION (comply with HMMA 820, 830)

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Hardware supplier / contractor shall supply hardware templates for preparing shop drawings and for preparing and reinforcing hollow metal work to receive hardware to hollow metal frame and door contractor.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 FABRICATION

A. Fabricate doors, frames, concealed stiffeners, anchors, hardware reinforcement, edge channels, louvers, moldings, stops and vision panel frames from the following commercial qualify carbon steel.(maintain minimum standards per each tested assembly)
   1. Hot-rolled steel sheets and strips, pickled and oiled, complying with ASTM A569.
   2. Cold-rolled steel sheets, complying with ASTM A366.
   3. Galvanized steel sheets, complying with ASTM A526, G90 zinc coating.
   4. Inserts, bolts and fasteners shall be standard manufacturer's units, except hot-dip galvanized items to be built into walls, complying with ASTM A153, Class C or D as applicable.
   5. Comply with NAAMM Standard, current published edition;
      a. Guide Specifications – Commercial:
         1. Hollow metal frames, Typical: HMMA 861
         2. Hollow metal frames, Security: HMMA 862
         3. Hollow metal frames, Detention: HMMA 863
         4. Hollow metal doors, Acoustical: HMMA 865
      b. Manufacturing Standard: MMMA 802
B. Steel doors, door frames and window frames shall be "Machine-Mitered and Full-Welded" joint construction, rigid, neat in appearance and free from defects, warp or buckle.
   1. Full welded mitered joints, continuously, grind, dress, and make smooth, flush and invisible.
   2. Install Knock-Down Window frames at locations that prohibit built-in place conditions where fully welded window assembly is feasible.
C. Accurately form metal to required size and profiles.
   1. Shop-fit and assemble wherever practical
   2. Site assembled units shall be of welded construction meeting all requirements of factory assembled units.
   3. Construction joints shall be reinforced and machine-mitered at corners.
   4. Exposed fasteners shall be provided countersunk pre-fitted holes at through bolting on doors.
   5. Concealed fasteners at face of frame and glazing molding stops shall be pre-drilled countersunk or dimpled holes.
      a. Supply flat head Phillips machine or Teks screws pre-fitted for field applied glazing putty.
   6. Reinforce doors and frames to receive surface-applied hardware, and shall be as follows.
      a. Drilling and tapping for surface-applied hardware may be done at project site. Door shall have internal reinforcing at all surface-applied hardware.
      b. Provide drilled holes for door silencers when required by Section 08 71 00 - Door Hardware.
      c. Hinges; 10 gauge x 1 1/2 inches wide x 6 inches longer than hinge; full perimeter fillet weld at bearing each end.
      d. Strike plate clips; 10 ga. x 1 1/2 inches wide x 3 inches long; full perimeter fillet weld at bearing.
      e. For Surface-applied closers; 10 gauge x required width and length, secured in both doors and frames whether or not closers are indicated. Spot welded in place. For future and/or required closer.
D. Paint all steel frames:
   1. General:
      a. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before applying shop primer.
      b. Apply pretreatment to clean metal surfaces, using cold phosphate solution (SSPC-PT 2), hot phosphate solution (SSPC-PT 4) or basic zinc chromate-vinyl butyl solution (SSPC-PT3).
      c. Install barier coating at inside of all frames including the ones to be fully grouted with mortar.
   2. Primer:
      a. Apply shop primer within time limits recommended by pretreatment manufacturer.
      b. Apply a smooth primer coat of even consistency to provide a uniform dry film thickness of not less than 2 mils, on all hollow metal surfaces.
         1. Door primer surface shall be completely smooth to the touch and visual.

3. Painting:
    a. Shop paint 1st. coat when possible
    b. Finish painting shall be in accordance with Paint Specification Section 09 90 00.
    c. Paint frame and doors custom color as directed by **Architect.**

3.05 INSTALLATION

A. General:
1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
    a. Installed metal doors, door frames and window lite frames and accessories in accordance with drawings, reviewed Shop Drawings, manufacturer's data, and as specified here.
    b. Hang with clearance indicated in Section 08 71 00 - Door Hardware. Install in accordance with HMMA 840 and 861.
2. All interior metal frames shall be;
    a. Filled with insulating foam at non rated conditions
        1. Brace frames to eliminate any potential bowing of frame.
    b. Filled with mineral wool at rated conditions
3. All exterior metal frames shall be;
    a. Painted inside frame with barrier coating.
    b. Fully grouted after barrier coating applied and cured.
        1. Brace frames to eliminate any potential bowing of frame.
    c. Holes in frame filled, bondo filled, sanded smooth and finished after grouting.
4. Prime coat touch-up;
    a. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer in accordance with Section 09 90 00.
5. Finish paint frames after installation, refer to Painting Section 09 90 00.
6. Except for frames located at in-place concrete or concrete block which can be installed after wall is placed, place frames prior to construction of enclosing walls and ceilings.
    a. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.
        1. After wall construction is completed, frames are grouted or filled with appropriate material, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

B. Anchorage:
1. Frame anchors shall be located on each jamb starting 4" from top and 24" on center maximum on down with floor anchor at base. Provide anchors at head not more than 24 inches on center and not less than two per door head.
2. Anchors shall be 14 ga. galvanized steel of size and length or shape required by construction.
3. Anchor to floors:
    a. 12 gauge galvanized angles welded to bottom of each door jamb and vertical mullions with two holes in bottom leg for 1/4 inch wedge anchor each.
4. Anchor to block or concrete walls
    a. UL approved wedge anchor at dimpled holes centered on stop face of frame jambs and/or head.
5. Comply with NAAMM Standard, HMMA 840, current published edition.

C. Fully grout all exterior steel frames:
1. Grouting:
    a. Provide and install appropriate mortar material for all exterior frames.
    b. Pre treat inside of frame as part of fabrication with barrier coating.
2. Sound deadening:
    a. Refer to FABRICATION heading for interior frames

D. Install Metal Doors

1. Inspection:
   a. Examine door frames and verify that they are of the correct type and have been installed as required for proper hanging of corresponding doors.
      1. Correct conditions detrimental to the proper and timely installation of plastic faced wood doors; do not proceed with installation until unsatisfactory conditions have been corrected.
2. Installation:
   a. Install doors and fit hardware to doors in accordance with manufacturer's instructions.
   b. Fit doors to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.
   c. Replace doors which have been improperly prepared at factory and which cannot be adjusted without damage to surfaces.
   d. Clearances: (Unless otherwise required by testing labeling of rated doors and mfgr. to be different)
      1. For non-fire-rated doors provided clearances of;
         a. 1/8" at jambs and head
         b. 1/8" at meeting stiles for pairs of door
         c. 1/2" from bottom of door to top of decorative floor finish or covering.
            1. Except where threshold is shown or scheduled provided 1/4" clearance from bottom of door to top of threshold.
   e. Fire-rated doors:
      1. Install in corresponding fire-rated frames in accordance with the requirements of NFPA Standard No. 80.
      2. Provide clearances complying with the limitations of the authority having jurisdiction.
   f. Operation:
      1. Re-hang or replace doors which do not swing or operate freely.
      2. Replace doors damaged during installation.
   g. Folding, Bi-parting, sliding and other specialty door shall be installed in accord with indicated details, reviewed shop drawings and manufacturer’s recommendations.
   h. Location of finishes and hardware as listed and detailed shall be used as a guide and shall be field verified to achieve a smooth and effortless operation.

3.06 ADJUSTING

A. Hardware adjustment shall be done by others under hardware specifications section.

3.07 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer’s specifications.
   2. The Applicator shall be responsible for the proper application of the materials.
B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.08 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.

D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
    1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END SECTION

08 33 33
OVERHEAD INSULATED COILING DOORS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
    1. Insulated overhead roll-up doors as specified, including all hardware, weather stripping, and other items necessary for complete operable doors.
        a. Door Type(s)
            1. Overhead Insulated Coiling Door
                a. Motorized

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society For Testing and Materials (ASTM)
    1. ASTM A123 - Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
    2. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron
    Alloy-Coated (Galvannealed) by the Hot-Dip Process
    3. ASTM D3363 - Standard Standard Test Method for Film Hardness by Pencil Test
    4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
    5. ASTM E90 - Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
E. Factory Mutual
F. National Fire Protection Agency (NFPA)
    1. NFPA 80 – Standard for Doors and Other Opening Protectives, 2007 Edition
    2. NFPA 80 – Labeled Protective assemblies
    3. NFPA 105 – Installation of Smoke and Draft Control of 20 minute labeled door assemblies
    4. NFPA 252 – Smoke and Draft Control of 20 minute labeled door assemblies
    5. NFPA 257 – Glazing in Fire Rated Door Assemblies
    6. NFPA 288 - Floor Fire Door Assemblies
    7. Provide door assembly with "S" label
G. Underwriters Laboratories (UL)
    1. UL 10A, UL 14B and UL 14C
    2. UL 1784 – Smoke and Draft control

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
    1. Comply with manufacturer's standards.
    2. Comply with Building Code.
    3. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Assembly	Rated Enclosure	Pass	NEMA 1
Control Station	Operates	Pass	NEMA 1, 1B

Refer to drawings and as herein specified

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
   1. Shop Drawings:
      a. Indicate construction, configuration, jointing methods, reinforcements, finish/color, frames & accessories.
      b. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each door.
      c. Include special conditions not detailed in product data
      d. Show interface with adjacent work and related work.
   2. Product Data:
      a. Submit manufacturer's technical literature describing the product to be used under this section.
      b. Provide proof of manufacturer ISO 9001:2000 registration.
      c. Provide proof of manufacturer and installer qualifications.
      d. Provide manufacturer's installation instructions.
E. Submit schedule:
   1. Schedule of doors and frames using the same reference numbers for details and openings as indicated on the Contract Drawings.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall be manufacturer approved and have been in business for **five (5)** years providing / installing / finishing projects of similar size and complexity.
C. Manufacturer shall be ISO 9001:2000 registered and have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Templates shall be furnished by door supplier for preparing wall substrate to receive hardware.
E. Fire-Rated Assemblies: Provide all doors with fire resistance rating required to comply with governing regulations which are inspected, tested, listed and labeled by UL, complying with NFPA 80 for class of opening. Provide UL label permanently fastened to each fire door assembly. Door shall be tested under UL10B and UL1784. Doors shall be provided with an "S" Label.
F. Regulatory requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
G. Testing: Provide documentation from a certified testing agency that the door has been tested for a minimum of 50,000 cycles and 5000 drop tests.
H. Door design & construction shall be capable of withstanding - Exposure "C" as defined in Building Code.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Store doors and frames at building site under cover in a manner that will prevent rust and damage.
C. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instruction.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.
C. Furnish manufacturer's additional five (5) year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Connection/wiring to electrical power.
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 04 2200 – Concrete Unit Masonry
   3. Section 05 12 00 – Structural Steel Framing
   4. Section 13 34 19 Pre-Manufactured Metal Building Assembly
   5. Division 26

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding operation of the equipment.
   2. Complete instructions regarding maintenance of the equipment, materials, finishes, etc.
   3. Maintenance Service Agreement for **Owner's** consideration and acceptance.
   4. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer.
B. Acceptable manufacturers shall be one of the following and as listed herein and in Drawings:
   1. Cornell Iron Works, Inc. www.cornelliron.com, (800) 233-8366, (800) 526-0841 fax
   2. McKeon Door Company www.mckeondoor.com
   3. The Cookson Company www.cooksondoor.com
   4. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.

D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS - DOOR TYPES

A. Schedule:
1. **Insulated Rolling Service Door**
a. Manufacturer: Cornell Iron Works
b. Operation: Rolling
c. Type: Insulated
d. Model: ESD20
e. Fire Operation: None
f. Fire Rating: None
g. Wind Loading: 25psf
h. Opening: Refer to Door Schedule and Drawings
i. Description: Motorized Overhead coiling insulated door
1. Performance:
a. Wind Loading: Supply doors to withstand wind loading as herein specified.
b. Cycle Life:
1. Design doors of standard construction for normal use of up to 20 cycles per day minimum.
j. Construction:
1. Materials:
a. Curtain:
1. Slat Material: No. 6F, (Listed Exterior/Interior):
a. Galvanized Steel/Galvanized Steel: 18/24 gauge, Grade 40, ASTM A 653 galvanized steel zinc coating.
b. Insulation: 7/8 inch (22 mm) foamed-in-place, closed cell urethane.
c. Total Slat Thickness: 15/16 inch (24 mm).
d. Flame Spread: 0
e. Smoke Developed: 10
f. Slat R-Value: 8.0
g. Slat STC Value: 26
h. Fabricate interlocking sections with high strength [nylon] [cast iron] endlocks on alternate slats each secured with two ¼" (6.35 mm) rivets. Provide windlocks as required to meet specified wind load.
2. Bottom Bar: Reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gauge.
3. Exterior Slat Finish:
a. GalvaNex™ Coating System and phosphate treatment followed by baked-on polyester powder coat:
1. Custom Color to match Metl Span Metal Panels "Weathered Copper" # 437R1124
4. Interior Slat Finish:
a. GalvaNex™ Coating System and phosphate treatment followed by baked-on polyester powder coat:
1. Match Exterior Slat Finish
5. Bottom Bar Finish:
a. Exterior Face: Match slats.
b. Interior Face:
1. Powder coat to match slats
b. Guides: Fabricate with minimum 3/16 inch (4.76 mm) structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.

Top 16 ½" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.

1. Finish:
    a. Steel: ASTM A 123, Grade 85, zinc coating, hot-dip galvanized after fabrication.

c. Counterbalance Shaft Assembly:
    1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
    2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

d. Brackets: Fabricate from minimum 3/16 inch (5 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
    1. Finish:
        a. ASTM A 123, Grade 85 zinc coating, hot-dip galvanized after fabrication.

e. Hood: 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
    1. Finish:
        a. GalvaNex™ Coating System and phosphate treatment followed by baked-on polyester powder coat:
            1. Match Exterior Slat Finish

f. Weatherstripping:
    1. Bottom Bar, Motor Operated Doors: Weather/sensing edge with neoprene or rubber astragal extending full width of door bottom bar.
    2. Guides: Replaceable vinyl strip on guides sealing against fascia side of curtain.
    3. Lintel Seal: Nylon brush seal fitted at door header to impede air flow.
    4. Hood: Neoprene/rayon baffle to impede air flow above coil.

2. Accessories
    a. Locking:

        1. Padlockable slide bolt on coil side of bottom bar at each jamb extending into slots in guides. [Provide interlock switches on motor operated units.]

    b. Vision Panels: 10 x 1-1/2 x 3/4 inch thick (254 x 38 x 19 mm) oval acrylic panes set with double-sided foam glazing tape and fully contained within slat assembly. Refer to drawings for number and placement.

    c. Operator [and Bracket Mechanism] Cover: Provide 24 gauge galvanized steel sheet metal cover [to enclose exposed moving operating components at coil area of unit. Finish to match door hood.

3. Operation
    a. Supply Model SG, heavy duty, UL listed, gearhead hoist type operator(s) rated ¾ H.P.,115 Volts, 3 Phase. Provide UL listed electric door operator assembly of size and capacity recommended by door manufacturer; complete with electric motor and factory pre-wired motor controls, worm-gear reduction unit, solenoid operated brake and control station(s). Motor shall be high starting torque, continuous duty, industrial type, protected against overload by a current sensing or thermal overload device. Speed reduction shall be worm-gear-in-oil-bath gear reducer with synthetic "All Climate" oil. Shall provide 45:1 speed reduction. Door drive shall utilize minimum #50 roller chain and sprockets. Operator shall be equipped with an electrically interlocked floor level disconnect and chain hoist for

manual operation and an electric solenoid-actuated brake to stop the motor and hold the door in position. Operator shall be capable of driving the door at a speed of 8 to 9 inches per second (20 to 23 cm/sec). Fully adjustable, driven linear type limit switch mechanism shall synchronize the operator with the door. Low friction nylon limit nuts fitted on threaded steel shaft, rotating on oilite self-lubricating bronze bushings. The motor shall be removable without affecting the limit switch settings. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

1. Control Station: Surface mounted, "Open/Close/Stop" push buttons ; NEMA
a. Weather/Sensing Edge: Provide automatic [reversing] [stop] control by an automatic sensing switch within neoprene or rubber astragal extending full width of door bottom bar.

2. Provide an electric sensing edge device. Contact before door fully closes shall cause door to immediately [stop downward travel and reverse direction to the fully opened position] [stop downward travel]. Provide a self-monitoring wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator. Supervised system alters normal door operation preventing damage, injury or death due to an inoperable sensing edge system.

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

C. Verify all dimensions taken at job site affecting the work.
   1. Notify the Architect in any instance where dimensions vary.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.

B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer’s recommendations.

3.04 INSTALLATION

A. General:
   1. Installed doors, operating equipment and accessories in accordance with reviewed Shop Drawings and manufacturer's data, and as specified herein with necessary hardware, anchors, inserts, hangers, supports, etc.
   2. Perform installation using only factory approved and certified representatives of the door manufacturer.
   3. Install door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.
   4. Adjust door installation to provide uniform clearances and smooth non-binding operation.

5. Upon completion of installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion and fitting weather tight for entire perimeter.

B. Rated Assemblies:
   1. Install wiring in accordance with applicable local codes and the California Electrical Code and Standards.
      a. Materials shall be UL listed.
   2. Test door closing sequences when activated by the building's fire alarm system. Reset door after successful test.
   3. Comply with NFPA 80 and NFPA 105 and follow manufacturer's installation instructions.

Coordinate installation of low voltage wiring to fire alarm panel, card key devices, etc.

3.05 ADJUSTING

A. Following completion of installation, including related work by others, lubricate and test doors for ease of operation, freedom from warp, twist, or distortion. Adjust as needed to produce fully functioning units that comply with requirements.

3.06 FIELD QUALITY CONTROL

A. Site Test:
   1. Test doors for normal operation and automatic closing.
   2. Coordinate with authorities having jurisdiction to witness test and sign Drop Test Form.

3.07 DEMONSTRATION

A. Demonstrate proper operation, testing and reset procedures to **Owner**.
B. Instruct **Owner** in maintenance procedures.

3.08 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition, so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.

END OF SECTION

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
    1. Window wall systems:
        a. Storefront:
    2. Flashing/Accessories:
        a. Coordinate with Section 07 62 00 – Sheet Metal Flashing and Trim.
        b. Sill Extension/Stool:
            1. Aluminum with watertight end dams
                a. Extruded when an accessory to specified system
            2. Fastening clip
    3. Glazing:
        a. Provide for and install glass and glazing supplied under Section 08 80 00
    4. Accessories/Specialty Items:
        a. Provide and install fasteners, weather-stripping, sealant and other necessary components.
        b. Sealants

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
C. Title 24, Chapter 11 – California Green Building Standards Code
    1. Non-residential new construction
        a. All occupancy types
D. Aluminum Association (AA) www.aluminum.org
    1. Aluminum Standards and Data.
    2. Specifications for Aluminum Structures.
    3. Designation System for Aluminum Finishes.
    4. Standards for Anodized Architectural Aluminum.
E. American Architectural Manufacturers Association (AAMA) www.aamanet.org
    1. AAMA - 101 Aluminum, Poly(Vinyl Chloride) (PVC) and Wood Windows and Glass Doors
    2. AAMA 502 Specification for Field Testing of Windows and Sliding Glass Doors
    3. AAMA 503 Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems
    4. AAMA - 605.2 High Performance Organic Coatings on Architectural Extrusions and Panels
    5. AAMA 1302.5 Forced Entry Resistance
    6. AAMA 1502.7 Condensation Resistance Factor
    7. AAMA 1503.1 Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
F. American Institute of Steel Construction (AISC) www.aisc.org
    1. Manual for Steel Construction
G. American Iron and Steel Institute (AISI) www.steel.org
    1. Cold Formed Steel Design Manual
H. American National Standards Institute (ANSI) www.ansi.org
    1. ANSI Z97.1 Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.

I. American Society For Testing and Materials (ASTM), www.astm.org
   1. ASTM A36 Standard Specification for Structural Steel
   2. ASTM A123 Zinc Coating on Fabricated Products.
   3. ASTM A165 Standard Specification for Electrodeposited coatings of Cadmium on Steel.
   4. ASTM B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel (replaced A164)
   5. ASTM C509 Standard Specification for Cellular Elastomeric Preformed Gasket and Sealing Material
   6. ASTM C864 Standard Specification for Dense Elastomeric Compression Seal Caskets, Setting Blocks and Spacers
   7. ASTM C920 Standard Specification for Elastomeric Joint Sealants
   8. ASTM C1036 Standard Specification for Flat Glass
   9. ASTM C1048 Standard Specification for Heat Treated Flat Glass
   10. ASTM C1193 Standard Guide for use of Elastomeric Joint Sealants
   11. ASTM D659 Evaluating Degree Of Chalking Of Exterior Paints
   12. ASTM D773 Seal Durability of Sealed Insulating Glass Units
   13. ASTM D774 Sealed Insulating Glass Units
   14. ASTM E28 Softening Point Of Resins Derived From Naval Stores By RingAndBall Apparatus
   15. ASTM E283 Rate Of Air Leakage Through Exterior Windows, Curtain Walls, And Doors Under Specified Pressure Differences Across The Specimen
   16. ASTM E283 Static Air
   17. ASTM E330 Structural Performance Of Exterior Windows, Doors, Skylights And Curtain Walls By Uniform Static Air Pressure Difference
   18. ASTM E331 Static Water
   19. ASTM E546 Frost Point of Sealed Insulating Glass Units
   20. ASTM E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors and Curtain Walls by Uniform or Cyclic Static Air Pressure Differential.
   21.

J. American Welding Society (AWS), www.aws.org
   1. AWS 01.0 Structural Welding Code

K. Consumer Product Safety Commission (CPSC) www.cpsc.gov

L. Flat Glass Marketing Association (FGMA), www.glasswebsite.com
   1. Glazing Manual.
   2. Sealant Manual.

M. Glass Association of North America (GANA) www.glasswebsite.com

N. International Code Council (ICC), www.iccsafe.org
   1. ICC – Evaluation Service
   2. ICC ES: ER-4780 Metal Fasteners
   3. ICC ES: ESR-2427 Concrete Anchors

O. II Evaluation Service National Fenestration Rating Council, NFRC, www.nfrc.com

P. National Glass Association (NGA), www.glass.org

Q. Storefront manufacturer's written instruction manuals

1.03 PERFORMANCE, TESTING AND INSPECTION

A. General:
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Aluminum	Recycled Content	45% minimum	Third party confirmation

Aluminum Window System	Air infiltration	Not to exceed 0.06 CFM. Per sq. ft. of fixed area at 6.24 PSF	ASTM E-283
	Water infiltration-Curtain Wall	No water at 12psf	AAMA-501 / ASTM E331
	Water infiltration-Storefront	No water at 8 psf	AAMA-501 / ASTM E331
Design Criteria	Wind Loading	Comply	CBC Section 1609
Glazing	Refer to Section 08 80 00		
Doors - Single	Air infiltration	Not to exceed 0.50 CFM per linear foot of perimeter crack at 6.24 PSF pressure differential	ASTM E283 for single doors
Doors - Double	Air infiltration	Not to exceed 1.00 CFM per linear foot of perimeter crack at 1.567 PSF pressure differential	ASTM E283
System Design Criteria	Wind exposure	"B" exposure	Building Code, ANSI A134.1
	Design Wind Pressure	25 psf	Building Code, ASTM E330
	Min. basic wind speed	85 mph	Building Code, ASTM E330
Fasteners	Types and design	Self-drilling structural fasteners	ICC Evaluation Service, ER-4780
		Concrete expansion anchors	ICC Evaluation Service, ESR-2427

Window / Door System	Deflection and stress design	Normal to the plane of the wall vertical deflection of framing members at design pressure shall • not exceed L/175 of span length or ¾" per individual pane of glass	AAMA TIR-A11-1996 or most current adopted edition
		Normal to the plane of the wall horizontal deflection of framing members at design pressure shall not exceed L/360 of span length or 1/8" maximum, whichever is less. Door head shall not exceed L/360 at 1/16" maximum	
		In the plane of the wall deflection of framing members when carrying their full design deadload shall not reduce the glass or panel bite below 75% of the design dimension, and shall not reduce the glass or panel edge clearance below 25% of the design dimension or 1/8", whichever is greater. Restrict deflection further if required for proper assembly and fit of components.	
		At connection points of framing members to anchors: Anchor deflection in any direction shall not exceed 1/16".	
		Stresses must take into account interaction and shall not exceed the allowable values established by the specifications listed under References. In no case shall allowable values exceed the yield stress.	
		At one and one-half times design pressure, permanent deflections of framing members must not exceed 1/1000 of span length, and components must not experience failure or gross permanent distortion. At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 1/8" and permanent set shall not exceed 1/16".	
	Thermal Design	Provide for free and noiseless vertical and horizontal thermal movement of component parts, for an ambient temperature range of 20ºF to 180ºF. Buckling, opening of joints, glass brakeage, undue stress on fasteners, vibration harmonics, wind whistles, failure of sealants or any other detrimental effects due to the thermal movement of component parts will not be permitted. Fabrication and erection procedures shall take into account the ambient temperature range at the time of the respective operations	
	Seismic Design	• The system and its attachments to the structure shall comply with the seismic lateral force requirements established by the applicable building code and the limitations described below and herein. • No failure or deterioration of any kind may occur when the system is displaced in the amount corresponding to the maximum allowable story drift as indicated on drawings. • At twice the above displacement, wedge gaskets may disengage and perimeter weather seals may experience adhesive or cohesive failure, but no other failure or deterioration of any kind may occur. • Glass contact with the system framing members may not occur during either displacement. • Story drift, refer to also to structural drawings	

	Water Resistance	Static air pressure difference of 9.75 psf	ASTM E331 ASTM E547
	Uniform Load Structural Test	Static air pressure difference of 9.75 pst positive pressure and 97.5 psi negative pressure. At conclusion of test there shall be no glass brakeage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms, nor any other damage which would cause the window to be inoperable.	
	Condensation Resistance Factor (CRF)	With window sash and ventilators closed and locked CRF shall not be less than 56 for the frame and 64 for the glass	AAMA 1502.7
	Thermal Transmittance Test (Conductive U-Valued)	With window sash and ventilators closed and locked conductive thermal transmittance *U-value) shall be not more than .56 BTU/hr/sf/F. Unless otherwise specified, windows tested for condensation resistance and thermal transmittance shall be glazed with no more than two lites of clear, uncoated, annealed glass. Sealed insulating glass shall be of standard construction.	AAMA 1503.1
Aluminum Finish, UON	Type	Kynar 500 Finish: 1. Color: Custom Color to match Metl Span Metal Panels "Weathered Copper" # 437R1124 Class: Class 1 Product: Fluropon 70% Kynar 500 or Hylar 5000	AAMA 605.2
Hardware- Hand Activated	Operation	Comply	CBC 1133B, 1133B.2 & 1133B.2.5.2
Refer to drawings and as herein specified			

C. **Sustainability:**
1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

D. **Construction Testing:**

Item	**Name of Test**	**Performance**	**Testing Std.**
Sill receptor assembly	Water infiltration; Perform testing as herein specified in Part 3 – Execution	No water leakage	AAMA 511
Window assembly	Water infiltration- Curtain wall (CW); Perform testing as herein specified in Part 3 – Execution	No water at 8psf	ASTM E1105, AAMA 502 & AAMA 503
Window assembly	Water infiltration-Storefront (SF); Perform testing as herein specified in Part 3 – Execution	No water at 8psf	ASTM E1105, AAMA 502 & AAMA 503

E. **Construction Testing / Inspection by others:**

Item	Name of Test	Performance Results	By Whom
System installation	General compliance with manufacturers written installation instructions and warranty criteria	Comply	Authorized window manufacturer representative

F. **Construction Monitoring/Observations by others:**

Item	Name of Test	Performance Results	By Whom
Aluminum	Const. Waste Management	Comply	Refer to Division 1 for construction waste management and disposal/recycling requirements

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
    1. Data:
        a. Submit manufacturer's data for all components.
        b. Schedule of all materials including fasteners, anchors, sealants, primers, back-up materials, tapes, gaskets, separators, and related items including the location where each material is to be used, methods of application, special instructions, cross-references to the shop drawings, and explanatory details as required to insure and appraise the complete application of all sealants.
        c. Detailed instruction for the installation and reglazing of glass units including explanatory details indicating the sequence of installation, method of installation for all materials, location of specific items and any special instructions as may be required.
        d. In addition to complying with pertinent regulations of governmental agencies having jurisdiction. Submit ICC report certifying the following compliance with ASTM standards herein listed.
        e. Precautionary instructions which will prevent damage to and prolong the life of the system components.
        f. Detailed instructions for cleaning the various materials, including methods and acceptable cleaning products, as well as those which should not be used.
        g. Instructions for the removal and replacement of glazing materials.
    2. Design calculations:
        a. Prepare and submit (with shop drawings) structural calculations for all work of this Section, including mock-up. Comply with current design rules of the Aluminum Association, AISC, AISI, and ACI. Include analysis for wind, dead load and seismic load on framing members and anchors. Show section property computations for framing members and submit full-size die drawings.
            1. Existing test reports shall not be an acceptable substitute for calculations.
            2. In no case shall glass be considered as a lateral brace for framing members.
            3. Anchor clips with slotted holes shall be calculated in the most extended conditions.
            4. Calculations shall dimensionally limit the stacking of shims in regard to bending stresses in bolts, clips, etc.
            5. Calculations shall be signed and sealed by a registered licensed structural engineer in the State of California.
            6. In addition, provide the following:
                a. Cross-references to the shop drawings.
                b. Certification that the responsible engineer has reviewed the shop drawings and that the structural performance requirements of this specification have been met and properly interpreted on the shop drawings.

1. Certification shall be by letter to the **Owner** and by engineer's signature on shop drawings.

7. Each specific manufacturer's Storefront, Window Wall and Curtain Wall Systems may require additional internal steel reinforcing which is integral to their specific system and provided as a component of their specific system.
   a. This reinforcing shall be furnished under this section of Work and completely detailed and included in shop drawings.

b. Submittal to be signed & stamped by a California Licensed Structural Engineer.
c. Indicate all steel reinforcing to be replaced in mullions by storefront manufacturer per storefront manufacturer's design requirements.
d. Submit wind loads and deflection calculations that prove frame systems shall support and resist listed loads required by this specification.
e. Wind resistance loads and deflection maximums.
f. Water resistance test standards listed.
g. Provide test reports from AAMA accredited laboratories certifying the performance.

2. Shop drawings:
   a. Submit a detailed diagram to the glass manufacturer indicating how his product will be used in the system, as well as written information describing application and/or installation techniques, wind load, wall and building movement, magnitude of thermal expansion, blocking and sealing and any other procedures, operations or exposures which may affect the performance of his product.
      1. Glass manufacturer shall review and approve in writing, this submittal for responsible use of his product relative to the specific application based on the information supplied therein, and shall note on the submittal any procedures he believes will not allow his product to perform.
      2. Review of this submittal by the manufacturer shall not relieve the **General Contractor** from responsibility for the performance of the system.
      3. Submit elevation drawings and sections for all windows and incorporate architectural reference for window types and details in shop drawings.
      4. Coordinate with Section 08 80 00.
   b. Provide and incorporate in the shop drawings data indicating pertinent dimensioning, general construction, steel reinforcing, anchorage methods and locations, slab edge attachment, hardware locations and job specific details (manufacturer's standard details not acceptable).
   c. Details showing journey techniques, provision for horizontal and vertical expansion, glass and metal thicknesses, framing and anchor member profiles.
   d. Identify all materials, including adjacent materials and substrates.
   e. Show relative layout of all adjacent walls, beams, columns and slabs, all correctly dimensioned to each other and grid lines.
   f. Dimension position of glass edge relative to face of frame, channel and face of stud.
   g. Include provisions for containing and draining to the exterior any water which accesses window internal cavities.
   h. Indicate and specifically note any deviations from contract drawings and specifications.
   i. Hardware mounting heights and indication of coordination with hardware specified in Section 08 71 00 – Door Hardware.
   j. All related flashing, bituminous membrane and vapor / moisture barrier membrane.
   k. Include all steel reinforcing to be installed integral to mullions.

E. Submit samples
   1. The following samples shall be submitted for review, sized to provide a true representation of color, flatness, texture and workmanship, properly identified with labels and in quantities to be determined by the **Owner**:
      a. Aluminum, extruded and / or sheet, with specified finish.
      b. Cured sealants for color selection and manufacturer's data sheets.
      c. All door and frame metal, with specified finish.

   d. All flashing metal, with finish to match frame finish.

F. Submit Warranty
   1. Submit in a form acceptable to the **Owner**, a warranty to be executed by an authorized officer of the subcontractor, subject to the conditions herein set forth.

G. Site mock-up, refer to "Mock-Up" heading.

H. Certification:
   1. Provide written certification that the following materials conform to the specifications, including the responsibility for ensuring that all items required for the complete and proper functioning installation are included, even though not specifically indicated herein, and at no additional cost to the **Owner**:
      a. Aluminum alloys and finishes (including test reports for anodic finish).
      b. Steel alloys and finishes.
      c. Sealants.
      d. Glass.
      e. Glazing Materials.
      f. Fasteners.
      g. Window and door hardware.
      h. Recycled content of aluminum

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.

B. Contractor / Installer shall have been in business for **Five (5)** years providing / finishing similar size projects and complexity.

C. Manufacturer shall have been in business for **Ten (10)** years providing/installing/finishing similar size projects and complexity.

D. Test reports shall be accompanied by the window manufacturer's letter of certification stating that the tested window meets or exceeds the referenced criteria for the appropriate ANSI/AAMA 101 window type.

E. Perform water testing as herein specified and witnessed by **Owner** or **Architect**.

F. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid.

G. Stipulations:
   1. **General Contractor's** Responsibilities:
      a. The responsibility for the system is totally that all designs and resolutions proposed in the shop drawings, calculations and related documentation and certification must be demonstrated, not only in the test procedure but also throughout the warranty periods herein specified. No compensation for omission and errors on the part of the Subcontractor in the execution of this contract will be awarded.
      b. Perform any actions required to fulfill the intent of this specification even though not specifically called for in this document. Included in this responsibility are instances of overlapping (or shared) duties with other sections of the project specification, in which case the **General Contractor** must coordinate and insure that all materials, labor, etc., are furnished to the extent required for completing the installed system.
      c. Design and Engineering of entire window and door system, and related flashings.
      d. Submit written notification of any deficiencies or discrepancies that would affect the proper or timely installation of the work in this section. Obtain written authorization for any modification to the system caused by deficiencies, discrepancies, or other conflicts with approved documents.
      e. Advise **Owner** where supplemental bracing of beams may be required if system requires bracing to bottom flange of beams, etc. This notification must occur prior to the fabrication of the entrance, storefront and window system and the structural steel framing members.
      f. Coordinate and verify, by measurement at the jobsite, lines, location, details and dimensions affecting his work.
      g. Compliance with the codes and regulations of all governing agencies having jurisdiction.

h. Coordinate hardware with requirements and products specified in Section 08 71 00 - Door Hardware.

H. Miscellaneous criteria:
1. System
a. The system shall be provided in accordance with the drawings, approved shop drawings, test reports, product data and submittals.
b. System proposed by the **General Contractor** must be equal to or better in design, performance and material standards than as described on the drawings and specified in this specification.
c. In addition to meeting the required design, performance and material criteria, the system must also:
1. Incorporate the "pressure equalization" concept, and provide details on drawings.
2. Have a positive method of preventing rotation of horizontal members without restricting thermal movement.
3. Allow for drainage to the exterior through the systems and to weeps and weep tubes.
4. Provide for the replacement of glazed materials from the exterior without modification of the system or adjacent materials and without projecting exterior stops
5. Accommodate acceptable construction tolerances.
6. Not utilize snap-engaged components as structural members.
7. Include butt joint mullions and glazing where indicated on the drawings and per the requirements of Section 08 80 00 - Glass and Glazing.
d. Deviations from the drawings and specifications must be specifically documented on the submittals for review by the **Owner**, who will be the sole judge as the acceptance or rejection of any or all deviations.
e. Any steel members and connections required to support or connect the system are to be designed, furnished and installed by the **General Contractor**, unless specifically indicated on the structural drawings as being the responsibility of others.
f. System shall be installed correctly so all water intrusion drains to the exterior of the building.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver all parts ready for erection; store in close proximity to final locations.
C. Package and store materials in a manner that will prevent surface damage, contamination, distortion, brakeage or structural weakening. Adhesive papers or sprayed-on coatings which bond when exposed to sunlight or weather are not permissible.
D. Replace any materials damaged during manufacture, shipping, storage or installation.
E. Protect stored and /or in place materials from contamination and damage.
F. Follow glass manufacturer's instructions for receiving, storing, handling and cleaning glass, as well as treatment of insulated (dual glazed) units which have air space pressure compensation provision for shipping.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.

1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

C. Furnish manufacturer's additional **five (5)** year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

D. Under the terms of these warranties, the **General Contractor** agrees to repair or replace defective materials, workmanship or failures, in a timely, satisfactory manner, at no cost to the **Owner.** Defective materials /workmanship include (but are not necessarily limited to) the following:
   1. Any abnormal deterioration, aging or weathering.
   2. Water or air leakage exceeding the limits herein specified, including that caused by shifted glass lites.
   3. Structural failure resulting from wind loads or forces not exceeding design criteria.
   4. Adhesive failure, cohesive failure, cracking or discoloration of sealants.
   5. Disengagement of gaskets or weatherstrips under conditions not exceeding specified design criteria.
   6. Glass lites which:
      a. Experience brakeage due to nickel sulfide inclusions, shifting of glass, or wind pressures and forces not exceeding design criteria.
      b. When heat-treated, have a surface compression stress greater than 6000 psi.
      c. Experience cracking, peeling or discoloration of reflective coating or contain coating flaws in excess of those outlined in PPG Coating Quality Criteria.
      d. Experience deterioration of insulating glass edge seal due to causes other than brakeage which results in intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coating, and any other visual evidence of seal failure or performance.
   7. Damage to other materials caused by falling glass which has broken due to defects.
   8. Hi-Performance organic coating and anodic coating not in compliance with:
      a. Coating thickness requirements
      b. Coating weight requirements
      c. Performance requirements for stain resistance
   9. Malfunctioning of entrance doors.
   10. Material, Craftmanship, etc. warranty periods as herein listed: (not for finish)
      1. Storefront: 5 year
      2. Thermal barrier: 10 year

E. Finish Warranties:
   11. Kynar 500
      a. Film integrity = 20 years,(No change)
      b. Chalk Resistance = 20 years. @ value 6 (ASTM D659)
      c. Color change = 20 years @ 7NBS max.
      d. Salt spray, air pollution & smog without any adverse affect = 5yrs.
      e. Adhesion to aluminum: = 20 years

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to, the following:
   1. Floor Slab
   2. Wall Framing and Finish
   3. Finish Caulking
   4. Support head frame at building storefront glazing, manufacturer & installer per this section shall coordinate their work with others to insure that proper support and framing is provided for window wall system.
   5. Structural framing.
   6. Intermediate floor slab edges.

B. Related Sections include, but are not limited to the following:

1. Division 1
2. Section 05 50 00 – Miscellaneous Metal Fabrications
3. Section 07 92 00 – Sealants and Caulking
4. Section 08 80 00 – Glass and Glazing
5. Section 13 34 19 Pre-Manufactured Metal Building Assembly

C. Related Documents include, but are not limited to the following:
1. Division 1 Supplementary Conditions

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
1. Complete instructions regarding maintenance of the materials, finishes, etc.
2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

1.13 GENERAL SYSTEM DESCRIPTION

A. System Design Criteria
1. The system shall be weather-tight, structurally sound, self-draining and will allow no water infiltration (infiltration is defined as the appearance of uncontrolled water other than condensation on the indoor face of any portion of the system).
2. The details shown indicate the preferred profiles and dimensions to achieve the design concept. Dimension and profile adjustments to those shown may be made, provided that the visual design concept and intent of the specifications are maintained.
3. All components, assemblies and completed work shall conform to the following performance criteria and comply with the applicable codes of governing agencies. Except when applicable codes make other provisions, or as noted herein, loads shall act in combinations that provide the most unfavorable conditions. Wind loading need not be considered as additive to seismic loading.
a. System shall be designed for flexural, shear and torsional stresses resulting from positive and negative wind pressures of a magnitude established. Refer to “General Manufacturing Requirements” heading.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturers shall be one of the following and as listed herein and in Drawings:
1. Storefront / Window Wall system & Entrances
a. Oldcastle Glass (Vistawall Products), www.oldcastleglassbe.com ,Terrell, TX
a. Kawneer Company, Inc., www.alcoa.com Phone No. (916) 638-5744. Kawneer Company, Inc., www.alcoa.com Phone No. (916) 638-5744.
b. Efco, www.efco.com
2. Sealant (concealed)
a. CR Laurence CO., Inc., www.CRLaurence.com
3. Reviewed Equivalent by **Architect.**
a. Substitutions and deviations shall require **Architect’s** approval and shall be given in letterform.
b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
c. Proposed alternate products must be equal in terms of aluminum extrusion thickness, load capabilities, chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related sections whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. General
1. Aluminum:
a. Alloy for aluminum extrusions shall satisfy requirements for 6063-T5. Provide a minimum nominal well thickness as required for structural members; 1/16" for nonstructural.
1. Manufacturer shall provide notarized certification letter that substantiates how much recycled billet is used and submit to **Architect** during submittal phase.
b. Alloy for clear anodized formed aluminum shall be equal to 5005 or 5052 and 3003 for non-exposed material. Provide a minimum nominal thickness which best suits application.
c. Provide alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B221 for extrusion, bars, wires and rods and ASTM B209 for sheet or plate.
d. Aluminum sheets and brake shapes: Minimum 0.032" thickness. Provide alloy and temper as recommended by the producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B209 for 5005-H15.
e. Standard commercial tolerances as listed in "Aluminum Standards and Data" shall apply to finished, fabricated and assembled materials except where stricter ones are required for proper function of system.
f. Recycled Content: As herein specified
2. Steel:
a. Hot-rolled shapes and plate shall comply with ASTM A36.
b. Cold-formed steel shall conform to one of the material specifications listed in the AISI "Specification for the Design of Cold-Formed Steel Structural Members" and ASTM A611.
c. All steel plates and shapes shall be prime painted, hot dipped galvanized or electro-galvanized. Any damage to protective coatings shall be touched up in the field with an appropriate coating.
d. Hot-rolled sheet and strip shall comply with ASTM A570.
e. Integral steel reinforcing at mullions
3. Glass:
a. Shall conform with requirements specified in Section 08 80 00 - Glass and Glazing.
1. Glass for doors is specified in sub sections below.
4. Glazing Materials:
a. Shall conform to requirements specified in Section 08 80 00 - Glass and Glazing.
b. Provide glazing sealants, gaskets, splines, and other glazing materials which are recommended and guaranteed by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof for the life of the building. Comply with recommendations of sealant, gasket and glass manufacturers for selection of glazing materials which have performance characteristics suitable for the applications indicated and for conditions at the time of installation. Select materials which are compatible with surfaces contacted in the installation, as demonstrated by testing and field experience.
c. Gaskets and weather seals: (weatherseals)
1. It is the responsibility of the Subcontractor to provide gaskets of a hardness and design such that they will be in contact at all times with adjacent elements during dynamic loading, building and thermal movements and provide a watertight seal as required to meet the performance criteria. They shall be sized in length to prevent pull-back at corners.
a. Sponge gaskets shall be extruded black neoprene with a hardness of 50+ /-5 durometer shore A and conforming to ASTM C509-70.

1. Design sponge gaskets to provide 20%-30% compression.

2. Dense gaskets shall be extruded black neoprene with a shore A hardness of 75+ / -5 for hollow profiles and 60+ /-5 for solid profiles, and conforming to ASTM C864.
   a. Dense gaskets of EPDM are also acceptable, provided the material conforms to all requirements, of ASTM C864 except for flame propagation.
3. Mold all corners of all gaskets, where compatible with installation procedure.

5. Sealants:
   a. General Sealant requirements:
      1. Locate and identify all sealants by product name on shop drawings.
      2. Sealants and joint fillers, both for joints within the entrance storefront and window system construction and for joints at the interface of entrance, storefront and window system construction and other work, shall comply with requirements specified in Section 07 92 00 – Sealants and Caulking and Section 08 80 00– Glass and Glazing.
      3. Structural glazing sealant shall be Silicone Glazing Sealant specifically designed and tested for structural glazing, as specified in Section 07 92 00 – Sealants and Caulking and approved by glazing manufacturer.
      4. Perimeter and flashing sealant shall be Silicone Sealant as specified in Section 07 92 00 – Sealants and Caulking.
6. Miscellaneous Materials:
   a. Fasteners:
      1. Type, size, alloy, quantity and spacing of all fasteners and anchorage devices shall be as required for performance.
      2. All screws, bolts, nuts, washers and rivets in wetting locations, window and door assembly and hardware fasteners in non-wetting locations can be stainless steel or an approved equal. Identify wetting and non-wetting areas on drawings.
      3. Exposed fasteners will be permitted only where approved by the **Owner** and shall be stainless steel with countersunk oval head, Phillips drive, finished to match adjacent finish.
      4. All anchor bolts and nuts shall have self-locking devices incorporating nylon insets or patches similar to those manufactured by USM Corporation, Nylock Fastener Division.
      5. “TEK” screws / fasteners are not allowed for any use or at any location.
   b. Inserts for anchorage in concrete shall be steel with integral or welded projections for embedment, and be prime painted, hot dip galvanized rolled steel, or hot dip galvanized formed steel complying with ASTM A386.
   c. Weep hole baffles shall be 45 pore per inch open cell plastic coated clear urethane foam, compressed 30%-50%.
   d. Slip pads:
      1. Provide eel slip, nylatron, high impact polystyrene or approved equal slip pads between moving parts at all dynamic connections.
      2. Provide minimum thickness of 1/16” for nylatron and polystyrene, and 1/8” for eel slip.
      3. Do not use nylatron or polystyrene in close proximity to a field weld.
   e. Flashings in direct relationship with the aluminum framing system shall be of 24 gauge galvanized steel or aluminum meeting the requirements of Section 07 62 00 - Flashing and Sheet Metal.
      1. Exposed flashings shall have hemmed edges where exposed to view to provide stiffness and a retainer for splice sleeves.
      2. Flashings shall be finished to match finishes for aluminum framing system in this specification.
   f. Brake-shapes glazed into the System shall be of 1/8” plate aluminum.
      1. Provide stiffeners as required and pocket reducer / retainers as required to install brake-shape.
      2. Brake-shape shall be finished in accordance with the aluminum framing system in this specification.
   g. Shims, blocking and spacers:

1. Unless otherwise noted on the drawings, metals used for shims, blocking and spacers shall be zinc chromate painted steel, incorporating separators for dissimilar materials and at dynamic connections.
2. Do not use aluminum or plastic shims at structural connections or horseshoe (U) shaped shims at dynamic or other connections where they may work free.
3. Shims of wood or other organic materials are not acceptable.

h. Prime Paint:
1. All steel and unpainted aluminum in contact with steel, masonry or concrete shall be painted with zinc chromate.
2. All unpainted aluminum flashing installed at sills shall be painted with zinc chromate.
3. Prime paint steel part of anchors, reinforcement and supports with zinc chromate. After field welding, remove weld slag and touch up primed surface.
4. Provide minimum dry film thickness of one mil for zinc chromate, and 30 mils for bituminous paint.
a. Zinc chromate primer shall conform to Fed. Spec. TT-P-645.

i. Kraft Paper: Kraft paper with reinforcing mesh.

7. Bituminous Waterproof Membrane Flashing: Provide a cold-applied, self-adhering membrane composed of high-strength polyethylene film coated on one side with a layer of adhesive-consistency rubberized asphalt.
a. Refer to Section 07 13 26 – Cold Applied Self-Adhering Membrane (CASAM).
8. Coordinate all requirements, including type of switch, wire leads and location on door with control system and security **General Contractor** prior to submittals, fabrication and installation.

B. General Manufacturing Requirements
1. Submit ICC certified report of the following:
a. Component parts and accessories shall be double-plated steel, aluminum, polycarbonate, or other corrosion resistant materials.
b. Provide bolts or screws min. as required by manufacturer.
1. Fasteners shall be sized and spaced to resist the tensile & shear loads imposed, with no exposed screws and/or bolts beads; **no alum. fasteners**.
2. Exterior aluminum flashing system shall comply with the shape as shown on drawings and may be either extrusion or bent shaped.
2. Metal alloy and coating shall be verified by manufacturer with required submittal of an ANSI/AAMA Report.
3. Provide aluminum window systems and aluminum doors as dimensioned and shown on the Drawings, complete with anchors of the type needed for installation and complying with the following standard as defined in ANSI A134.1.

2.03 MATERIALS - WINDOW PRODUCTS SCHEDULE

A. STOREFRONT SYSTEM
1. Shall be:
a. System: **Series 3000 Thermal Multiplane**
1. Type: SF Type 01
2. Mfgr:Oldcastle Glass (Vistawall Products)
3. Glazing:
a. Installation: Inside
b. Glass joints: Captured
c. Glass Location at Mullion
1. Center
d. Glass Type:
1. Vision: 1” Insulated
2. Refer to Section 08 80 00 – Glass and Glazing
4. Profiles: 2" x 4-1/2"
5. Construction:
a. Integral steel reinforcing to accommodate spans & wind loads

b. Thermally broken frame
c. Sill:

6. Accessories: (as required & filler extrusions as required for complete installation, including, but not limited to;)
   a. Head Receptor: M0-678/M0-224 with seals

B. SEALANT
1. **Exposed Conditions:**
   a. Refer to Section 07 92 00 – Sealants and Caulking

2. **Mastic bed below sills:**
   a. Manufacturer: Tremco
   b. Product: Vulkem 116
   c. Type: One part polyurethane
   d. Color: Black or approved alternate

3. **Concealed fasteners:**
   a. Manufacturer: CR Laurence Co., Inc.
   b. Product Type: Silicone
   Model: No. 33 S
4. **Miscellaneous conditions:**
   a. Manufacturer: CR Laurence Co., Inc. (confirm with window wall mfgr.)
   b. Product Type: Silicone
   c. Model: No. 33 S (confirm with window wall mfgr.)
   d. Applications: Pressure Plates, Shear Blocks, locations as directed by Mfgr.

2.04 GLAZING
A. Refer to Section 08 80 00 - Glass and Glazing.

2.05 OTHER MATERIALS
A. Provide aluminum storefront system as dimensioned and shown on the Drawings, complete with anchors of the type needed for installation.
1. Provide anchor bolts or screws minimum as required by manufacturer. Fasteners shall be sized and spaced to resist the tensile and shear loads imposed, with no exposed screws and/or bolts beads, no aluminum fasteners.
2. Exterior flashing system shall comply with the shape as shown on drawings and may be either extrusion or bent shaped aluminum.
3. All members shall be extruded aluminum alloy 6063-T5. Component parts and accessories shall be double-plated steel, aluminum, and polycarbonate.
4. Provide flashing components as detailed and as required to provide a weathertight assembly.

B. Copings, flashings, etc.
1. Material: Aluminum
2. Finish: Match window mullions
3. Size: Refer to documents.
4. Attachment: Refer to documents
5. Construction:
   a. Provided as part of this section.
   b. Installed under this section scope of work.
   c. Design to be in compliance with this section and Section 07 62 00 – Sheet Metal Flashing and Trim

PART 3 - EXECUTION
3.01 INSPECTION/EXAMINATION
A. Verification of Conditions:
1. Examine areas and conditions under which work is to be performed.

2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 INSTALLATION

A. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
B. Install framing, glazing and adjust the work of this Section in strict accordance with the manufacturer's recommendations as reviewed by the **Architect**, anchoring all units firmly into position square, plumb, straight and true.
C. Dissimilar materials:
1. Where aluminum surfaces come in contact with metals other than stainless steel, zinc, or white bronze, then isolate the aluminum by one of the following methods:
d. Paint the dissimilar metal with a prime coat of zinc-chromate primer, followed by two coats of aluminum metal-and-masonry paint.
e. Apply a good quality sealant material between the aluminum and the dissimilar metal complies with "Sealants & Caulking" specifications.

D. Sills
1. Install full bed of sealant below sill in conjunction with shims, press down firmly and remove sealant that presses out past sill mullion.
2. Install finish backer rod & sealant at outer edge of sill.
3. Isolate the dissimilar metals with non-absorptive tape or gaskets.

E. Test all window installations at jambs & sills for water penetration with hose spray test after installation.
F. Copings, flashings and other brake shapes associated with the windows shall be installed and provided under this section and coordinated with Section 07 62 00 – Sheet Metal Flashing and Trim.
G. Sealant:
1. Exterior:
a. Sealant exposed face shall be set flush with face of mullion, unless noted or detailed otherwise.
b. Sealant shall be tooled with smooth concave face in compliance with sealant manufacturer's recommendations.
c. Install at all locations as indicated on manufacturers details and as directed by manufacturer and their specifications.
2. Interior:
a. Sealant at sill mullions at floor shall be set back ½" from face of mullion to allow floor covering material to fit below mullion.
b. Jamb and head sealant shall be flush with face of mullion, unless noted or detailed otherwise.
1. Sill sealant at floor mounted mullions shall typically be inset ¼" minimum to allow floor finish to pass under mullion.
c. Sealant shall be tooled with smooth concave face in compliance with sealant manufacturer's recommendations.

3.05 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
   2. The Applicator shall be responsible for the proper application of the materials.

B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.06 TESTING

A. Sill Receptor:
   1. General:
      a. Perform tests witnessed by **Owner** and **Architect.**
      b. Failing windows shall be replaced and repaired to meet test requirements at no additional cost to **Owner.**
   2. Type: Flood Test
   3. Scope: **General Contractor** shall flood the window sill receptor and fabricated sheet metal receptor with water to insure that the assembly is water tight and the end dams are sealed properly.
      a. **General Contractor** shall provide required lifts, apparatus and such to perform tests.
   4. Description: Involves placing a malleable "dam" around a specific area to be tested - alarm sensor/sill penetrations, window or door frame junctures, as well as threshold penetrations.
      a. The test dam may be constructed using plumber's putty, plexi-glass, or an adhesive tape/membrane configuration.
      b. The dam is then filled to a specified, marked level and the level is noted at timed intervals to determine water leakage through the test area according to such standards.
   5. Quantity & Location:
      a. Test one location for each window type and a minimum of one on every building elevation and floor level.
   6. Duration: Test for 8 hours, min. unless longer duration required by standard
   7. Failure: Should testing result in leakage, eliminate the causes of such leakage at no additional cost to the **Owner.**
      a. Remedial measures must maintain standards of quality and durability and are subject to approval.
         1. Provide powered scaffold or lift, hose and sufficient personnel to operate scaffold or lift and hose.
         2. Leakage, in this specification, is defined as being any appearance of uncontrolled water other than condensation on the indoor face of any part of the wall.

B. Sealant:
   1. General:
      a. Perform tests witnessed by Sealant mfgr's representative.
      b. Failing sealant assemblies shall be removed and replaced.
   1. Type: Pick and adhesion test
   2. Scope: **General Contractor** shall periodically test sealants in place for adhesion, using methods recommended by sealant manufacturer.
      a. **General Contractor** shall provide required lifts, apparatus and such to perform tests.
   3. Description:
      a. Comply with sealant mfgr's recommendations.
   4. Quantity: Test one 36" long section at one location for each exterior building elevation and floor level, min.
   5. Failure: Should testing result in adhesion failure, remove, clean, prime and reinstall sealant at no additional cost to the **Owner.**

a. Remedial measures must maintain standards of quality and durability and are subject to approval.

3.07 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this section prior to and during installation, and protect the installed work and materials of other trades.
D. Labels:
   1. Leave all labels in place, intact and legible, until reviewed and approved by the **Architect**.
   2. Do not at any time remove required AAMA labels.
E. Prior to completion of the work, thoroughly clean all exposed surfaces and glazing.
   1. Use only the cleaning materials and techniques recommended by the manufacturer of the material being cleaned.
   2. Do not scratch or otherwise damage the glass, screen, or aluminum finish.
F. Institute protective measures and other precautions required to assure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.
G. All damaged fabrications, including but not limited to damaged mullions, muntins and face caps caused by fastener read through shall be replaced at no cost to **Owner**.
H. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
I. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
J. Provide record drawings in accordance with Division 1 closeout submittal procedures t.
K. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

08 71 00
DOOR HARDWARE
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. All finish hardware described in the hardware schedule, and any other finish hardware not described but required for a complete and operable facility including, but not limited to;
      a. Building Interior and exterior hardware
E. Refer to standards herein listed with specific products/materials.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society For Testing and Materials (ASTM), www.astm.org
E. American National Standards Institute (ANSI), www.ansi.org
F. Door Hardware Institute (DHI), www.dhi.org
G. Factory Mutual (FM), www.fmglobal.com
H. International Code Council (ICC), www.iccsafe.org
I. Underwriters Laboratories (UL), www.ul.com, www.ulstandardsinfoet.ul.com
   1. UL 10A Tin-Clad Fire Doors
   2. UL 10B Fire Tests of Door Assemblies
   3. UL 10C Positive Pressure Fire Tests of Door Assemblies
   4. UL 14B Sliding Hardware for Standard, Horizontally Mounted Tin-Clad Fire Doors
   5. UL 14C Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs
   6. UL Subject 63 Outline of Investigation for Fire Tests of Door Assemblies
   7. UL 305 Standard for Panic Hardware
   8. UL 1784 Standard for Air Leakage Tests of Door Assemblies
J. National Fire Protection Agency (NFPA), www.nfpa.org
   1. NFPA 80 Labeled Protective assemblies
   2. NFPA 101 Life Safety Code
   3. NFPA 105 Installation of Smoke and Draft Control of 20 minute labeled door assemblies
   4. NFPA 252 Smoke and Draft Control of 20 minute labeled door assemblies
   5. NFPA 257 Glazing in Fire Rated Door Assemblies
   6. NFPA 288 Floor Fire Door Assemblies

1.03 PERFORMANCE, TESTING AND INSPECTION

A. General:
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.

Opening/Closing – Interior & Exterior doors	Operating Force	5 pound maximum effort to operate interior & exterior doors.	CBC Chapters 10 & 11 including, but not limited to; 1008.1.3 & 11B-404.2.9
Opening/Closing – Fire Rated doors	Operating Force	Fire doors up to 15 pounds per approval of the governing authority.	CBC Chapters 10 & 11 including, but not limited to; 1008.1.3 & 11B-404.2.9
Rated Assembly	"S" Label	Comply	Building Code & UL10C
	Fire test compliance	Comply	• UL Underwriters Laboratories • WH Warnok Hersey / Intertek Testing Services, Caleb Brett
Ratings of door assemblies	Fire ratings and Draft and Smoke control	Pass	Refer as herein listed in 'REFERENCE STANDARDS' heading, CBC 715.4, 715.4.3, 715.4.3.1, 715.4.4, 715.4.5 & 715.4, UL1784
Fire Doors	Labeling	Comply	CBC 715.4.5.3
Door assemblies	Positive Pressure Test	Pass	Refer as herein listed in 'REFERENCE STANDARDS' heading, CBC 1133B.2
Closers	Sweep Period	Comply	CBC Chapter 11, including but not limited to Section 11B – 404.2.8.
Butt Hinges	Grade	Grade 1	ANSI 156.2
Continuous Hinges	Grade	Grade 1	ANSI 156.2
Exit Devices	Cycles	100,000 cycles without failure	ANSI A156.3, CBC 1008.1.9
Latch, Locksets & Cylinders	Compliance	Pass	ANSI A156
	Grade	Grade 1, Series 4000, 300,000 cycles without failure	ANSI A156.2
Closers	Cycles	10,000,000 cycles without failure	ANSI A156.4
Thresholds	Height and slopes	Comply	CBC 11B-404.2.5
Hand Activated Hardware	Function	Comply	CBC Section 1008.1.9
Hardware	Mounting Heights	Comply	CBC 1008.1.9.2 & 11B-404.2.7

Hardware: Exterior Operating Mounting Heights [	Finish	As indicated under finish heading	This specification
	Lever/Exit Device	Doors, typical 38" Storefront 38"	
	Door Pulls/Push Plate	Doors, typical 44" Storefront 44"	
	Cylinders	Doors, typical 44" Storefront 44"	
	3 Position Lock Cylinder/Level	Doors, typical 50" Storefront 50"	
Hardware: Interior Operating Mounting Heights	Finish	As indicated under finish heading	This specification
	Lever/Exit Device	Doors, typical 38" Storefront 38"	
	Door Pulls/Push Plate	Doors, typical 44" Storefront 44"	
	Cylinders	Doors, typical 44" Storefront 44"	
Hardware: Hinge (Butt) Mounting	Hollow Metal Frames	The top butt hinge shall be set 5 inches from the top of the frame opening and the bottom butt hinges 10 inches from the finish floor. The third butt hinge shall be centered between the top and bottom hinges. Where more than three butt hinges are specified, the top and bottom hinges shall be located as above and the remaining hinges equally spaced between the top and bottom hinges	
Door Clearances	Hinge side	1/16"	Shall be measured between frame rabbets and from head rabbet to finish floor, or to top of saddle or threshold unless otherwise noted Coordinate with Doors and/or frames supplied under other specification sections Coordinate with requirements for rated doors with other specification sections
	Top & above threshold	1/8"	
	Above floor finish or carpet (no threshold)	3/8" clearance unless required to be less due to use of Automatic Door Bottom	
	Lock side of door	1/8"	
Glazing in Door	Assembly	Comply	CBC 715.4.4.1
Refer to drawings and as herein specified			

E. **Construction Testing:**

Item	**Name of Test**	**Performance Results**	**Testing Std.**
Hardware	Operation	Pass	Test that all hardware installed on doors and frames functions in accordance with its function and meets the push/'pull pounds of force code criteria as herein listed

Opening/Closing – Interior & Exterior doors	Operating Force	Comply as herein listed	As herein listed
Opening/Closing – Fire Rated doors	Operating Force	Comply as herein listed	As herein listed
Closers	Sweep Period	Comply as herein listed	As herein listed

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements.
D. Submit Manufacturers data and shop drawings.
   1. Hardware Schedule:
      a. Schedule shall be completely detailed, showing complete opening descriptions, door and frame materials, fire ratings, and all items, numbers and finish of hardware for each opening. **Architect's** review of schedule shall not relieve supplier of responsibility for errors or omissions, which it may contain.
      b. Schedule must include name of manufacturer for each item listed.
      c. Submitted hardware group numbers shall match the numbers herein listed.
   2. Prior to installation, deliver to all installing personnel complete recommendations from the manufacturer regarding installation methods. Provide hardware templates for all hardware.
   3. Furnish templates for hardware to be secured to metal or woodwork, and for other hardware requiring templates, to provide accurate setting and fitting.
      a. Furnish in ample time so as not to delay work.
   4. Submit a typed proposed keying schedule to the **Architect** for approval within 45 days of contract signing by **General Contractor**. After corrections and/or revisions, **General Contractor** will resubmit six (6) final typed schedules to the **Architect**.
   5. Submit Installation aids, instructions and Maintenance Guides:
      a. Upon completion of installation and adjustment, hand over to dogging keys, closer valve keys, lock spanner wrenches, and other factory furnished installation aids, instructions and maintenance guides.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing similar size projects and complexity.
D. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid
E. Supplier shall;
   1. Be a recognized architectural finish hardware supplier, with experience with like project type, who has been furnishing hardware for a period of not less than Five (5) years, and who is, or who employs an experienced architectural hardware detailer who is a certified A.H.C. detailer by the Door and Hardware Institute; who shall supervise the detailing of the required submittals for the work.
   2. Examine all Drawings, Specifications and Addenda and furnish proper hardware for all openings whether listed or not.
      a. **WHILE THE FOLLOWING HARDWARE SCHEDULE IS INTENDED TO COVER ALL DOORS AND OTHER MOVABLE PARTS OF THE BUILDING, AND ESTABLISH A TYPE AND STANDARD OF QUALITY, IT SHALL REMAIN THE GENERAL**

CONTRACTOR'S AND FINISH HARDWARE SUPPLIER'S RESPONSIBILITY TO FURNISH ALL REQUIRED HARDWARE, WHETHER LISTED AND/OR NOT LISTED.

F. Stipulations
   1. The attention of the **Architect** shall be called to any omissions in the hardware schedule at least 10 days prior to bid opening, otherwise the list shall be considered complete and no extras shall be allowed.

G. Assemblies
   1. The supplier shall furnish all hardware with the proper handing complete with all required screws, nuts, bolts, grommets, washers and other fastening devices in appropriate metal and finish for proper installation of the hardware.
   2. All exit doors shall comply with Building code & Americans with Disabilities Act (ADA)
      a. Doors from any room or exit way shall be operable from the inside at any time by turning of the lever only, without use of key or any other special effort or knowledge, or by pushing an exit device.
      b. It shall be the responsibility of hardware supplier to furnish hardware in compliance with applicable fire, egress and building codes. Any specified hardware not in compliance with said codes shall be called to **Architect's** attention, prior to bid opening, otherwise any hardware not complying with said codes shall be changed to proper hardware, and no extras allowed.
      c. Hardware and hardware assemblies shall be approved for fire rated assemblies and shall conform to requirements for fire label and Positive Pressure certification per UL-10C and NFPA 80.
   3. Closers shall be designed to compensate for positive and/or negative building pressures.
   4. Furnish hardware in proper "hand" for doors. Package and mark hardware for door number, hardware type and location.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Delivery: Deliver all finish hardware to the installers in a timely manner to ensure orderly progress of the total work.
C. Packaging:
   1. Furnish all finish hardware with each unit clearly marked or numbered in accordance with the hardware schedule as specified.
   2. Pack each item complete with all necessary pieces and fasteners.
   3. Properly wrap and cushion each item to prevent scratches during delivery and storage.
D. Protect hardware against deterioration and damage. Store in clean, dry area until installed.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by contractor agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**
C. Furnish installing contractors additional **five (5)** year warranty agreeing to repair and/or replace work and/or components which have failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and

replaced at no cost to the **Owner.**

D. Furnish manufacturer's additional warranty periods as herein listed in addition to the initial warranty period as provided with installed products, including but not limited to:
   1. Schedule:
      a. Closers:
         1. Surface: 10 year
      b. Lockets:
         1. Mortise: 3 year period unless longer per mfgr.
         2. Non-Mortise: 7 year period unless longer per mfgr
   2. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK / SECTIONS

A. Related work includes, but is not limited to the following:
   1. Door frame installation
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 08 11 13 – Steel Doors & Frames
C. Hardware not included;
   1. Operable window hardware
   2. Casework hardware, refer to casework specification section(s)
   3. Toilet and bath accessories
D. Related Documents include, but are not limited to the following:
   1. Division 1 Supplementary Conditions

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding operation of the equipment, hardware, card key pads, power supplies, etc.
   2. Complete instructions regarding maintenance of the equipment, hardware, materials, finishes, etc.
   3. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

1.13 GENERAL SYSTEM DESCRIPTION

A. Hardware Groups Doors

Hardware Group 1

• Butts	Full Mortise TA2714 NRP 4-1/2"x4-1/2"		US26D	McKinney
• Cylindrical Lock	ND53PD RHO		626	Schlage
• Surface Closer	4040 XP	689		LCN Closers
• Drip Strip p	NGP 16A		AL	National Guard
• Gasket	S88W		GA-3 k	Pemko (4)
• Floor Stop	FS43926D		626	Ives

Hardware Group 2

• Butts	Full Mortise TA2714 NRP 4-1/2"x4-1/2"	US26D	McKinney
• Cylindrical Lock	ND53PD RHO	626	Schlage
• Gasket	S88W	GA-3 k	Pemko (4)
• Floor Stop	FS43926D	626	Ives

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type as herein scheduled.

B. Acceptable manufacturers shall be one of the following, as herein listed and as herein scheduled for manufacturer for each hardware component.
   1. Refer to documents and as herein specified
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.

D. Refer to drawings, details, and other related specification section whether listed or not.

E. Details shall set basic requirements for size and configuration of systems.

F. Any hardware supplied that is not in accordance with this Specification will be replaced at the supplier's expense.
   1. Upon completion of the job, the hardware will be inspected by a representative of the **Architect** and all unacceptable hardware will be replaced at no increase in cost to the **Owner.**

Hardware Types List / Manufacturer List:

NO	ITEM	MANUFACTURER	ABBRV	SUBSTITUTION	ABBRV
1.	Deadlocks & Accessories	Adams Rite	A	Do Not Substitute	N/A
2.	Push Button Locks	Alarm Lock Company	ALC	Do Not Substitute	N/A
3.	Kickplates, Trim, & Signs	TRIMCO	T	IVES, Burns Manufacturing	IVES, BM
4.	Miscellaneous Trim	TRIMCO	T	IVES, Sargent, Burns Mfgr.	IVES, Sarg, BM
5.	Power Supplies	By electrified hardware mfgr.	N/A	N/A	N/A
6.	Overhead Door Stops	Dorma	D	Glynn-Johnson (Ingersol-Rand Co)	GJ
7.	Concealed Floor Closers	Dorma	D	Do Not Substitute	N/A
8.	Pivots	Dorma	D	Rixson	R
9.	Surface Closers	Dorma	D	LCN (Ingersol-Rand Co)	LCN
10.	Door Coordinator	Door Controls International	DCI	H.B. Ives / Rockwood	H.B. Ives / RW
11.	Flush bolts	Door Controls International	DCI	H.B. Ives / Rockwood	H.B. Ives / RW
12.	Door Mutes	Door Controls International	DCI	H.B. Ives / Rockwood	H.B. Ives / RW
13.	Floor Stops	TRIMCO	IVE	Rockwood, Trimco, Door Controls International	RW, T, DCI
14.	Architectural Pulls	**[Specifier, fill in]** **Forms & Surfaces-FS** **Rockwood-RW** **Elms - E**	[Fill in]	Do Not Substitute	N/A
15.	Pocket Door Hardware	Pemkp	P	HAFELE/ Johnson Hard	HAFELE / JH

16.	Continuous Hinges	Pemko	P	Zero, Select Products Ltd / Markar Products	Z / , Select / M
17.	Power Transfer Butts	Murray Enterprises, Inc.	MAR	Hager	HA
18.	Key Control System	Major Metalfab	MMF	P.O. Moore Telkee	P.O. Moore Telkee
19.	Butt and Hinges	IVES	IVE	Hager, McKinney, PBB, Stanley	H, MK, PBB, Stan
20.	Door Seal/Thresholds/ Weatherstripping/ Door Sweeps	Pemko	P	Ultra, Zero, Reese, National Guard Products	U / Z / R, NG
21.	Auto Door Bottom	Pemko	P	Ultra, Zero, Reese	U / Z / R
22.	Smoke Seal (Intumescent)	Pemko	P	Reese	R
23.	Locksets and Cylinders	Schlage	S	Dorma, Best	D / B
24.	Pocket Door Pulls	[Specifier, fill in]	[Fill in]	Do Not Substitute	N/A
25.	Exit Devices (Panic)	Von Duprin	VD	Dorma	D
26.	Barrel Weld-On Hinges	Hardware Source, www.hardwaresource.com	HS		

2.02 MATERIALS

A. Fasteners:

1. Finish hardware shall be furnished with all necessary screws, bolts, or other fasteners of suitable size and type to anchor hardware in position for heavy use and long life; they shall harmonize with hardware as to material and finish. Screws shall be plated steel, bronze, brass or stainless steel. Aluminum screws shall not be permitted. Screws shall be plated or painted to match hardware finish.
2. "Phillips Head" shall be used for exposed fasteners. Fastening shall be furnished where necessary with sex bolts, or other approved anchors according to material to which it is applied and as recommended by the manufacturer.
3. Use machine screws for hardware applied to metal.
4. Use through-bolts (sex bolts) for door closers and stop/holders applied on wood and metal doors.
5. Stops and holders, where applied to concrete, shall be set with wedge anchors.
6. Strike lips for all locks shall not project more than 1/4" beyond the finish jamb or trim. Use strikes with same finish as locksets.
7. Install Push / Pull sets with "BTB" (back to back) mounting typical.

B. Keys, Keying and Cylinders

1. General:
   a. Permanent building keying and providing of all Non-removable lock cylinders shall be **General Contractor** Furnished and **General Contractor** Installed

b. **General Contractor** shall coordinate required keying with **Owner**.
c. All door locations shall be supplied with Non-Removable construction keyed cylinders.
d. Key cylinder locks in accordance with the **Owner's** instructions as shown in the keying schedule.

2. Permanent Exterior Key Cylinders:
   a. General:
      1. Permanent cylinders to be packaged separate from permanent keys (PKI).
         a. All permanent keys and all permanent cylinders are to be labeled with the door location and keying code.
         b. The permanent keys are to be delivered directly from the Schlage factory to the Construction Manager.
         c. All of the permanent cylinders are to be delivered to the hardware supplier for order verification, and then be delivered to the Construction Manager.
         d. The Contractor is responsible to coordinate the manufacturer's "Facesheet" with the hardware supplier and Construction Manager before the cylinders are ordered.

C. Locksets and Latchsets
1. Lock set and Latchset Design:
   a. Furnish UL labeled locksets and latch sets on all fire labeled doors.
   b. Strikes:
      1. All strikes shall be supplied with closed metal strike boxes.
      2. Furnish standard strikes with extended lips where required to protect trim from being marred by latch bolt.
      3. Provide strike cup in hollow metal frames.
      4. Verify whether standard or ANSI cutouts are provided in metal frames.
   c. All cylinders shall be as herein specified
2. Locksets shall be listed by Underwriters Laboratories for all doors.
   a. Locksets shall comply with provisions of building code and ADA accessibility law
      1. All levers to have a return on the end within 1/2" of the door.
      2. Hardware at fire labeled doors shall be positive latching.
   b. Lever Design:
      1. **Rhodes Sparta**
         a. Confirm with **Owner**

D. Finish:
1. General:
   a. All exposed hardware and related accessories shall have finishes as listed, specified and/or detailed.
2. Finishes shall be B.H.M.A. / ANSI, as follows:
   a. Typical:
      1. Satin Chrome - 626 (US26D) uno.
   b. Cylinders: Match locking/latching hardware
   c. Butts (hinges): Satin Chrome - 652 (US26D)
   d. Door Closers: Alum - AL 689 - Exposed conditions
   e. Thresholds: Clear anodized aluminum
   f. Door Sweeps: Match Door color
   g. Rain Drips: Match Mullion color
3. Door Stops: 613 w/ black bumper

E. Hinges
1. Typical hinges shall be listed in the "Itemized Hardware Schedule", and shall meet the following minimum requirements. Finish shall be as listed as specified.
   a. Interior butts (hinges) shall have NRP feature.
      1. Throw in excess of 2 13/16.
   b. Exterior butts (hinges) shall have NRP feature.

1. Throw in excess of 2 13/16.
2. Continuous hinges where specified, refer to hardware groups.

c. Pins:
   1. Shall be of stainless steel and have continuous groove for seating of NRP screws.

d. Butts (hinges):
   1. General:
      a. Butts of proper width shall be furnished to clear trim projection or other jamb projection in accordance with the formula: twice the door thickness plus the trim projection equals the proper hinge width.
      b. Mount with machine screws on hollow metal frames, hollow metal doors.
      c. Fully welded at exterior gates.
      d. All butts shall be of proper width to clear trim in projection to allow 180 degree swing and that width shall be determined by the following rules:
      e. Type as scheduled.
   2. Type: five (5) knuckle, two (2) bearing heavy duty, typical.
      a. Height:
         1. Doors 1-3/4" thick and up to 36" wide: 4-1/2"
         2. Doors 1-3/4" thick and 37" to 48" wide: 5"
         3. Width:
         4. Provide widths sufficient to clear trim and/or veneer projection when door swings 180 degrees.
   3. Size: (Unless otherwise specified in the Hardware Groups, the size of the butts will be determined by the following rules)
      a. Width:
         1. General:
            a. For doors up to 2 ½:" in thickness, twice the door thickness, plus the trim projection, equals the proper hinge width for standard weight hinges based on hinges set back ¼" from edge of door.
         2. Schedule:
            a. Doors 1-3/8 inch thick and up to 2'-4" wide: 3-1/2" butts.
            b. Doors 1-3/8 inch thick over 2'-4" to 3'-0" Wide: 4" butts.
            c. Doors 1-3/4 inch thick up to 3'-0" wide: 4-1/2" butts.
            d. Doors 1-3/4 inch thick over 3'-0" wide: 5" butts.
            e. Doors 2-1/4 inch thick 5" butts
            f. Doors over 2-1/4 inch thick up to 3" thick: 5" butts
            g. Exterior gates: 8 x 8" butts
            h. For doors over seven feet in height, provide additional butts for every 30" in height.

      b. Quantity:
         1. Doors up to 5'-0": tall:
            a. Furnish two butts each leaf
         2. Doors over 5"-0" tall up to 7'-0" tall:
            a. Furnish three butts for each door leaf.
         3. Doors over 7'-0" tall up to 9'-0" tall:
            a. Furnish four butts for each leaf
         4. Doors over 9'-0" tall:
            a. Per hardware groups, but not less than four butts for each leaf
         5. Exterior Steel gates and steel post assemblies:
            a. Furnish five butts for each leaf

F. Door Closers
   1. Furnish flat rectangular type closers with covers and listed finish for each location.
      a. Mounted closer to allow maximum opening of all doors.
         1. Exterior Storefront doors shall swing a minimum of 110 degrees.

2. Size all closers in accordance with manufacturer's recommendations and good standard practice.
   a. All closers shall be the products of a single manufacturer.
3. Provide all closers with adjustable back check as a standard feature, which at out swinging exterior doors, become effective at 45 degrees, allowing door to swing 180 degrees.
4. All closers shall incorporate a spring, which allows for a 50% increase in power.
5. Supply drop plates at narrow top rail doors and parallel-arm closers at reverse bevel doors and where doors swing a full 180 degrees.
6. Provide long-arm at doors with wide-throw hinges.
7. Closers shall be ordered with appropriate spring to insure they operate doors within ADA and building code most restrictive requirements/ guidelines and also insure the doors close and latch when operated.

G. Floor Stops
   1. General:
      a. Provide risers for exterior stops as required based on grade heights.
      b. Overhead stops must be sized according to manufacturer's recommendations.
      c. Contractor to field verify specific model of device for strike size1 for each floor applications.
         1. Contractor to verify correct strike heights, 3", 4" or 5" prior to submittal and make appropriate comment in submittal.

H. Mutes, weatherstrips and Smoke seals
   1. All doors which have Smoke seals which are not mounted on the face of frame strike shall be installed with Silencers.

I. Thresholds
   1. Refer to hardware groups and details for types and configurations.
   2. Overall length of threshold shall be coordinated with frame configurations such that threshold extends full frame opening length.

2.03 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Installation of shades at door lights shall be done with appropriate spacer at exit devices to allow shade to pass between door and device.

D. Door Hardware Coordination
   1. In accordance with Division 1 and this specification it shall be the **General Contractor's** and the sub-contractor responsible for providing and installing herein specified hardware to fully coordinate and confirm that all hardware functions properly together and that all required clearances are maintained for complete operation of hardware.
      a. All conflicts discovered shall be brought to the **Architect's** attention prior to the installation and fabrication of door preparation.
      b. Clearances for specialized hardware such as Sound Seals and operating hardware such as Levers and Exit Devices shall be confirmed prior to fabrication and installation.

E. Project Security during Construction:
   1. Project security during construction shall be the responsibility of the **General Contractor**.
   2. During construction, and until buildings are turned over to **Owner**, locks shall use special "Project Key". Furnish 6 project keys to **General Contractor**.
   3. Locksets shall be installed complete with permanent cylinders. Pins in last one or two chambers in cylinder shall be held inoperative by a key block. Lock cylinders shall be operable by special "Project Key". Locks must be fully operative during construction stages.
   4. Upon completion of project, key blocks shall be removed from Lever Locksets with special removal tool. Removal of key blocks shall be under supervision of **Owner's** representative. Lever lockset shall be checked for proper operation and keying with permanent keys. After removal of all key blocks, all 6-project keys and all permanent keys shall be given to the **Owner's** representative.

F. Security:
   1. Project security during construction shall be the responsibility of the **General Contractor**.
   2. During construction, and until buildings are turned over to **Owner**, locks shall use special **"Construction Key".**.
      a. Furnish 6 **"Construction Keys"** 48-101 ICX to **General Contractor**.
   3. Locksets shall be installed complete with **Construction** cylinders. Lock cylinders shall be operable by special **"Construction Key".**
      a. Locks must be fully operative during construction stages.
   4. Upon completion of project, Construction cores shall be removed from Lever Locksets and cylinders with special Control Key by **Owner** Representative Lever lockset shall be checked for proper operation and keying with permanent keys.
      a. All permanent cores and keys and construction core control keys shall be delivered directly from the lock manufacturer to the **Owner** Representative by secure delivery.

3.03 PREPARATION

A. Prepare work, doors, frames, substrates, etc. in accordance with manufacturer's recommendations, as herein specified and per Drawings.

3.04 INSTALLATION

A. General:
   1. Install hardware in precise manner, in accordance with manufacturer's instructions; door clearance and hardware placement as specified.
      a. Pre-drill pilot holes in wood for screws.
      b. Drill and tap for surface mounted hardware on metal.
      c. Set hinge leaves snug and flat in mortises; turn screws to flat seat (do not drive).
   2. Mount door closers for maximum swing of door before setting stops.
      a. Mutes in place before adjusting strikes.
      b. Drive hinge pins down and tighten setscrews.
   3. Install locks with keyways in proper position; and levers, roses and escutcheons firmly affixed.
   4. Set thresholds in waterproof sealant and secure with wedge anchors and countersunk screws of same finish as threshold.
   5. Except for hinges, do not install hardware until completion of painting and finishing work.
   6. Clean adjacent surfaces soiled by hardware installation.

7. Doors stops and holders:
    a. Place doorstops in such a position that they permit maximum door swing but do not present a hazard or obstruction.
    b. Not to obstruct more than 4 inches from wall.
8. Install Smoke seal and Expandable Smoke seal at all labeled doorframe openings, typ.
9. Installation aids, instructions and maintenance guides:
    a. Upon completion of installation and adjustment, hand over dogging keys, closer valve keys, lock spanner wrenches, and other factory furnished installation aids, instructions and maintenance guides to **Owner**.

B. Adjusting:
1. Test operation of all hardware, mechanical & electrified, and adjust as needed to produce fully functioning units that comply with requirements.
2. Adjust hardware so that moving parts operate freely without bind or excessive play.
    a. Installed hardware shall be free from paint, corrosion or damage.
3. Adjust closers for closing speed, latching speed, back checking, and adjust hold-open devices for full control of door.

C. Hardware Mounting Heights
1. General:
    a. Shall be measured from finish floor to centerline of item.
    b. Order proper length for concealed vertical rods to match and coordinate mounting height.
2. Schedule:
    a. As herein specified.

3.05 MAINTENANCE

A. Within 6 months but not exceeding 7 months after completion of project, installing contractor shall return to project as coordinated with **Owner** to adjust operation of hardware to restore to proper function.
1. Consult with and instruct **Owner** in recommended additions to maintenance procedures.
2. Replace system elements which have deteriorated or failed due to faulty material and/or installation.
3. Prepare and submit to **Owner** a report of actions taken.

3.06 COMMISSIONING

A. Provide factory-certified field service engineer to a site visit to ensure proper system installation and operation under following parameters:

3.07 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
2. The Applicator shall be responsible for the proper application of the materials.

B. The Applicator shall certify in writing that the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.08 DEMONSTRATING

A. Provide site visit by a factory-certified field service engineer to instruct user in proper operation of all hardware and any monitoring systems.

3.09 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Keep areas of work free from debris as work progresses.
C. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.

D. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

08 80 00
GLASS AND GLAZING
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Glass and glazing.
      a. Vision

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Architectural Manufacturers Association (AAMA), www.aamanet.org
   1. AAMA – "Metal Curtain Wall, Window Storefront and Entrance Guide Specifications Manual"
E. American National Standards Institute (ANSI), www.ansi.org
F. American Society For Testing and Materials (ASTM), www.astm.org
   1. ASTM C1036 Flat Glass
   2. ASTM C1048 Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass
   3. ASTM E119 Fire Tests of Building Construction and Materials
      a. Fire barriers over 25% of wall area
   4. ASTM E283 Rate of Airflow Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
   5. ASTM E330 Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference
G. ASTM E331 Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference
   1. ASTM E774 Sealed Insulating Glass Units
   2. ASTM E2010 Positive Pressure Fire Tests of Window Assemblies.
   3. ASTM E2074 Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies
H. Glass Association of North America (GANA), www.glasswebsite.com
I. Flat Glass Marketing Association, "Glazing Manual", most current adopted edition.
J. National Fenestration Rating Council, NFRC, www.nfrc.com
K. National Glass Association (NGA), www.glass.org
L. Window and Door Manufacturers Association, (WDMA), www.wdma.org

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Safety Glazing	Human Impact Loads	Comply	CBC 2406
	Identification		CBC Section 2406.3
	Hazardous Locations		CBC Section 2406.4

Glazing	General	Comply	CBC Section 2401
	Definitions		CBC Section 2402
	General Requirements		CBC Section 2403
	Wind, Snow, Seismic and Dead Loads on glass		CBC Section 2404
Refer to drawings and as herein specified			

C. **Sustainability:**
1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

D. **Construction Testing:**

Item	Name of Test	Performance Results	Testing Std.
Framed glazing system	Hose stream test	Comply	Refer to specific window section

E. **Construction Monitoring/Observations by others:**

Item	Name of Test	Performance Results	By Whom
Window system installation	Periodic observation by window mfgr.	Comply	Refer specific window system section

1.04 SUBMITTALS AND MOCK-UPS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
1. Schedule of all glass types with all listed performance criteria
a. Technical data substantiating compliance with these specifications.
2. Submit technical data for all sealants and other materials use in completing the work in this section.
E. Submit samples:
1. Five (5) 6" square samples for each required glass and construction type.
F. Site mock-up, refer to "Mock-Up" heading.
G. Certification:
1. Safety rating of glass
2. Fire ratings of glass
3. Technical values of glass

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Material with lead times in question or confirmed to conflict with meeting the schedule and sequence of construction must be documented at time of bid
E. Stipulations:
1. Glazing in fired rated assemblies shall be labeled for the required fire protection rating and installed in accordance with their listing.
2. Glazing at tempered required locations and designated locations shall bear appropriate designation on glass
3. **General Contractor** shall request meeting 5 days in advance of construction.

F. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site periodically during installation work to review installation procedures.
   1. Manufacturer's representative shall review and certify in writing all phases of construction to verify the complete work meets specification requirements.
   2. Written certification of all phases of construction shall be sent to the **Architect** by the manufacturer's representative.

A. Miscellaneous criteria:
   1. Protect glass from edge damage at all times during handling, and installation.
   2. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified.
   3. Comply with "Reference Standards" specified above except as shown and specifically recommended otherwise by the manufacturers of the glass and glazing materials.
   4. Inspect each piece of glass immediately before installation, and eliminate any, which have observable edge damage or face imperfections.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver glass crated to the jobsite to protect it against scratches, discoloration, breakage, or other damage. Deliver glazing compounds to jobsite in manufacturers factory sealed containers, bearing the brand name. Store materials under cover until their installation.

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.
B. Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.
C. Furnish manufacturer's additional [**Five] (5)** year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Door lites
   2. Window Frames
   3. Roof structure
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 08 11 13 – Steel Doors and Frames
   3. Section 08 41 00 – Aluminum Storefront Windows

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING
A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

1.13 TESTING AGENT
A. Refer to Division 1 for Testing Laboratory service requirements
B. Refer to specific window frame system specifications.

PART 2 - PRODUCTS
2.01 ACCEPTABLE MANUFACTURERS
A. Single source responsibility, specified items shall be from one manufacturer.
B. Acceptable manufacturer shall be one of the following and as listed herein and in Drawings:
   1. Glazing:
      a. PPG, www.ppg.com,
      b. Cardinal Glass Corporation, www.cardinalcorp.com
      c. Viracon, www.viracon.com
      d. As herein specified
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS – GLAZING: EXTERIOR VISION GLASS TYPES
A. **Insulated**
   1. Application:
      a. **Storefront Windows**
         1. Type: Insulated units
         2. Schedule:
            a. Thickness:
               1. Insulated: 1" overall with ½" airspace
            b. IG spacer
               1. Spacer® from Edgetech unless unit is not available with this spacer
         3. Specifications: Refer also to Performance heading 1.03.
            a. Insulated Glazing: (Values for glass unit, not overall window)
               1. Product:
                  a. Mfgr: Cardinal, www.cardinalcorp.com
                  b. Product: LoE³ - 366
                  c. Color: Clear
                  d. Coating: Low E
                  e. Type:
                     1. Fully tempered safety glass at all locations indicated and as required by CBC.
                  f. Fill: Insulated with Argon Fill

g. Performance:

Product (One lite)	U Factor-winter	Solar Blockage	Visible Light			Solar Heat Gain Coeff.	Shading Coeff.	Fading Transmission		
			Trans	Refl. Ext	Refl Int			UV	TDW-K	TDW
Insulating Glass										
LoE³ - 366 #2	0.24 Argon filled	73%	65%	11%	12%	0.27	0.31	0.05	N/A	0.43
F. Refer to drawings and as herein specified.										

2.03 MATERIALS - ACCESSORIES

A. Sealant: Refer to Section 07 92 00 - Sealants & Caulking.
B. Compounds:
   1. Provide hardness of materials recommended by the manufacturer for the required application and condition of installation in each case.
   2. Provide only compounds which are known (proven) to be fully compatible with contact surfaces.
      a. Extra care shall be used in the selection and use of structural rated sealant.
C. Setting blocks: Neoprene, 70-90 durometer hardness, with proven compatibility with sealants used.
D. Spacers: Neoprene 40-50 durometer hardness, with proven compatibility with sealants used.
E. Compressible filler rod: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 5-10 psi compressive strength for 25% deflection. Confirm compatibility with sealants, refer to Section 07 92 00.
F. Cleaners, primers, and sealers: Type recommended by sealant and gasket manufacturer.
G. Glazing gaskets:
   1. Use for interior glazing only.
   2. Extruded, flexible DuPont Neoprene gaskets of the profile shown.
   3. Confirm compatibility with sealant manufacturer.

2.04 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 INSTALLATION

A. General:
   1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.

B. Preparation for Glazing
   1. Clean the glazing channel, or other framing members to receive glass, immediately before glazing. Remove coatings, which are not firmly bonded to the substrate.
   2. Apply primer or sealer to joint surfaces wherever recommended by sealant manufacturer.

C. Glazing
   1. Install setting blocks or setting bed of proper size quarter points of sill rabbet. Set blocks or bed material in thin course of the heel-bead compound, if used.
   2. Provide spacers inside and out, and of proper size and spacing, for all glass sizes larger than 50 united inches, except where gaskets and pre-shimmed tape are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape. Glass to be 3/16" clear of frame, frame lap to be 5/16" minimum.
   3. Voids and filler rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in the channel at the heel of jambs and head (do not leave voids in the sill channels) depending on light size, thickness and type of glass, and complying with manufacturer's recommendations.
   4. Do not attempt to cut, seam, or abrade glass, which is tempered, heat strengthened, or coated. Do not nip glass.
   5. Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
   6. Glazing of interior window frames:
      a. Use pressure or foamed tape and sealant as noted to eliminate rattle and reduce sound transmission.
      b. Coordinate with window frame manufacturer.
   7. Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from the glass. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate innate dirt and moisture pockets.
   8. Clean and trim excess glazing materials from the glass and stops or frames promptly after installation and eliminate stains and discolorations.
   9. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure that gaskets will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel head.

D. Cure
   1. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength, and surface durability.

3.05 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
   2. The Applicator shall be responsible for the proper application of the materials.

B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.06 TESTING

A. Testing shall be done under each specific window frame specification.

3.07 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Remove and replace glass which is broken, chipped, cracked, and abraded or damaged in other ways during the construction period, including natural causes, accidents and vandalism.
C. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other work.
D. Wash and polish glass on both faces not more than 4 days prior to **Owner's** Beneficial Occupancy Date.
E. Keep areas of work and building free from accumulated debris, rubbish and waste materials as work progresses.
F. Protect work and materials of this Section prior to and during installation and protect the installed work and materials of other trades.
    1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
    2. Remove masking tape immediately after tooling joints, leaving finished work in neat and clean condition.
    3. Clean up and leave premise broom clean. Clean adjoining work spotted or otherwise defaced by work of this Section.
G. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
H. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
I. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   Leave entire area in a neat, clean, acceptable condition.
J. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
K. Provide record drawings in accordance with Division 1 closeout submittal procedures.
L. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END SECTION

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Metal wall framing – when not included as part of Section 05410
      a. Non-load bearing interior wall framing
      b. Non-load bearing ceiling metal framing
      c. Miscellaneous metal backing, bridging and metal backing for wall hung items
      d. Non-load bearing metal framing at door frames
      e. Non-load bearing metal framing at window frames
      f. Painting of all welds

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
C. Title 24, Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
D. American Institute of Steel Construction (AISC):
   1. Manual of Steel Construction, 9th edition
E. American Iron and Steel Institute (AISI)
   1. Specifications for the "Design of Cold Formed Steel Structural Members," most current edition.
F. American Society for Testing and Materials (ASTM):
   1. ASTM 446 Standard Specification for Nickel Chromium
   2. ASTM A525 General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
   3. ASTM A553 Standard Specification for Pressure Vessel Plates, Alloy Steel, Quenched and Tempered 8 and 9 Percent Nickel
   4. ASTM A570 Standard Specification for Structural Steel, Sheet and Strip, Carbon, Hot-Rolled
   5. ASTM A591 Steel sheet, cold-rolled, electrolytic Zinc-Coated.
   6. ASTM A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   7. ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
   8. ASTM C840 Specification for Application and Finishing of Gypsum Board
   9. ASTM C1396 Specification for Gypsum Board
G. American Welding Society (AWS):
   1. D.1.3, 1981 Structural Welding Code – Sheet Steel
   2. Electrodes for Welding
H. Gypsum Association (GA), except where conflicts with drawing requirements, whereas drawings shall govern.
   1. Including, but not limited to:
      a. GA-600 Fire Resistive Design Manual
      b. GA-530 Design Data – Gypsum Board
I. International Code Council (ICC)

1. ICC Report No. ESR-1663 Hilti Powder Actuated Fasteners
2. ICC Report No. 4943P Bearing and Non-Bearing Steel Studs, Joists And Tracks

J. Materials and Methods Standards Association (MMSA), www.mmsa.ws
   1. MMSA Bulletins 1 – 16
K. Steel Stud Manufacturers Association (SSMA)
   1. Standardization brochures, except where conflicts with drawing requirements, whereas drawings shall govern.
      a. ICC # ER-4943P
      b. Industry Technical Note, Cold formed Steel Construction, Document 3, April 2000 – Track within a Track Deflection Assembly.
      c. Industry Technical Note, Cold formed Steel Construction, Document 1, January 2000 – Steel Deflection Track Selection.
      d. Industry Technical Note, Cold formed Steel Construction, Document 2, March 2000 – Unsheathed Flange Bracing.
      e. Industry Technical Notes, Cold Formed Steel Construction:
         1. No.1, January, 2000 – Single Deflection Track Selection.
         2. No.2, March 2000 – Unsheathed Flange Bracing
         3. No.3, April 2000 – Track Within A Track Deflection Assembly
   2. Specifications for the "Design of Cold Formed Steel Structural Members", most current edition.
L. Underwriters Laboratory (UL)
   1. Listed UL Design Numbers
M. United States Gypsum Co. (USG Building Systems)
   1. Steel framing systems
      a. AS-510 Systems folder, except where conflicts with drawing requirements, whereas drawings shall govern.

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	**Name of Test**	**Performance**	**Testing Std.**
Walls (Design unless noted in drawings to be more restrictive)	Deflection	Interior: L/240	CBSC
		Exterior: L/180	
	Wall Loading	Interior: 5 psf	Design
		Exterior: 25 psf	
	Wall Type	Interior: • Typical: Flexible	Design
		Exterior: Brittle	
Framing	Tolerance	1/8" in 10'-0" non-accumulative	Design
Ceiling framing – damp – wet & damp areas	Construction	Comply	ICC #ER 4943P
	Spacing	12" o.c. maximum	CBSC/ Design
Studs	Lengths	Full height of wall extent w/o splices	Design
	Gauge	As indicated in contract documents, but never less than required by stud mfgr. for application requirements	Design and Mfgr. Refer also to listed wall designs
	Spacing		

Framing and accessories	Gauge	20 gauge minimum if not listed otherwise.	Design
Metal	Recycled content	35% minimum	
Refer to drawings and as herein specified			

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
    1. Submit typed list of all material and products proposed for use, which shall include manufacturer's published technical literature.
    2. Framing components:
        a. Gauges, widths, flange dimensions, etc.
        b. Tracks, runners, backing, etc.
    3. Wedge anchor and shot-in anchor capacity to resist lateral and tension loads.
    4. Fasteners
    5. Welded assemblies
    6. Accessories
    7. Detailed drawings that explicitly show, indicate and demonstrate all general connection types, profiles and fastening for review and acceptance.
        a. Supplemental strapping, bracing, splices, bridging, accessories, and details required for proper installation.
E. Submit samples.
    1. N/A
F. Certification:
    1. Stud manufacturers written tables for framing heights, loads, spans, etc
    2. Provide Certification for percentage of total and post-consumer recycled content.
    3. ICC and other applicable reports.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing projects of similar size and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing / installing / finishing projects of similar size and complexity.
D. Stipulations:
    1. At proprietary assemblies use specified and tested manufacturer and specific products, including but not limited to the gypsum board, fastening, etc.
    2. Framing shall be installed and finished by persons regularly engaged in this type of work.
        a. Supervision:
            1. Provide the services of a qualified and experienced superintendent who shall constantly be in charge of the work of this section and who shall remain at the site at all times that work is in progress.
            2. He shall direct all work performed under this Section.
        b. Qualifications for workmen:
            1. Provide persons at all times during execution of this portion of the work who are thoroughly familiar with the type of materials being installed and the best methods for their installation.
        c. Damp and wet locations:

1. Framing shall not exceed 12” o.c.

d. Assemblies:
1. Wall system shall provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperatures.
2. Wall system shall accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2. Welders: Qualified for welding in horizontal, vertical, and overhead positions in accordance with AWS D1.3.
3. Perform work in accordance with, but not limited to:
a. Gypsum Association GA-203
b. ASTM C754.
c. SSMA, Steel Stud Manufacturer’s Association, ICC ER-4943P Technical Manual or most current edition
d. Contract Documents and Details
a. ANSI/ASTM A591 - Steel sheet, cold-rolled, electrolytic Zinc-Coated.

E. Miscellaneous Criteria:
1. Inspections
a. As directed **Owner’s** testing agency may inspect the maintenance of a quality control program including spot checking welds and welding procedures in accordance with AWS. Standards.
b. Full responsibility for quality control shall remain with the **General Contractor**.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Protect metal framing units, components, etc., from rusting, deformation, and other damage.
1. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.
2. Store off ground in a dry ventilated space or protect with breathable waterproof tarpaulins.

1.07 JOB CONDITIONS

A. Field verify that all components, backing, etc provided by others are installed correctly before proceeding with installation of products as herein specified

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following,
1. Wall sheathing and finish
2. Wall assemblies
3. Attachment to floors and structure
4. Acoustical and fire stopping
5. Ceiling construction
6. Insulation

7. Electrical & low voltage wiring, devices, etc.
8. Electrical work, conduit, etc.
9. Mechanical work, ducts, devices, etc.
10. Recessed components in walls, soffits and ceilings
11. Surface mounted components to walls
12. Wall Backing

B. Related sections include, but are not limited to, the following:
1. Division 1
2. Section 05 12 00 – Structural Steel Framing
3. Section 05 40 00 – Cold Formed Metal Framing
4. Section 05 50 00 – Metal Fabrications
5. Section 08 11 13 – Steel Doors and Frames
6. Section 09 29 00 – Gypsum Board and Sheathing Substrates

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
1. Complete instructions regarding maintenance of the materials, finishes, etc.
2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers shall be subject for compliance with all requirements, provide products from the following list:
1. Stud Manufacturers:
a. Dietrich Metal Framing, www.dietrichindustries.com
b. Angeles Metal Systems www.scafco.com/angeles
c. SCAFCO Steel Stud Manufacturer www.scafco.com
d. United Construction Supply
e. American Studco www.studco.com
f. Western Metal www.wmlinc.com
g. Clark Western
h. USG Steel Framing Systems
i. Gold Bond & Gold Bond Shaft Walls
j. Clark Western
k. Steeler Inc., www.steeler.com
2. Fasteners
a. Hilti, www.hilti.com
b. Steeler Inc., www.steeler.com
c. Marker & Darts, Compass International
b. www.marker-darts.com
1. Prefabricated Headers
a. Brandy Construction Innovations, Inc.
www.proxheader.com
888.475-7875
2. Reviewed Equivalent by **Architect**.
a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
b. Refer to Division 1 for substitution, deviation and/or submittal procedures.

c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

B. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
C. Refer to drawings, details, and other related specification section whether listed or not.
D. Details shall set basic requirements for size and configuration of systems

2.02 MATERIALS

A. System Components:
1. With each type of metal framing required, provide and install per manufacturer's standard details and specifications, including but not limited to:
a. Standard steel studs, joists, angles, straps, steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as recommended by manufacturer for applications indicated, as needed to provide a complete metal framing system.
b. Custom fabricated channels, angles, etc.
c. Fasteners
1. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws.
a. Head Type: Low-profile head beneath sheathing, manufacturer’s standard elsewhere.
2. Welded Electrodes: Comply with AWS standards.

B. System Design:
1. Comply with size, gauge and spacing as indicated on the Drawings, conforming with manufacturer’s design tables and in accordance with ICC and or other approved tested systems design as indicated.

C. Materials and Finishes:
1. General:
a. For 20-gauge and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A446, A570, or A611.
b. Provide galvanized finish to metal framing components complying with ASTM A525 for minimum G60 coating.

D. Curved/Flexible components;
1. Galvanized – Steel Sheet Track: ASTM A653, and as follows:
a. Coating Designation: G40
b. Grade: As required by Specification
2. Galvanized – 20 Gauge Steel Sheet Tract (for 6” track): ASTM A653, and as follows:
a. Coating Designation: Equal or superior to ASTM A653 G60 or A60.
b. Grade: Structural Grade 33
3. Galvanized – Steel Sheet Angle:
a. Coating Designation: Hot Dipped Galvanized Steel equal or superior to ASTM A653 G40 or A40.
b. Grade: As required by Specification.
4. Galvanized Sliding Steel Strap (for all track and angles): ASTM A653
a. Coating Designation: Hot Dipped Galvanized Steel Strapping equal or superior to ASTM A653 G60 or A60.

E. Framing Components:
1. Studs:
a. Manufacturer's standard load-bearing steel Studs of size, shape, and gauge indicated on drawings & in conformance with manufacturer’s Structural Property tables.

b. Designator section as required to comply with manufacturer's Structural Property tables.
2. Joists:
   a. Manufacturer's standard Joist sections of size shape, and gauge indicated on drawings & in conformance with manufacturer's Structural Property tables.
   b. Designator section as required to comply with manufacturer's Structural Property tables.
   c. Damp and wet locations:
      1. Framing shall not exceed 12" o.c.
3. Tracks:
   a. Straight conditions:
      1. General:
         a. Manufacturer's standard load-bearing steel tracks of size, shape, and gauge indicated on drawings and in accordance with rated wall design requirements
         b. Sizes as indicated in contract drawings
         c. Custom leg lengths as indicated in drawings and/or details
      2. Size:
         a. Typical Tracks:
            1. Width: To accommodate wall framing
            2. Flange: 1.5" min. length unless indicated otherwise
            3. Gauge: 20, min. unless noted to be heavier
         b. Deflection Tracks:
            1. Width: To accommodate wall framing
            2. Flange: 2" length unless indicated otherwise
            3. Gauge: 18 min. unless noted to be heavier
         c. Slotted Track:
            1. Width: To accommodate wall framing
            2. Flange: 2.5"
            3. Gauge: 18 min. unless noted to be heavier
            4.
4. Channel Stud: (Coordinate with structural documents for alternate material, profiles, gauges, etc., structural documents shall govern.)
   a. Manufacturer's standard load-bearing steel Channel studs of size, shape, and gauge indicated on drawings.
5. Flat stock:
   a. "FS" Flat Stock:
      1. Size as indicated and required.
   b. Manufacturer's Flat Stock of size, shape, and gauge indicated on drawings.
6. Header Assembly:
   a. Straight conditions:
      1. Assembly:
         a. Built-up assembly, refer to Drawings and details
         b. Prefabricated:
            1. Mfgr: Brandy
            2. Series: Pro X Header
            3. Assembly:
               a. Single component assembly for desired length and loads.
               b. Multiple component assembly for desired length and loads
               c. Clips for securing to jamb framing
            4. Performance:
               a. Spans up to 14'-0"

2.03 OTHER MATERIALS

A. Galvanized Repair Paint:
   1. Mfgr: ZRC Worldwide, www.zrcworldwide.com, 800.831-3275
   2. Product: ZRC ZERO VOC Water-Based Galvanizing Compound

3. Type: Two-pack Water-Based Galvanizing Compound
4. Standards: (Meets or exceeds)
   a. ISO 9001 registered
   b. MIL-P-26915A (USAF Zinc dust Primer)
   c. SSPC-Paint 20 (Specification for Zinc Rich Primer)
   d. ASTM Des. A239 Preece Test for hot dipping galvanizing
   e. ASTM Des B117 10,000 salt spray without failure
5. Material:
   a. 93% Zinc in the dry film using Tpe III “ultra pure” ASTM-D-520 zinc
6. Preparation:
   a. Grease & Oils: Solvent clean to SSPC-SP1
   b. Rust Scale: Power tool clean to SSPC-SP3 or SSPC-SP11 (SIS St. 2 or 3)
      1. Sand blast (SSPC-SP6) at exterior exposed conditions.
   c. Mill Scale: Sandblast to SSPC-SP6
   d. Water Immersion: (100 degree F max.) Sandblast to SSPC-SP10 (near-white)

B. Welding Electrodes: E60XX

C. Metal Backing Plates
   1. Horizontal 'C'- Studs 6" x 18 gauge x distance between vertical supporting studs 3 studs minimum). Refer to indicated details (for surface mounted items furnished by others).
   2. Alternate when approved is 6” x 16 gauge steel plate continuous and spanning minimum two (2) studs past mounting location to each side.

2.04 METAL FRAMING AT DOOR & WINDOW JAMBS & HEADS

A. Comply with all requirements of 2.02 in addition to those listed here.
   1. Jambs:
      a. Provide double stud framing at all jambs, 20-gauge min. metal studs unless wall type requires a heavier stud and shall be spot-welded together at 6" O.C. (stud gauge shall not be less than wall stud framing gauge)
      b. Jamb framing shall frame full height of wall such that jamb framing incorporates and attaches to built-up header.
      c. Where cutouts are required at door jambs for hardware, etc., then install a third jamb stud to reinforce jamb framing.
   2. Header:
      a. Provide built-up double joist header at all heads conditions.
         1. 20 gage min. metal studs and shall be fastened together (stud gauge shall not be less than wall stud framing gauge.
            a. Heavier gauge where noted in drawings.
            b. Heavier gauge when required by manufacturer for specific condition.

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
   3. Do not proceed until unsatisfactory conditions are corrected.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

2.05 FABRICATION

A. General:
   1. Fabricate panels plumb, square, true to line and braced against racking with joints welded.
   2. Perform lifting of prefabricated panels in a manner to prevent damage or distortion
B. Fastenings:
   1. Attach similar components by welding or screw fasteners as indicated on structural drawings.
C. Fabrication Tolerances:
   1. Fabricate framing not to exceed a maximum allowable tolerance variation from plumb, level and true to line of 1/8" in 10'-0".
D. Install as detailed, herein specified and in accordance with manufacturers recommendations.

3.04 INSTALLATION

A. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
B. Accurately layout partition and wall lines from the dimensions shown on Contract Drawings.
C. Install metal studs (NOT TO EXCEED 24 INCHES O.C. SPACING.) and accessories in strict accordance with manufacturer's recommendations, unless otherwise shown or specified; anchoring all components firmly into position.
D. Furring and bracing members: Same material and finish as studs, thickness to suit purpose.
E. Extend partition through suspended ceiling line to structural deck above, unless specifically noted otherwise.
F. Isolation of partitions: Provide slip or cushion-type joint between metal framing and structure to prevent transfer of structural loads or movements to partitions, except as otherwise indicated.
G. Studs: Use full-length studs between runner tracks. Friction fits studs to runner tracks by positioning and rotating into place. Provide positive attachment to runner tracks for studs; using #10x20x3/8" min. Pan Head self-tapping screws in both flanges of studs top and bottom.
   1. Size and spacing: Use studs of the sizes and spacing indicated.
   2. Provide additional studs to support inside corners at partition intersections and corners, and to support outside corners, termination of partitions and both sides of control joints.
   3. Provide rough framing at openings, except doors, consisting of full-length studs adjacent to jambs, and horizontal header and sill tracks. Cut horizontal tracks to length and split flanges and bend webs at ends for flange overlap and screw to jamb studs. Install cut-to-length, intermediate studs above and below openings, at same spacing as full-length studs.
   4. At door frames, provide two 18 gauge structural studs continuous at each side of openings and provide one additional stud located not more than 6" from jamb stud. Fasten jamb studs to metal frames with anchor clips using 2 self-tapping screws or bolts one each side. (3 clips minimum per jamb each side; 2 clips minimum at head). Clips not to exceed 24 inches on center.
   5. At electrical cabinets and panel boards, provide one 18 gauge H.D.S. structural stud continuous at end side of opening for mounting fixture.
   6. Where partitions will support ceramic tile, fixtures and wall cabinets, use 18 gauge "C"-studs, unless otherwise noted.
   7. Shaft walls, install per listed design and in accordance with manufacturers system.
H. Provide rigid metal furring channels where gypsum board is to be applied over concrete substrates, except where full size studs are indicated.

1. Install channels at 16" O.C. maximum and provide additional framing at openings, cutouts, and corners. Fasten to concrete with concrete nails or power-driven fasteners not more than 24" O.C. and stagger on opposite flanges of hat-shaped channels.

I. Where connections of metal framing are indicated to be welded, all such welding shall be performed by certified welders and then tested in accordance with Code requirements.
J. Metal Backing Plates: Shall be applied as detailed and in locations as indicated on Drawing floor plans and interior room elevations.
K. Prepare and paint all welds with galvanized paint as herein specified.

3.05 TOLERANCES

A. Install members to provide surface plane with maximum variations of 1/8 inch in 10 feet in any direction.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
   1. Galvanizing Repairs:
      a. Prepare and repair damaged galvanized coatings on fabricated and installed metal framing with galvanizing repair paint according to ASTM A780 and the manufacturer's instructions.
      b. Prepare and repair galvanized coatings on welds as part of fabricated and installed metal framing with galvanizing repair paint according to ASTM A780 and the manufacturer's instructions.
   2. Touch-up painting:
      a. Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted metal framing.
         1. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.
F. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer to ensure that metal framing is without damage or deterioration at the time of Substantial Completion.
G. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
H. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
I. Provide record drawings in accordance with Division 1 closeout submittal procedures.
J. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END SECTION

09 29 00
GYPSUM BOARD AND SHEATHING SUBSTRATES
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions at the job site.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Interior: Gypsum wallboard and sheathing
   2. Joint treatment
   3. Surface treatment – Interior:
   4. Sealants and Backer rod
   5. Drywall Primer / Sealer
   6. Related accessories

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society For Testing and Materials (ASTM) www.astm.org
   1. ASTM C 36 Specification for Gypsum Wallboard
   2. ASTM C 79 Specification for Gypsum Sheathing - Paper faced (Glass mat faced, see ASTM C1177)
   3. ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products
   4. ASTM C 475 Standard Spec for Joint Compound & Joint Tape for Finishing Gypsum Board
   5. ASTM C 518 Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
   6. ASTM C 840 Standard Spec for Application and Finishing of Gypsum Board
      a. Comply with applicable requirements including recommendations of manufacturer, and comply with more restringent specifications as herein specified.
   7. ASTM C 931 Specification for Exterior Gypsum Soffit Board
   8. ASTM C 1177 Standard Spec for Glass Mat Gypsum Substrate for Use as Sheathing
   9. ASTM C 1178 Standard Spec for Glass Mat Water-Resistant Gypsum Backing Panel
   10. ASTM C1396 Specification for Gypsum Board
   11. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
   12. ASTM E 72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
   13. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
E. Gypsum Association (GA) www.gypsum.org
   1. GA-214 Recommended Levels of Gypsum Board Finish
   2. GA-216 Specifications for the application and Finishing of Gypsum Board
   3. GA-220 Gypsum Board Winter Related Installation Recommendations
   4. GA-221 Repair of Gypsum Board Joint Ridging
   5. GA-223 Gypsum Panel Products Types, Uses, Sizes, And Standards
   6. GA-224 Installation of Predecorated Gypsum Board
   7. GA-225 Repair of Fire-Rated Gypsum Board Systems
   8. GA-226 Application of Gypsum Board To Form Curved Surfaces

9. GA-229 Shear Values for Screw Application OF Gypsum Board On Walls
10. GA-231 Assessing Water Damage to Gypsum Board
11. GA-232 Painting New Gypsum Board
12. GA-234 Control Joints For Fire-Resistant Rated Systems
13. GA-235 Gypsum Board Typical Mechanical and Physical Properties
14. GA-238 Guidelines for Prevention Of Mold Growth On Gypsum Board
15. GA 253 Application Of Gypsum Sheathing
16. GA-254 Fire-Resistant Gypsum Sheathing
17. GA-276 Gypsum Board Roof Underlayment Systems
18. GA-290 Gypsum Board Area Separation Walls
19. GA-530 Design Data - Gypsum Board
20. GA-600 Fire resistant Design Manual
21. GA-605 Proprietary Gypsum Panels Products For Use In UL Classified Systems
22. GA-610 Fire resistance Provided By Gypsum Board Membrane Protection
23. GA-618 Building and Inspecting Smoke Barriers
24. GA-620 Gypsum Area Separation Firewalls
25. GA-801 Handling and Storage of Gypsum Panel Products

F. International Code Council (ICC), www.iccsafe.org
G. United States Gypsum (USG) www.usg.com
   1. SA927 Application And Finishing Of Gypsum Panel Products
   2. SA923 Drywall/Steel Framed Systems
   3. SA924 Drywall/Wood Framed Systems
   4. SA925 USG Area Separation Fire Wall/Party Wall Systems
   5. SA926 USG Cavity Shaft Wall Systems
   6. SA933 “Sheetrock” Brand Textures and Finish Products
H. Federation of Societies for Coating Technology (FSCT) www.coatingssocietiesinternational.org
   1. Coatings Encyclopedic Dictionary
I. Painting and Decorating Contractors of America (PDCA) www.pdca.org
   1. Standard P1-92 Touch Up Painting and Damage Repair
   2. Standard P4-94 Responsibility for Inspection and Acceptance of Surface Prior to Painting and Decorating
   3. Standard P5-94 Benchmark Sample Procedures for Paint and Other Coating System
   4. Glossary of Terms, Painting and Decorating Contractors of America, Fairfax, VA.
J. Drywall Finishing Council Incorporated (DWFC) www.dwfc.org
   1. Recommended Specification for Preparation of Gypsum Board Surfaces Prior to Texture Application.
   2. Interior Job Condition Specifications for the Application of Drywall Joint Compounds, Drywall Textures, and Paint/Coatings.
K. National Evaluation Report (NER)
   1. NER 458 Code Compliance for Exterior Ceiling Sheathing (Soffit sheathing)
   2. NER 258 USG Drywall Shaft Partition Systems

1.03 PERFORMANCE

A. **General:**
   1. Comply with manufacturer’s standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Gypsum Board / Sheathing & Sound Board	Flatness Tolerance	1/8” offsets between planes of board faces and 1/8” in 10 feet or	Gypsum Association

		plumb, level, warp and bow. Tolerance variation shall not be collective.	
Gypsum Board / Sheathing	Recommended Levels of Gypsum Board Finish	Comply or as herein specified, whichever is more restrictive	GA-214-07 ANSI A98-7.1
	Application and Finishing of Gypsum Panel Products		GA-216-07
	Gypsum Board Winter Related Installation Recommendations		GA-220-06
	Repair of Gypsum Board Joint Ridging		GA-221-00
	Repairing Screw or nail Pops		GA-222-08
	Gypsum Panel Products Types, Uses, Sizes and Standards		GA-223-04
	Installation of Pre-decorated Gypsum Board		GA-224-08
	Repair of Fire-Rated Gypsum Board Systems		GA-225-08
	Application of Gypsum Board to Form Curved Surfaces		GA-226-08
	Shear Values for Screw Application of Gypsum Board on Walls		GA-229-08
	Assessing Water Damage to Gypsum Board		GA-231-06
	Painting New Gypsum Board		GA-232-04
	Control Joints for Fire-Resistance Rated Systems		GA-234-08
	Gypsum Board Typical Mechanical and Physical Properties		GA-235-05
	Joint Treatment Under Extreme Weather Conditions		GA-236-00
	Guidelines for Prevention of Mold Growth on Gypsum Board		GA-238-03
	Water-Resistant Gypsum Backing Board For Ceramic Tile in Wet Areas		GA-239-04
	Application of Gypsum Sheathing		GA-253-07
	Fire-Resistant Gypsum Sheathing		GA-254-07
	Gypsum Board Roof Underlayment Systems		GA-276-05
	Gypsum Board – Area Separation Walls		GA-290-02
	Fire Resistance Design Manual		GA-600-06
	Proprietary Gypsum Panel Products For Use in UL Classified Systems		GA-605-08
	Fire Resistance Provided by Gypsum Board Membrane Protection		GA-610-02
	Building and Inspecting Smoke Barriers		GA-618-04
	Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors		GA-801-07

Exposed interior Gypsum Sheathing	Smooth Wall		
Smooth Wall / Level 5	Smooth Wall with Darby full surface float		
Refer to drawings and as herein specified			

C. **Sustainability:**
1. Refer to Division 1 sustainability requirements.
2. Refer to product criteria identified herein.

D. Definitions
1. Levels of gypsum board finish: (Typical)
   a. **Scope.** The required level of finish of gypsum board wall and the ceiling surfaces is described with typical applications and is listed as a minimum allowable standard. All proposed deviations from these herein specifications shall be in written form of a request and approved by the **Architect** prior to installation.
   b. **Terminology.** The following definitions are applicable to this document.
      1. Accessories: Metal or plastic beads, trim or molding used to protect or conceal corners, edges or abutments of the gypsum board construction.
      2. Back Roll: Rolling a spray painted surface with a paint roller immediately following spray application.
      3. Coat: Paint, Varnish, or lacquer applied to a surface in a single application (one Layer) to form a properly distributed film when dry –ASTM
         Note: Shall be applied as installed per Painting specification.
      4. Critical (Severe) Lighting: A condition whereby interior surfaces are flooded by natural or artificial lighting at an oblique angle; such as lighting from large expanses of windows, glass curtain walls, skylights, or surface mounted light fixtures. Strong side lighting from windows or surface-mounted light fixtures. - ASTM
         Note: See "comments" section of this document.
      5. Drywall Primer: A paint material specifically formulated to fill the pores and minimize suction differences between gypsum board surfaces paper and the compound used on finished joints, angles, fastener heads, accessories, and over skim coating.
         Note: this shall be applied as part of gypsum board specification
      6. Gloss: A subjective term used to describe the relative amount and nature of mirror like (specular) reflection.
         Note: FSCT
      7. Joint Photographing (Telegraphing): The shadowing of the finished joint areas through the surface decoration and/or Smooth Wall
         Note: Syn telegraphing. – GA-214-96
      8. Paint: Any pigmented liquid, liquefiable, or mastic composition designed for application to a substrate as a thin layer which is converted to an opaque solid film after application. Used for protection, decoration or identification or to serve some functional purpose, such as filling or concealing surface irregularities.
         Note: FSCT, shall be applied as part of painting specification
      9. Properly Painted Surfaces: A surfaces that is uniform in appearance, color and sheen. It is one that is free of foreign material, lumps skins, runs, sags, holidays, misses, strike-through, or insufficient coverage. It is a surface, which is free of drips, spatters, spills, or overspray, which were caused by the **General Contractor's** work force. Compliance to meeting the criteria of a "Properly painted surface" shall be determined when viewed without magnification at a distance of five feet or more under normal lighting conditions and form a normal viewing position.
         Note: A surface uniform in appearance, color and sheen may not be achieved with a coat

of primer or a single coat of topcoat. Shall be applied as part of Painting specification. – PDCA

10. Prime/Sealer: A gypsum board prime/sealer manufactured by company explicitly for priming gypsum board and formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories, and over skim coatings. See "comments" section of this document.
    Note: Primer shall be provided by Gypsum board mfgr. and installed by gypsum board finisher in addition to "primer and finish paint as installed under separate specification Section 09 90 00."
11. Skim Coat: A thin coat of herein listed joint compound installed over the entire surface of the gypsum board to fill imperfections in the joint work, smooth the paper texture, and provide a uniform surface for a Smooth Wall appearance. Compound will be installed with Steel Trowel or Knife blade.
    Note: Spray application is not allowed
12. Spotting: To cover fastener head with joint compound.
13. Texture: A decorative treatment of gypsum board surfaces.
14. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with primer/sealer.
    Note: Refer to Heading 2.05
15. Top Coat: The finish coat(s) of a coating system, formulated for appearance and or environmental resistance.
    Note: shall be applied as part of painting specification – PDCA
16. Wall covering: Any type of paper, vinyl, fabric, or specialty material that is pasted onto a wall or ceiling in a wide array of colors, patterns, textures, and performance characteristics, such as washability and abrasion resistance.
    Note: shall be applied as part of wall covering specification - FSCT
17. Wall covering Primer: Coatings formulated to seal the porosity of new drywall, joint compounds, and most surfaces. Also formulated to promote adhesion and serviceability under wall covering products.
    Note: Shall be applied as part of wall covering specification.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
   1. Drywall products
   2. Joint tapes for Interior and Exterior applications
   3. Joint topping material
   4. Skim coat joint compound material –Wall Finish Level 4
   5. Fasteners
   6. Tools for product application
   7. Texturing products
E. Submit samples.
   1. Three (3) each 20" square portable mockups on gypsum board that include:
      a. Finish taping, mud and primer
      b. Butt joint treatment
      c. Edge treatment
      d. Specific required finishes
F.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **Five (5)** years providing/installing/finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **Five (5)** years providing/installing/finishing similar size projects and complexity.
D. Lead Times:
    1. **General Contractor** shall coordinate with supplier to verify product lead times during bids and at award of contract, and account for such lead times in their costs and schedules.
    2. **General Contractor** shall provide an itemized list of materials which might have or are confirmed to have a lead time problem and what the anticipated lead time is.
    3. **General Contractor** shall certify in writing that all materials have acceptable lead times as they relate to availability for sub-contractor and **General Contractor** to meet construction schedule and sequence of construction.
    4. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must me documented at time of bid.
E. Stipulations:
    1. At proprietary assemblies use specified and tested manufacturer and specific products, including but not limited to the gypsum board, fastening, etc.
F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
    1. Agenda for meeting shall include, but not be limited to; review of Smooth wall, taping for various wall coverings and texture of wall.
    2. **General Contractor** shall request meeting 5 days in advance of construction.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Comply with manufacturers recommendations

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.
B. Environmental:
    1. Interior: Do not install gypsum board, joint compounds, skim coats and textures if building temperature is below 55ºF or if proper ventilation is not provided to eliminate excessive moisture from building.
        a. Temperature shall be maintained after installation.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
    1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to, the following:
    1. Wall Framing

2. Electrical/Low Voltage Wiring & Devices
3. Wall Finish for Mechanical Work

B. Related Sections include, but are not limited to, the following**:**
1. Division 1
2. Section 05 40 00 – Cold-Formed Metal Framing
3. Section 09 22 16 – Non-Structural Metal Framing
4. Section 09 90 00 – Paints and Coatings

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
1. Complete instructions regarding maintenance of the materials, finishes, etc.
2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
1. Gypsum sheathing (Interior):
   a. Typical and as indicated:
      1. Georgia Pacific (GP), www.gp.com
      2. U.S Gypsum (USG), www.usg.com
      3. National Gypsum, Gold Bond www.national-gypsum.com
   b. Where indicated:
      1. U.S Gypsum (USG), www.usg.com
   c. Alternates where allowed:
      1. National Gypsum, Gold Bond & GridMarx, www.national-gypsum.com
      2. Pabco Gypsum, www.pabcogypsum.com
      3. www.national-gypsum.com
   d. Where indicated:
      1. National Gypsum, Gold Bond, www.national-gypsum.com
2. Joint treatment & finishing (Interior & Exterior)
   a. U.S Gypsum (USG), www.usg.com
   b. National Gypsum, Gold Bond www.national-gypsum.com
   c. Georgia Pacific (GP), www.gp.com
   d. Bead-Ex www.usg.com
   e. Hamilton www.hamiltonnw.com
3. Accessories:
   a. U.S Gypsum (USG), www.usg.com
   b. National Gypsum, Gold Bond & GridMarx, www.national-gypsum.com
   c. Superior Metal Trim www.superiormetaltrim.com
   d. Flannery, Inc., 818 837-7585, www.flannerytrim.com
   e. Fry Reglet www.fryreglet.com
   f. MILGO/BUFKIN, www.milgo-bufkin.com
4. Reveals/End Caps:
   a. Flannery, Inc., 818 837-7585, www.flannerytrim.com
   b. Superior Metal Trim www.superiormetaltrim.com
   c. Fry Reglet www.fryreglet.com
   d. MILGO/BUFKIN, www.milgo-bufkin.com
   e. Liquid applied waterproof membrane – Laticrete, www.Laticrete.com

5. Sealants:
   a. Pecora, www.precora.com
   b. Refer also to Sealant Specification Section 07 92 00.
6. Reviewed Equivalent by **Architect**.
   a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
   b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
   c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. General
1. Conform to American National Standards Institute Specifications and Gypsum Association for Gypsum Wallboard finishes.
2. Sheathing type as herein specified and in accordance with manufacturer's recommendations.
3. Wall board shall be fire-rated typical, Type "X" typical, U.N.O. and comply with specified and detailed wall construction types.

B. Wallboard & Ceiling Board Sheathing
1. **INTERIOR SCHEDULE:**
   a. General:
      1. Type X Core, Fire Code C and/or Type XXX regarding if application is a rated assembly
   b. Interior walls, u.n.o.:
      1. Mfgr:
         a. Typical: Georgia Pacific
         b. Alternate 1: US Gypsum
         c. Alternate 2: Pabco
         d. Alternate 3: Nation Gypsum, Gold Bond
      2. Brand:
         a. Typical: ToughRock®Fireguard Type X
         b. Alternate 1: Sheetrock
         c. Alternate 2: Flame Curb
         d. Alternate 3: Fire Shield
      3. Product:
         a. Typical: Type "X" Core
         b. Alternate 1: Firecode "C" Core (if specific to approved design)
         c. Alternate 2: Type XXX
      4. Size:
         a. Thickness:
            1. 5/8" typical
            2. 1/2" as indicated per plan details
         b. Width x Length: 4'-0" wide x 8', 9', 10', 12' or 14' (size to minimize quantity of joints)
      5. Material: Paper faced gypsum core board
      6. Edge: Tapered
      7. Standard: ASTM C36
      8. Finish: As herein specified and indicated in drawings
      9. Limitations:
         a. See body of this specification for specific product types for specific conditions.

b. At interior face of Exterior walls use Dens Armour Plus Fireguard, High Performance Interior Panel as herein specified unless herein in indicated otherwise or an herein approved alternate.

2.03 OTHER MATERIALS

A. Accessories: Trim accessories, including, but not limited to:
1. Joint treatment: Refer to Heading 2.04
2. Outside edge:
   a. Mfgr: USG
   b. Product: DUR-A-BEAD Corner Bead
   c. Material: Standard galvanized steel units
   d. Model: No.103 1-¼" x 1-¼"
3. Inside corner:
   a. Mfgr: USG
   b. Product: Sheetrock Brand
   c. Material: Paper Faced Metal Trim x 90-degree angle
   d. Model: Tape on Trim No. B2
4. Offset Inside corner:
   a. Mfgr: USG
   b. Product: Sheetrock Brand
   c. Material: Paper Faced Metal Trim x greater than 90 degree angle
   d. Model: B2 OS
5. "Z" shape trim for edge of board at step back reveal:
   a. Mfgr: USG
   b. Product: Sheetrock Brand
   c. Material: Paper Faced Metal Trim Tape on trim x "Z" profile
   d. Model: B4 NB
6. "L" shape trim for edge of board at Acoustical tile ceiling:
   a. Mfgr: USG
   b. Product: Sheetrock Brand
   c. Material: Galvanized Metal Trim x "L" shape 90-degree angle
   d. Model: No. 200 – B x ½" and/or ⅝"
7. "J" shape trim for edge of board, typical:
   a. Mfgr: USG
   b. Product: Sheetrock Brand
   c. Material: Galvanized Metal Trim
   d. Model: No. 200 – A x ½" and/or ⅝"
8. Control Joint:
   a. Mfgr: USG
   b. Product: Sheetrock Brand
   c. Material: Zinc
   d. Model: No. 093
   e. Profile: ¼" opening x $^{7}/_{16}$" depth x 10'-0" length
9. Drywall "L" trim:
   a. Mfgr: Flannery,
   b. Product: Drywall "L"
   c. Model: DWL
   d. Material: Mil Finish Aluminum

   e. Size:

1. Width: ¼" thru 4-3/'4"
   a. Size to fit field condition
2. Length: 10'-0"
3. Tape flange: 7/8" wide

B. Substrate Fasteners
   1. Nails (Wood framing)
      a. Size (1-1/2") (1-3/4")
         1. 11-gauge, hot-dipped galvanized roofing nails with nominal 7/16" diameter head for wood framing.
   2. Screws: (Metal stud framing)
      a. 1" Type S-12 Bugle Head Corrosion-Resistant Screws for application of sheathing to steel studs.
      b. 1-1/4" Type S-12 Pancake Head Corrosion-Resistant Screws for application of self-furring metal lath or brick ties through sheathing to steel studs.

C. Joint Treatment and Skim Coat Treatment - Interior
   1. Schedule:
      a. Applications:
         1. Typical, interior dry conditions, UON
            a. Type:
               1. Drying: water evaporation type unless application is;
                  a. In cold weather
                  b. Required to be Setting Compound by type of tape such as mesh fiberglass
                  c. Required by application
                  d. Required by sheathing mfgr.
            b. Mfgr: USG
            c. Brand: Sheetrock
            d. Tape Product: Joint Tape – Heavy
            e. Treatment Compound:
               1. Product:
                  a. Initial installation of tape:
                     1. Product: Taping Compound
                  b. Secondary and final finishing compound:
                     1. Product: Toping Compound or Plus Three Compound
                  c. Skim Coat:
                     1. Product: Plus Three Compound

         1. Smooth Wall / Level 5 – Skim Coat
            a. Mfgr: USG
            b. Texture Designation: Smooth Wall, Level 4
            c. Schedule:
               a. Fire Control Room
               b. Equipment Bay
               2. Sealer /Primer Coat: Level 4 and 5 finish
               3. Material: Gypsum board sealer/primer
               4. Product: First Coat, Sheetrock brand
               5. Application: Spray applied over entire surface
               6. Note: This is in addition to painters primer to be installed per Section 09 90 00 – Painting and Coatings.

PART 3 - EXECUTION
3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 MOCK-UP

A. Erect at location approved by **Architect**.
   1. Mock-up shall be part of final construction once approved by **Architect**.
   2. Mock-up shall comprise of all components and finishes as specified and indicated in Drawings.
      a. Texture
      b. Level 4 finish

B. Mock-up
   1. Size: 6' x 6'
   2. Qty: One (1) each for each wall surface condition and finish

3.05 INSTALLATION

A. General:
   1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
   2. Perform work in accordance with herein listed standards.
   3. Install with fiberglass tape at gypsum board requiring it as herein specified and required by mfgr.

B. Sheet arrangement layout: Conform to layouts and requirements indicated; use long sheets to restrict joints to minimum.
   1. Edges of sheathing shall not align with the vertical and/or horizontal edges of window and/or door openings.

C. Interior Joints:
   1. Perform work in accordance with gypsum board mfgr's requirements and to meet smooth wall and/or textured wall surface

D. Typical:
   1. Fasteners:
      a. Place fasteners 3/8 inch from edges of boards, except when using washers or clips with fasteners in joint.
      b. Install fasteners with heads dimpled slightly below surface; do not cut through skin.
      c. Space fasteners in accordance with ASTM C840 and manufacturer's recommendations, except as otherwise required by CBC.
      d. Install type of fastener and length in accordance with sheathing manufacturer.
      e. All ends and edges of all gypsum wallboard shall occur over framing members, except when joints are at right angles to framing members.
   2. Ceilings:
      a. General:
         1. Place boards with long dimension at right angles to supports and end joints occurring over supports.
         2. Place perimeters of ceilings and edges of openings over solid bearing members.

b. Maximum joist spacing shall not exceed 12” O.C.

3. Partitions: Place boards with long dimension either vertical or horizontal (but not combination of both) on studs. Stagger joints on opposite sides of partitions. Locate joints at least 12 inches from jambs of openings. Keep end joints to minimum. Fasten double layer gypsum board as required by code, stagger joints in second layer.
4. Caulking: Using double bead of specified material, install at floors, wall intersections, where walls abut other materials and at all electrical boxes. Install wherever caulking materials is indicated in connection with gypsum board. Apply in accordance with manufacturer's printed directions.
5. Cutting and scribing: Cut neatly to fit around outlets, switch boxes and other protrusions, using keyhole saw or specially designed cutting tool for opening of exact shape and size needed.
6. Trim: Edge exterior corners with bead set to true, plumb line. Where gypsum board joins or abuts any material other than gypsum board, cover end of board with metal casing, leaving joint sufficient for installation of caulking (refer to Article 3.03 F above).

E. Finishing
1. Matrix: Joint treatment and Skim coat treatment:
a. USG matrix of materials and level of finish
1. For other products indicated, match that manufacturer’s installation recommendations.

		Ready-Mixed Joint Compounds				Drying-Type Joint Compounds				Setting-Type Joint Compounds	
	First Coat	Taping	Topping	All-Purpose	Plus 3	Taping	Topping	All-Purpose	AP Lite	Durabond®	Easy Sand™
Level 0											
Not Used											
Level 1											
Embedding		■		■	■	■		■	■	■	■
Level 2											
Embedding		■		■	■	■		■	■	■	■
Fill			■	■	■		■	■	■	■	■
Level 3											
Embedding		■		■	■	■		■	■	■	■
Fill			■	■	■		■	■	■	■	■
Primer	■										
Level 4											
Embedding		■		■	■	■		■	■	■	■
Fill			■	■	■		■	■	■	■	■
Finish			■	■	■		■	■	■	■	■
Primer	■										
Level 5											
Embedding		■		■	■	■		■	■	■	■
Fill			■	■	■		■	■	■	■	■
Finish			■	■	■		■	■	■	■	■
Skim/Darby				■	■						

Primer	■										

2. Levels Schedule
   a. **Levels of Finish.** The following levels of finish are established as a guide for specific final decoration and/or Smooth Wall finish and are a minimum standard for each condition.
      1. **Level 4:**
         a. Schedule:
            1. Use at all conditions
            2. Texture; refer to Heading 2.05 for required texture.
         b. Application:
            1. All joints, fasteners, exterior angles, reveals and interior angles shall have tape embedded in joint compound and **three** separate coats of joint compound applied over all joints, fasteners, angles, fastener heads, and accessories. All joint compounds shall be smooth and free of tool marks and ridges. Refer to Heading 2.04 for schedule of specific products.
               a. Taping Compound width schedule:
                  1. First coat: 8” wide
                  2. Second coat: 10” wide
                  3. Third coat: 12” wide
               b. Primer/Sealer: yes, entire gypsum board surface including treated joints, exterior angles, interior angles, reveals, fasteners, etc. shall be coated with a primer/sealer prior to the application of final finishes.
                  1. Gypsum board primer/sealer must be applied as a requirement of this specification section in addition to any and all requirements of primer and paint specified and installed under Section 09 90 00 – Painting and Coatings.
         c. Limitations:
            1. At un-backed vinyl wall covering apply a Level 5 finish to wall substrate

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer’s recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor’s NOTICE** of “Certificate of Substantial Completion”.

END SECTION

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Base

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. Aluminum Association (AA), www.aluminum.org
E. American Society For Testing and Materials (ASTM), www.astm.org
   1. ASTM C 1028 – Evaluating the Static Coefficient of Friction of Ceramic Time and Other Like
   2. ASTM E 648 – Standard test method for critical radiant flux of floor covering systems using a radiant heat source
F. Ceramic Tile Institute (TCA), www.ctioa.org
   1. Handbook for Ceramic Tile Installation
G. International Code Council (ICC), www.iccsafe.org
H. National Sanitation Foundation (NSF), www.nsf.org
I. Occupational Safety and Health Administration (OSHA), www.osha.gov

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Installed Moldings	Accessible, change in level	Are accessible	ADA, Section 4.5.2 (Change in Level) & Section 4.5.3 (Carpet-Edge Trim Compliance)
Moldings	Flammability	Class 1, FS = 110 SDD = 870 Fuel Contribution = 55	ASTM E 648
Moldings	Fire Rating	Class 1	ASTM E 648
Refer to drawings and as herein specified			

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
   1. Primers

2. Cut sheet of each product type with color selections
3. Adhesive for each product type

E. Submit samples.
1. Of each product type x 6" long

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing similar size projects and complexity.
D. Lead Times**:**
1. **General Contractor** shall coordinate with supplier to verify product lead times during bids and at award of contract, and account for such lead times in their costs and schedules.
2. **General Contractor** shall provide an itemized list of materials which might have or are confirmed to have a lead time problem and what the anticipated lead time is.
3. **General Contractor** shall certify in writing that all materials have acceptable lead times as they relate to availability for sub-contractor and **General Contractor** to meet construction schedule and sequence of construction.

E. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid
F. Stipulations:
1. Products shall be approved for each application

G. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
1. Agenda for meeting shall include, but not be limited to;
a. Various heights of finish flooring and compliance with accessibility criteria related to slopes, changes in heights, etc.
2. **General Contractor** shall request meeting 5 days in advance of construction.

H. Miscellaneous criteria:
1. Installation of transition trim, moldings, etc. shall not be installed until shop drawing of layout is reviewed.

I. Miscellaneous criteria:
1. Installation of transition trim, moldings, etc. shall not be installed until shop drawing of layout is reviewed.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.

1.07 JOB CONDITIONS

A. Field-verify that all components, substrates, backing, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

C. Furnish manufacturer's additional two (2) year warranty agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship for all moldings.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Substrate
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 03 30 00 – Cast-in-Place Concrete
   3. Section 03 00 61 – Concrete Floor Leveling, Patching and Grouting – Cementitious
   4. Section 09 97 23 – Concrete Sealer
C. Related Documents include, but are not limited to the following:
   1. Division 1 Supplementary Conditions

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.
C. Schedule slab vapor emission and PH testing of concrete floors prior to the installation of finish flooring.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer.
B. Acceptable manufacturer shall be one of the following and as herein listed and in Drawings:
   1. BurkeMercer, www.burkemercer.com
   2. Johnsonite, www.johnsonite.com
   3. Loxcreen Flooring Group, Bengard line, www.loxcreenflooring.com
   4. BENGARD, www.dura-trim.com
   5. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. Base

1.	Mfgr:	Burke Mercer, www.burkemercer.com
2.	Material:	100% First Quality Homopolymer Vinyl, UNO
3.	Profile:	4" coved base
4.	Color:	As selected by **Architect** for each condition from manufacturer's full line of colors

2.03 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the **General Contractor** subject to the approval of the **Architect**.
B. Sealant
   1. Mfgr: BurkeMercer, www.burkemercer.com
   2. Applications: Touch-up / Filler for minimal gaps & irregularities.
   3. Model: Color Caulk
   4. Color: To match molding color
C. Accessories
   1. Mfgr: BurkeMercer, www.burkemercer.com
   2. Schedule:
      a. Vinyl Track Extenders
      b. Model: 975

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.04 INSTALLATION

A. General:
   1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.

3.05 MAINTENANCE

A. Product shall be installed, cleaned and sealed as herein specified and in accordance with each specific flooring manufacturers recommendations to maintain the following of their installed product, but not limited to;
   1. Slip Resistance
   2. Slip Resistance Coefficient of Friction of 0.6.
   3. Warrantee requirements
B. Product shall be maintained by **Owner** after occupancy to maintain the Slip Resistance and coefficient of friction rating.
C. Refer also to PROTECTION AND CLEAN UP heading.

3.06 FIELD QUALITY CONTROL

A. Product manufacturer shall provide field service support as requested by the Installer/Applicator
   1. **General Contractor** and the product manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications.
   2. The Applicator shall be responsible for the proper application of the materials.

B. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.
C. The sealant applicator shall certify in writing that the sealant application is in accordance with the sealant manufacturer's recommendations

3.07 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition, so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
    1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
    1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

09 90 00
PAINTING AND COATINGS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, Division 0, and Division 1 requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable extents of work at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other Sections of Work.
   2. Painting in any room in which finishing work is performed, including painting new surfaces as specified and repainting all existing painted surfaces one coat same as last coat specified for similar new work.
   3. Painting of all exposed and semi-exposed surfaces.
   4. Painting of all surfaces indicated in Drawings, and as herein specified.
   5. Painting the primer for wall finish (in addition to and) after Drywall primer/sealer is installed per Section 09 29 00.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. American Society for Testing and Materials:
   1. ASTM D523 Standard Test Method for Specular Gloss
E. Gypsum Association (GA)
   1. GA-232 Painting New Gypsum Board
F. National Fire Protection Agency (NFPA), www.nfpa.org
   1. NFPA 703 - Standard for Fire-Retardant Treated Wood and Fire-Retardant Coatings for Building Materials
G. The Society for Protective Coatings (SSPC), www.sspc.org

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Interior Applied Paints	V.O.C.	Comply with California Criteria and as herein required when more restrictive.	California Air Resources Board (CARB) or local AHJ whichever is more stringent
			South Coast Air Quality Management District Rule 1113
Refer to drawings and as herein specified			

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS AND MOCKUPS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Refer to Division 1 for sustainability requirements
C. Submittals:
   1. Product & Technical Data
   2. MSDS Sheets
   3. Manufacturer Installation Instructions
D. Samples:
   1. Brush Outs:
      a. On 8 x 12 inch heavy cardstock paper, provide four (4) samples of each color, paint type and sheen.
      b. Samples shall be labeled with paint designation number as indicated in drawings and paint type as herein indicated.
      c. Resubmit each sample as requested until acceptable sheen and color is achieved.
D. Mock-Ups:
   1. Erect at location approved by **Architect**.
      a. Size:
         1. Exposed Steel: 4'-0" long section
         2. Gypsum Board: 4'-0" square
      b. Mock-up shall not be part of final construction once approved by **Architect**.
      c. Mock-up shall comprise of all components and finishes as specified and indicated in Drawings.
E. O&M Manuals
   1. As part of O&M (Operation and Maintenance) manual submittals per Division 1 requirements, provide the following:
      a. Two (2) copies of coating maintenance manual, equivalent to Sherwin Williams' "CUSTODIAN"; maintenance manual shall include the following:
         1. Location of manufacturer's paint store closest to the project site
         2. Area summary with finish schedule
         3. Area detail designating where each product, color and finish was used
         4. Product Data Sheets and MSDS sheets for each product used
         5. Color formulations for each color used
         6. Cleaning instructions
         7. Touch up procedures
         8. Color samples of each color and finish used

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer shall have been in business for **five (5)** years providing/installing/finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **ten (10)** years providing similar size projects and complexity.
D. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid.
E. Stipulations:
   1. Steel preparation shall comply with SSPC (Steel Structures Painting Council) guidelines and as herein required when more stringent.
   2. Provide finish coats which are compatible with prime paints used.
      a. Review other Sections of these Specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates.
   3. Number of coats specified herein are minimum; uniform coverage, free from defects or blemishes is required.

F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. **General Contractor** shall request meeting **5 days** in advance of construction.
Agenda for meeting shall include, but not be limited to;
1. Substrate preparation
2. Colors

G. Miscellaneous criteria:
1. Upon request from other subcontractors, furnish information on characteristics of finish materials proposed for use, to ensure that compatible prime coats are used.
   a. Provide barrier coats over incompatible primers or remove and re-prime as required.
   b. Notify **Architect** in writing of any anticipated problems using coating systems as specified with substrates primed by others.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver all materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information, including but not limited to:
1. Product Information:
   a. Paint type
   b. Manufacturer's name, stock number and date of manufacture
   c. Contents by volume, for major pigment and vehicle constituents (VOC)
   d. Thinning instructions
   e. Application instructions
   f. Manufacturer's color name and number
2. Designation Information:
   a. Project paint designation, ie: "P1", "P2", "P3", etc.
   b. Sheen type

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, substrates, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.
B. Apply water-based paints only when temperature of surfaces to be painted and surrounding air temperatures are between 55ºF and 90ºF unless otherwise permitted by paint manufacturer's printed instructions.
C. Apply VOC compliant solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45ºF and 95ºF, unless otherwise permitted by paint manufacturer's printed instructions.
D. Do not apply primers, paint and/or stain in rain, fog, and/or mist, when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
E. Painting may be continued during inclement weather only if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Wall substrates
   2. Floor substrates
   3. Component substrates
   4. Metal substrates
   5. Coordinate with surfaces which might be finished by and/or shop painted

B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 05 12 00 – Structural Steel Framing
   3. Section 05 50 00 – Metal Fabrications
   4. Section 05 52 00 – Metal Railings
   5. Section 07 62 00 – Sheet Metal Flashing and Trim
   6. Section 09 29 00 – Gypsum Board & Sheathing Substrates

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.

B. Schedule required cleaning of substrates prior to the installation of materials, components, etc.

1.13 EXTRA MATERIAL

A. Submit as part of project closeout:
   1. Provide Three (3) 1-gallon containers of extra material in each finish paint type, color, sheet, etc. and in same lot as installed product.
      a. Provide in factory packaged and labeled containers; identify containers with project name, manufacturer's paint system, color name and number, and paint sheen as indicated in documents and in accordance with specifications.
      b. Do not supply anything less the full containers.
      c. For paint that is available only in 5-gallon containers provide one (1) 5-gallon container.
      a. Deliver materials to project premises just prior to substantial completion, and store at location directed by the **Owner**.

1.14 PAINTING EXCLUSIONS AND CLARIFICATIONS

A. Following categories of work are not included as part of field-applied finish work, or are included in other Sections of these Specifications:
   1. Shop priming: Unless otherwise specified, initial shop priming of metal items is included under various Sections for structural steel, miscellaneous metal items, hollow metal work, and similar items, and for such fabricated components, wood casework, and shop-fabricated or factory-built mechanical and electrical equipment or accessories.
      a. This shop priming shall not replace the final priming required as herein specified.
      b. Shop priming shall be compatible with priming and painting as herein specified.
      c. Steel which will be welded in the field shall be primed and painted after erection and shop priming material shall be compatible with painting products as herein specified.
   2. Pre-finished items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) toilet partitions, finish hardware, plastic laminate casework, exterior insulation system, carpeting, ceramic tile, louver blinds, knock-down steel or aluminum drywall frames, finished electrical equipment including light fixtures, and finished mechanical equipment.
   3. Concealed surfaces: Unless otherwise indicated, painting is not required on wall or ceiling surfaces in concealed areas and generally inaccessible areas, such as foundation spaces, furred areas, pipe spaces and duct shafts.

a. Fire Control Room, Mechanical and Electrical rooms are to be painted.
b. Back side of all casework shall be painted.

4. Finished metal surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.
5. Operating parts and labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise indicated.
   a. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

B. "Paint" as used herein means all coating systems materials, which includes primers, emulsions, enamels, stain, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
C. Paint all exposed surfaces whether or not colors are designated in any "schedule", except where natural finish of material is specifically noted as surface not to be painted.
   1. Where items or surfaces are not specifically mentioned, use paint systems of adjacent similar materials in color/finish selected by **Architect**.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each paint type.
B. Acceptable manufacturers shall be one of the following, as herein listed and in Drawings:
   1. General Paint:
      a. Sherwin Williams, www.sherwinwilliams.com
      b. Dunn Edwards, www.dunnedwards.com
      c. Benjamin Moore, www.benjaminmoore.com
   2. Specialty Touch-up paint for galvanized framing
      a. ZRC Worldwide, www.zrcworldwide.com
   3. Reviewed Equivalent by **Architect.**
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.

2.02 PRODUCT SCHEDULE - EXTERIOR SURFACES

A. **General:**
   1. Application: Typical for specified type/substrate unless otherwise noted.

B. **Exterior Ferrous Metal (Non-Exposed Steel)**
   1. Substrates: Exterior ferrous and non-galvanized metals, typical u.o.n.
   2. Application: Non-exposed conditions, typical u.o.n.
   3. Product Schedule:

	Application				Manufacturer's Product		
	Product Type	**Sheen**	**Dry Film Thickness (mil)**	**VOC Limit (g/L)**	**Sherwin Williams**	**Alternate: Dunn Edwards**	**Alternate: Benjamin Moore**
1st Coat	Primer	-	5.0-10.0 wet 1.9-3.8 dry	<50	Pro-Industrial Pro-Cryl Universal Acrylic Primer B66 Series	ENDURA-PRIME ENPR00	Ultra Spec HP Acrylic Metal Primer #HP04
2nd & 3rd Coats	Finish	Semi-Gloss	6.0-12.0 wet 2.2-4.2 dry	<50	Pro-Industrial Acrylic B66 Series	ENDURA-PRIME ENPR00	Ultra Spec HP Acrylic DTM #HP29

C. **Exterior Ferrous Metal (Architectural Features / Exposed Steel)**
1. Substrates: Exterior Architecturally Exposed Structural Steel (AESS) and other exposed exterior ferrous metals.
2. Application: Exposed conditions, typical, u.o.n.
3. Exceptions:
   a. Flashing:
      1. Associated with storefront, curtain wall and/or window wall, Section 08 41 00 shall be provided by storefront / curtain wall manufacturer and have same finish as storefront / curtain wall, U.N.O.
4. Product Schedule:

	Application				Manufacturer's Product		
	Product Type	**Sheen**	**Dry Film Thickness (mil)**	**VOC Limit (g/L)**	**Sherwin Williams**	**Alternate: Dunn Edwards**	**Alternate: Benjamin Moore**
1st Coat	Primer	Low Sheen	5.0-10.0 wet 1.8-3.6 dry	<100	ProIndustrial ProCryl Universal Acrylic Primer B66-310	US Coatings EpoxyGrip 2300	Acrylic Metal Primer #HP04
2nd & 3rd Coats	Finish	Gloss	4.0-5.0 wet 1.4-1.7 dry	<50	ProIndustrial Waterbased Alkyd Urethane B53-1050 Series (Gloss)	US Coatings UreGrip 3000 HS VO	Ultra Spec HP D.T.M. system: Gloss #HP28

D. **Exterior Galvanized Metal & Aluminum, typical u.o.n.**
1. Substrates:
   a. Exterior Galvanized Metals, typical u.o.n. (includes reveals and expansion joints unless specifically noted not to be painted)
   b. Aluminum
2. Application: Typical u.o.n., excluding galvanized handrail and guardrail assemblies
3. Exceptions:
   a. Flashing:
      1. Associated with storefront, curtain wall and/or window wall, Section 08 41 00 shall be provided by storefront / curtain wall manufacturer and have same finish as storefront / curtain wall, U.N.O.
4. Product Schedule:

	Application				Manufacturer's Product		
	Product Type	**Sheen**	**Dry Film Thickness (mil)**	**VOC Limit (g/L)**	**Sherwin Williams**	**Alternate: Dunn Edwards**	**Alternate:Benjamin Moore**
1st Coat	Primer	-	5.0-10.0 wet 1.9-3.8 dry	<50	Pro-Industrial Pro-Cryl Universal Acrylic Primer B66 Series	ULTRA-SHIELD Galvaninzed Metal Primer ULGM00	Ultra Spec HP Acrylic Metal Primer #HP04

2nd & 3rd Coats	Finish	Semi-Gloss	6.0-12.0 wet 2.2-4.2 dry	<50	Pro-Industrial Acrylic B66 Series	ENDURA-COAT ENCT50	Ultra Spec HP Acrylic D.T.M. #HP29

2.03 PRODUCT SCHEDULE - INTERIOR SURFACES

E. **Interior Aluminum, Ferrous Metal (Non-exposed), and Galvanized Metal**

1. Substrates:
   a. Aluminum
   b. Interior ferrous metals, typical u.o.n.
   c. Galvanized metals, typical u.o.n. (excluding handrail and guardrails)
2. Application: Non-exposed conditions, typical u.o.n.
3. Exceptions:
   a. Flashing:
      1. Associated with storefront, curtain wall and/or window wall, Section 08 41 00 shall be provided by storefront / curtain wall manufacturer and have same finish as storefront / curtain wall, U.N.O.
   b. Reveals, expansion joints, etc
      1. Finish:
         a. Painted per Section 09 90 00 – Painting and Coatings
4. Product Schedule:

	Application				**Manufacturer's Product**		
	Product Type	**Sheen**	**Dry Film Thickness (mil)**	**VOC Limit (g/L)**	**Sherwin Williams**	**Alternate: Dunn Edwards**	**Alternate: Benjamin Moore**
1st Coat	Primer	-	5.0-10.0 wet 1.9-3.8 dry	<50	Pro-Industrial Pro-Cryl Universal Acrylic Primer B66 Series	ENDURA-PRIME Metal Primer ENPR00	Ultra Spec HP Acrylic Metal Primer #HP04
2nd & 3rd Coats	Finish	Semi-Gloss Eg-Shel	4.0 wet 1.7 dry	<50	Solo A75 (Eg-Shel)	SPARTA Series SWLL30 (Egg Shell)	Ultra Spec 500 Zero VOC Interior Latex #538 (Eggshell))

F. **Gypsum Board Walls & Ceilings**

1. Substrates: Gypsum Board substrates per Section 09 29 00 – Gypsum Board & Sheathing Substrates.
2. Application: Typical, u.o.n.
3. Product Schedule:

	Application				**Manufacturer's Product**		
	Product Type	**Sheen**	**Dry Film Thickness (mil)**	**VOC Limit (g/L)**	**Sherwin Williams**	**Alternate: Dunn Edwards**	**Alternate: Benjamin Moore**

1st Coat	Primer	-	4.0 wet 1.0 dry	<50	ProMar 200 Zero VOC Latex Primer B28 Series	VINYLASTIC Select VNSL00	Ultra Spec 500 Latex Primer #534
2nd & 3rd Coats	Finish	Refer to Interior Finish Legend	5.0-12.0 wet 2.0-5.0 dry	<50	Pro-Industrial Water Based Catalyzed Epoxy Part A B73 Series	US Coatings AquaGrip 2600	Corotech Pre Catalyzed Waterborne Epoxy V341
4TH Coat	Hardener		5.0-12.0 wet 2.0-5.0 dry	<50	Pro-Industrial Water Based Catalyzed Epoxy Part B B73 Series	US Coatings AquaGrip 2600	Single component

G. **Interior TRAFFIC MARKING**
1. Substrate:
   a. Concrete
   b. Asphalt
   c. Brick
2. Specified in "Pavement Markings Section 32 17 23"
3. VOCs: Compliant with current SCAQMD VOC requirements.

H. **Interior GALVANIZED REPAIR PAINT**: (Coordinate with Specifications containing galvanized metal)
1. Mfgr: ZRC Worldwide, www.zrcworldwide.com, 800.831-3275
2. Product: ZRC ZERO VOC Water-Based Galvanizing Compound
3. Type: Two-pack Water-Based Galvanizing Compound
4. Standards: (Meets or exceeds)
   a. ISO 9001 registered
   b. MIL-P-26915A (USAF Zinc dust Primer)
   c. SSPC-Paint 20 (Specification for Zinc Rich Primer)
   d. ASTM Des. A239 Preece Test for hot dipping galvanizing
   e. ASTM Des B117 10,000 salt spray without failure
   f. VOCs: Compliant with current SCAQMD VOC requirements
5. Material:
   a. 93% Zinc in the dry film using Type III "ultra-pure" ASTM-D-520 zinc
6. Preparation:
   a. Grease & Oils: Solvent clean to SSPC-SP1
   b. Rust Scale: Power tool clean to SSPC-SP3 or SSPC-SP11 (SIS St. 2 or 3)
      1. Sand blast (SSPC-SP6) at exterior exposed conditions.
   c. Mill Scale: Sandblast to SSPC-SP6
   d. Water Immersion: (100 degree F max.) Sandblast to SSPC-SP10 (near-white)

2.04 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Applicator must examine areas and conditions under which painting work is to be performed and notify **General Contractor** in writing of conditions detrimental to proper and timely completion of work.
1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.
2. Confirm water vapor emission of concrete surfaces to be painted do not exceed manufacturer's recommendations.

3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of durable paint film
4. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to applicator.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.
   1. General:
      a. Perform all preparation and cleaning procedures in strict accordance with paint/stain manufacturer's instructions and as herein specified, for each particular substrate condition.
      b. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items by workmen skilled in trades involved.
      c. Clean surfaces to be painted before applying material.
         1. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program cleaning and painting so that dust and other contaminants from cleaning process will not fall in wet, newly painted surfaces.
         2. Shot blast all area's to remove rust and other contaminants in accordance with SSPC guidelines.
   2. Metal / Steel:
      a. Ferrous metals:
         1. Clean non-galvanized, ferrous surfaces that have not been shop-coated of all oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning, complying with Steel Structures Painting Council (SSPC)-SP3.
         2. Sand blast all non-galvanized, ferrous surfaces that have not been shop-coated of all rust and other foreign substances by mechanical blast cleaning, complying with Steel Structures Painting Council (SSPC)-SP6.
         3. Comply with SSPC guidelines in addition to these instructions.
      b. Galvanized surfaces
         1. Clean free of oil and surface contaminates with acceptable non-petroleum based solvent.
         2. Comply with SSPC guidelines in addition to these instructions.
      c. Metal Decking
         1. Factory Primed:
            a. Field fog finish painted for acoustical deck locations, coordinate with metal deck manufacturer.
         2. Factory Finish Painted:
            a. Field tough up in accordance with this specification and paint in accordance with metal decking Section.
   3. Exposed Architectural Steel: (Structural and non-structural components included)
      a. All steel that is exposed to view at interior & exterior shall be cleaned, prepared and primed for an Architectural painted finish.
         1. Ferrous metals:
            a. Clean non-galvanized, ferrous surfaces that have not been shop-coated of all oil, grease, dirt, loose mill scale and other foreign substances by solvent and mechanical cleaning, complying with Steel Structures Painting Council (SSPC)-SP3.

b. Sandblast all non-galvanized, ferrous surfaces that have been shop-coated of all rust and other foreign substances by mechanical blast cleaning, complying with Steel Structures Painting Council (SSPC)-SP6.
c. Clean all non-galvanized, ferrous surfaces that have been shop-coated of all foreign substances by chemical cleaning, complying with Steel Structures Painting Council (SSPC)
d. Comply with SSPC guidelines in addition to these instructions.
e. Remove all burrs / scratches, etc.
f. Prepare all surfaces to be smooth – fill voids & imperfections to achieve smooth surfaces.

b. Galvanized surfaces
1. Clean free of oil and surface contaminates with acceptable non-petroleum based solvent.
2. Prepare all surfaces to be smooth – fill voids & imperfections to achieve smooth surfaces.
3. Remove all burrs / scratches, etc.
4. Fill all gaps left where welding occurs between two items to achieve a continuous & even joint.
5. Comply with SSPC guidelines in addition to these instructions.

4. Concrete:
a. Clean concrete surfaces to be painted of dirt, oil, or other foreign substances with scrapers, VOC compliant cleaners, and sandpaper, as required.
b. Prime concrete as required by paint manufacturer.
c. Tape the locations for stair tread stripes to install true and straight edges of contrasting stripes.

3.04 INSTALLATION

A. General:
1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
2. Apply paint by brush, roller, spray, or other acceptable practice in accordance with manufacturer's directions.
a. Use brushes best suited for type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by paint manufacturer for material and texture required.
1. Roll apply 1st coat of paint typical at all wall and ceiling applications.
2. Install finish coats with sprayer at all interior and exterior exposed Architectural/structural steel locations.
3. Number of coats and paint film thickness required is same regardless of application method. Do not apply succeeding coats until previous coat has completely dried and inspected. Sand between each enamel or varnish coat application with fine sandpaper or rub surfaces with pumice stone where required to produce even, smooth surface in accordance with manufacturer's directions.
4. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive film thickness equivalent to that of flat surfaces.
5. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts, where visible through registers or grilles, and other surfaces indicated on Drawings with flat non-specular black paint, before final installation of equipment.
7. Paint back sides of access panels, removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges same as exterior faces, unless otherwise indicated.

9. Painting of mechanical and electrical work is limited to those items exposed in Mechanical Equipment Rooms and in occupied spaces.
10. Doors: Finish tops, bottoms and edges of doors to provide same appearance as balance of door; re-seal all trimmed edges and mortising on factory sealed doors immediately after fitting by the finish carpenter.
11. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

B. Mechanical items to be painted include, but are not limited to, following:
1. Piping, pipe hangers, and supports, when exposed in finished spaces.
2. Motors, mechanical equipment, and supports.
3. Accessory items.

C. Electrical items to be painted include, but are not limited to, following:
1. Conduit and fittings.
2. Switchgear.

D. Minimum coating thickness: Apply each material at not less than manufacturer's recommended spreading rate, to provide total dry film thickness as indicated.

E. Prime coats: Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure finish coat with no burn-through or other defects due to insufficient sealing.

F. Scheduling painting: Apply first-coat material to surfaces that have been cleaned, pre-treated, primed and/or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. All materials shall be applied and cut in neatly to ensure uniform drying to the color and sheen specified, free from runs, sags, wrinkles, shiners, streaks and brush marks.
2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of under coat.
3. Each coat of paint or finish must be inspected and approved before application of the succeeding specified coat, failure to comply with the inspection and approval requirements for successive coats will necessitate recoating at the painting contractor's expense wherever work is not properly credited. The painting contractor must furnish a report of each coat applied when completed for inspection and approval to comply with the above. Notify the **Architect** in advance of completed coats to be inspected.

G. Pigmented (opaque) finishes: Completely cover to provide opaque, smooth surface of uniform finish, color, appearance, and coverage.
1. Vary each coat of paint in shade from the preceding coat in a manner which renders each coat readily distinguishable without affecting finish color. Touch up all blemishes.

H. Transparent (clear) finishes: On exposed portions, use multiple coats to produce glass-smooth surface film continuity of even luster. Provide finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

I. Brush application: Brush-out and work all brush coats onto surfaces in even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass and color break lines.

J. Mechanical applicators: Use mechanical methods for paint application when permitted by governing ordinances and trade union regulations. If permitted, limit to only those surfaces impracticable for brush applications.
1. Limit roller application (generally) to interior wall and ceiling finishes for second and third coats. Apply each roller coat to provide equivalent hiding as brush-applied coats.
2. Where spray application is used, apply each coat to provide equivalent hiding of brush-applied primer. Do not double back with spray equipment for purpose of building up film thickness of two coats in one pass.

3.05 FIELD QUALITY CONTROL

A. Product Manufacturer shall provide field service support as requested by the Installer/Applicator

B. **General Contractor** and the Product Manufacturer shall make periodic on-site inspections to ensure that the materials are being installed in strict accordance with manufacturer's specifications. The Applicator shall be responsible for the proper application of the materials.
C. The Applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
    1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
    1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

09 97 23
CONCRETE SEALER
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable extents of work at the jobsite and coordinate with **General Contractor**.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Cleaning of concrete floor slab surface and installation of Floor Finish Sealer for concrete floors not designated to receive another floor finish.
      a. Clean Interior Concrete floor substrate in accordance with manufacturer's recommendations, refer to Section 03 00 51.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. Environmental Regulations
   1. Comply with applicable federal, state, and local environmental regulations including testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes and cleaning effluents.
   2. All materials used shall not exceed maximum VOC amounts as listed by agencies having jurisdiction.

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturers standards

Standards:

Item	Name of Test	Performance	Testing Std.
Floor slab – after sealing	Slip Resistance Coefficient of Friction	0.6 min level to 5%	ASTM C 1028
Ramps – after sealing	Slip Resistance Coefficient of Friction	0.8 min >than 5%	ASTM C 1028
Refer to drawings and as herein specified			

B. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

Construction Testing:

Item	Name of Test	Performance	Testing Std.
Floor slab – after sealing	Slip Resistance Coefficient of Friction	Comply	ASTM C 1028
Ramps – after sealing	Slip Resistance Coefficient of Friction	Comply	ASTM C 1028
Refer to drawings and as herein specified			

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.

B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.
   1. Include manufacturer's technical information and cleaning agent label analysis with application instructions for each material proposed for use.
   2. List each material and cross-reference to specific cleaning material for finish system and application. Identify by manufacturer's catalog number and general classification.
E. Submit samples:
   1. Provide listing of material and application for each finish sample.
      a. On actual substrate surfaces', provide 1 sample of applied sealer.
      b. Label and identify each as to location and application.
F. Applicator Qualifications: Submit qualifications of applicator.
   1. Certification stating applicator is experienced in the application of the specified products.
G. Environmental Regulations: Submit description for testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes, cleaning and sealing effluents. Describe any hazardous materials to be cleaned from substrates. Submit applicable local environmental regulations.
H. Protection: Submit description for protecting surrounding areas, building occupants, pedestrians, and non-concrete surfaces during the work from contact with concrete cleaners, residues, rinse water, fumes, wastes, cleaning effluents and sealer.
I. Surface Preparation: Submit description for surface preparation of substrates to be completed before application of concrete sealers.
J. Application: Submit description for application procedures of concrete sealers.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing similar size projects and complexity.
D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
   1. **General Contractor** shall request meeting 5 days in advance of construction.
E. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site periodically during installation work to review installation procedures.
   2. Manufacturer's representative shall review and certify all phases of construction to verify the complete work meets specification requirements.
   3. Written certification of all phases of construction shall be sent to the **Architect** by the manufacturer's representative.
   4. Cleaning and sealing.
      a. Require attendance of parties directly affecting work of this section, including the **General Contractor** , applicator, and product representative. Review environmental regulations, test panel procedures, protection of surrounding areas and non-concrete surfaces, surface preparation, application, field quality control, final cleaning sealing and coordination with other work.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Delivery:
   1. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
   2. Storage and Handling:

a. Store containers upright in a cool, dry, well ventilated place, out of the sun. Store away from all other chemicals and potential sources of contamination. Keep lights, fire, sparks, and heat away from containers. Do not drop containers or slide across sharp objects. Keep containers tightly closed when not in use. Store and handle materials in accordance with manufacturers written instructions.

C. Precautionary Measures:
   1. Contains ester alcohol and glycol ethers. Wear rubber gloves and protective clothing to avoid contact with eyes and skin. Wash thoroughly after handling. Avoid breathing fumes. Apply in areas that are well ventilated. Do not cross ventilate while treated surfaces are drying. Keep container tightly closed when not dispensing product.
   2. Do not use for applications other than specified. Dispose of empty containers according to federal, state and local regulations. Read Material Safety Data Sheet for additional safety and health hazard information.

D. First Aid Instructions
   1. **Eye Contact:** Flush with large amounts of water for 15 minutes, holding eyelids apart to ensure flushing of the entire eye surface. Get medical attention.
   2. **Skin Contact:** Wash with soap and water. Remove contaminated clothing and launder before reuse. If persistent irritation occurs, get medical attention.
   3. **Inhalation:** Remove to fresh air. Provide oxygen if breathing is difficult. Give artificial respiration if not breathing. Get medical attention.
   4. **Ingestion:** If swallowed, dilute by drinking 2 glasses of water and call a physician. Never give anything by mouth to an unconscious person.

E. Spill or Leak Procedures
   1. Keep spectators away as floor may be slippery. Dike and contain the spill with material such as sand or fuller's earth. Flush area with water to remove trace residue. If appropriate, transfer liquid and solid diking material to separate container for recovery or disposal. Dispose of in accordance with local, state and federal regulations.
   2. Keep out of surface water and watercourses or sewers entering or leading to surface waters.

F. Container Handling and Storage
   1. Sore in a cool dry place. Keep container out of sun and away from heat and open flames. Store at temperatures below 120ºF and above 40ºF. Vent containers frequently and more often in warm temperatures to relieve pressure. Do not use pressure to empty container. Do not wash out container to use for any other purpose. Emptied containers retain product residue and all appropriate cautionary measures should be observed. Do not cut, drill, grind or weld on or near this container. Do not drop onto or slide across sharp objects.

1.07 JOB CONDITIONS

A. Do not clean concrete surfaces when temperatures are below freezing or will be overnight, to avoid harm to concrete. Clean concrete surfaces only when air and concrete surface temperatures are 40ºF and above. Allow adequate time for concrete to thaw if freezing conditions exist before application.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.
C. Furnish manufacturer's additional **two (2)** year warranty agreeing to repair and/or replace work

which has failed as a result of defects in materials or workmanship.

1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner.**

1.10 RELATED WORK / SECTIONS

A. Related work includes, but is not limited to, the following:
   1. Floor Substrate
   2. Floor Cleaning

B. Related Sections include, but are not limited to, the following:
   1. Division 1
   2. Section 03 30 00 – Cast-In-Place Concrete
   3. Section 03 00 51 – Concrete Cleaning
   4. Section 03 00 61 – Concrete Floor Leveling, Patching & Grouting - Cementitious

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the sealer.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.

B. Schedule required testing, prior to the installation of materials, components, etc.

C. **General Contractor** shall coordinate slab vapor emission and PH testing of concrete floors and ensure that concrete treatment within criteria of finish flooring is complete prior to the installation of finish flooring as herein specified.

1.13 EXTRA MATERIAL

A. Submit as part of project closeout:
   1. Provide extra material for each product type, color, finish, etc. in same lot as installed product.
      b. Furnish written certification that extra materials supplied have been inspected and reconfirmed to be the same as those used in the Work.
   5. Provide extra material in unopened fully labeled containers
      a. Do not supply anything less the full carton containers.
      b. Furnish in factory packaged and labeled cartons and identify cartons with Project name.
      c. Deliver materials to project premises just prior to substantial completion, and store at location directed by the **Owner.**
   6. Provide the following:
      a. Two gallons

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer.

B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
   1. W.R. Meadows, SealTight, www.wrmeadows.com 800.342-5976
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.

D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. Refer to manufacturer's product data sheets & contact product representative to determine the appropriate concrete cleaners and method of cleaning to be submitted & used.
   1. Cleaner: Refer to Section 03 00 51 – Concrete Cleaning
   2. Interior Sealer:
      a. Manufacturer: W.R. Meadows
      b. Product: BELLATRIX
      c. Type: Water based hybrid system
      d. Application: Concrete

2.03 OTHER MATERIALS

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

2.04 PRODUCT SCHEDULE

A. **General:**
   1. Application: Typical for specified Rooms unless otherwise noted.
B. Slab on Grade: All rooms/spaces
C. Concrete filled metal deck: Mezzanine floor

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.
B. Apply all specified sealants and caulking and allow to cure before cleaning and sealing process begins.
C. Confirm that concrete has cured for allowable period of time in accordance with sealer requirements.
D. Surface to be treated must be clean of all dirt, dust and contaminates and thoroughly dry. The pressure of moisture within the floor will inhibit penetration, reducing the surface life of the coating. It may also cause blushing. If surface cleaning is necessary, allow a minimum of 48 hours (75ºF – 60% humidity) drying time before application of sealer. All mortar and underbleeding should be completely cured and thoroughly dry.

3.04 PRETESTING

A. Always test each type of surface before overall application to ensure suitability and desired results. Tests areas should be applied according to the following procedures and allowed to dry thoroughly before inspection by the project **Architect**.
B. Before full-scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces. Apply each concrete cleaner to test panels to determine dilution rates, dwell times, number of applications, compatibility, effectiveness, application procedures, effects of pressure rinsing, and desired results.
C. Apply concrete sealer to test appearance and application in accordance with manufacturer's written instructions. Allow 48 hours or until test panels are thoroughly dry before evaluating final appearance and results. Do not begin full-scale application until test panels are inspected and approved by the **Architect**.
D. Test Panel Requirements:
   1. Size: Minimum 4 feet by 4 feet each.
   2. Locations: As determined by the **Architect**.
   3. Number: As required to completely test each concrete cleaner with each type of substrate to be cleaned.
E. Test all cleaning effluents generated by the concrete cleaning of the test panels to determine any hazardous characteristics. Comply with applicable federal, state, and local environmental regulations including testing, handing, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes.
F. Retain and protect test panels approved by the **Architect** in undisturbed condition during the work of this section, to be used as a standard for judging the concrete cleaning work.

3.05 INSTALLATION

A. **General:** Apply concrete sealers to substrates in accordance with manufacturers written instructions, environmental regulations, and application procedures determined from test panel results approved by the **Architect**. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.
B. **Dilutions:** Use in concentrate or dilute with up to 3 parts water for desired finish. Allow 1 hour between coats
C. Instructions:
   1. Apply a thin even coat of Top Coat with a brush or lamb’s wool applicator. Under normal conditions, Top Coat will dry in 1 hour.
   2. Additional applications may be necessary to provide a uniform appearance on porous surfaces. Allow 1 hour between coats
   3. Allow treated surfaces to dry thoroughly before polishing or burnishing

3.06 FIELD QUALITY CONTROL

A. Inspection: Inspect the concrete cleaning work with the **General Contractor**, **Architect**, applicator, and product representative, and compare with test panel results approved by the **Architect**. Determine if the substrates are suitably clean.
B. Manufacturer's Field Services: Provide the services of a manufacturer's authorized field representative to verify specified products are used, and protection, surface preparation, and application of concrete cleaners are in accordance with the manufacturer's written instructions and the test panel results approved by the **Architect**.

3.07 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition, so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.

D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
    1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

10 14 00
SIGNAGE
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, Division 0 and Division 1 requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work required by project conditions, including, but not limited to:
   1. Code and ADA required signage:
      a. All signage shall meet with standards and codes as herein listed, whether listed or not, and comply with the most restrictive requirements.
   2. Accessories:
      a. Adhesives, fasteners and accessories, as required for complete installed assembly, specified or not.
      b. Posts and concrete footings.
      c. Gravel

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
D. International Code Council (ICC), www.iccsafe.org
E. Refer to standards herein listed with specific products/materials.

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Comply with Building Code, ADA, and CBC Title 24 most restrictive requirements
B. **Standards:**

Item	Name of Test	Performance	Testing Standard
Signage and Identification	General	Comply	California Building Code including, but not limited to CBC 11-B Division 7, and CBC Chapter 10 & ATBCB ADAAG.
Raised Characters	Depth	Comply	CBC 11B-703.2.1
	Case	Comply	CBC 11B-703.2.2
	Style	Comply	CBC 11B-703.2.3
	Proportions	Comply	CBC 11B-703.2.4
	Character height	Comply	CBC 11B-703.2.5
	Stroke thickness	Comply	CBC 11B-703.2.6
	Character spacing	Comply	CBC 11B-703.2.7
	Line spacing	Comply	CBC 11B-703.2.8
	Format	Comply	CBC 11B-703.2.9
Braille	Type	Comply	CBC 11B-703.3
	Dimensions & capitalization	Comply	CBC 11B-703.3.1 Table 11B-703.3.1
	Position	Comply	CBC 11B-703.3.2

Installation height and placement	Tactile signs (except for tactile characters at elevator car controls)	Comply	CBC 11B-703.4.1
	Location	Comply	CBC 11B-703.4.2
Visual Characters (non-Tactile signs)	Finish and Contrast	Comply	CBC 11B-703.5.1
	Case	Comply	CBC 11B-703.5.2
	Style	Comply	CBC 11B-703.5.3
	Character Proportions	Comply	CBC 11B-703.5.4
	Character Height	Comply	CBC 11B-703.5.5
	Height from finish floor or ground	Comply	CBC 11B-703.5.6
	Stroke thickness	Comply	CBC 11B-703.5.7
	Character spacing	Comply	CBC 11B-703.5.8
	Line spacing	Comply	CBC 11B-703.5.9
Pictograms	Pictogram field	Comply	CBC 11B-703.6.1
	Finish and contrast	Comply	CBC 11B-703.6.2
	Text descriptors	Comply	CBC 11B-703.6.3
Symbols of Accessibility	Finish and Contrast	Comply	CBC 11B-703.7.1
	Symbols	International Symbol of Accessibility	CBC 11B-703.7.2.1
		International Symbol of TTY	CBC 11B-703.7.2.2
		Volume Control Telephones	CBC 11B-703.7.2.3
		Assistive Listening Systems	CBC 11B-703.7.2.4
		Cleaner Air Symbol	CBC 11B-703.7.2.5
		Toilet & Bathing Facility geometric symbols	CBC 11B-703.7.2.6
Sign Body	Thickness	1/4", u.n.o.	
Refer to drawings and as herein specified			

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
      a. Refer to product criteria identified herein.

1.04 SUBMITTALS AND MOCK-UPS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit the following for **Architect's** review:
   1. Manufacturer product data and technical data sheets
   2. Product MSDS sheets
   3. Shop drawings
      a. Floor plan showing each sign location
      b. Sign Schedule with sign type, room/location, sign message
      c. Drawings showing each sign configuration, including raised characters, braille and pictograms and colors
      d. Drawings showing poles/posts and footings (for exterior pole mounted signage)
   4. Samples:
      a. Samples of each type of cast, cut or engraved signs including, but not limited to, Braille, Pictorial symbols, and raised characters
      b. 4" x 6" size color samples for selection of signage colors by **Architect**

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver and store products suitable wrapped or packaged to protect against damage. Do not remove protective coverings until time of installation.
   1. Protect finish and edges in accordance with panel manufacturer's recommendations.
   2. Store material in accordance with panel manufacturer's recommendations.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish initial **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Building walls, windows and doors
   2. Site parking, flatwork, paving, footings, etc.
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 08 11 13 – Steel Doors and Frames
   3. Section 09 29 00 – Gypsum Board and Sheathing Substrates
   4. Section 09 90 00 – Painting and Coating

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding maintenance of the materials, finishes, etc.
   2. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.
B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
   1. Signage Manufacturer:
      a. Advance Corporation, Braille-Tac™ Division, www.advancecorp.com
      b. Apco www.apcosigns.com

c. Gemini Incorporated, www.signletters.com
d. In-Pro Signscape, www.inprocorp.com
e. Interface Architectural Signage, Inc., www.interfacedesign.com
f. Mohawk Sign Systems, www.mohawksign.com
g. ProAd Signs, www.proadsigns.com
h. Takeform Architectural Graphics, www.takeform.net

2. Fire Extinguisher Signage:
   a. Seton, www.seton.com
3. Plastic Material:
   a. Rowmark, www.rowmark.com
4. Reviewed Equivalent by **Architect**.
   a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
   b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
   c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS – SITE VEHICULAR, EXITING AND ACCESSIBILITY SIGNAGE

A. General:
1. Refer to details for additional information, design criteria and posts and footing requirements.
2. Coordinate with Section 03 30 00 – Cast-in-Place Concrete
3. Coordinate with Section 05 50 00 – Metal Fabrications.

B. Material:
1. Sign: Stainless steel
2. Text: Powder coated

C. Post Mounted:
1. Posts:
   a. Galvanized steel pipe
2. Footings: Concrete
3. Fasteners:
   a. Type: Tamper resistant machine bolt, washer, lock washer & tamper proof nut
   b. Material: Stainless steel
   c. Size: ¼" dia. X length required

D. Wall Mounted:
1. Fasteners:
   a. Masonry walls:
      1. Type: Drilled expansion anchor/tamper resistant fastener, washer & lock washer
      2. Material: Stainless steel
      3. Size: 3/16" dia. X length to penetrate 1-1/2" min.
   b. Metal and wood stud framing
      1. Type: Self taping with washer and lock washer
      2. Material: Stainless steel
      3. Size: 1/8" dia. X length to penetrate framing 1" min.

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

2.03 MATERIAL – EXTERIOR BUILDING MOUNTED SIGNAGE

A. General
1. Refer to documents for additional information and design criteria

2. Signage Type:
    a. Partial Inlay, uno.

B. Material
1. Acrylic – Face of Sign
2. Vinyl – Raised Characters, Visual Characters and Pictograms

C. Raised Characters
1. Partial inlay
2. Raised 1/32”
3. Beveled edges

D. Visual Characters and Pictograms
1. Partial inlay

E. Braille
1. Partial inlay
2. Raised
    a. Contracted Grade 2 California Braille

F. Configuration
1. Size: Refer to details
2. Sign Edges: Beveled

G. Installation:
1. Door mounted signs shall be installed with 1” wide x 62 mil thick 3M VHB 5962 Conformable Tape applied continuously along all four sides of sign and set ¼” clear of outside edge of sign.
2. Wall mounted signs shall be installed with tamper resistant stainless steel fasteners at all four sides of sign, typical u.o.n.
    a. Masonry/Stone: Drilled expansion anchors x 1-1/2” embedment
    b. Metal Studs: Self taping x 1” embedment
    c. Wood studs: Self taping x 1” embedment
    d. Wall mounted signs shall be installed with 1” wide x 62 mil thick 3M VHB 5962 Conformable Tape applied continuously along all four sides of sign and set ¼” clear of outside edge of sign.
3. Glass mounted signs shall be installed with 1” wide x 62 mil thick 3M VHB 5962 Conformable Tape applied continuously along all four sides of sign and set ¼” clear of outside edge of sign.
    a. Install blank sign on opposite side of glass which matches size & color of informative

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

2.04 MATERIAL – INTERIOR SIGNAGE

A. Material:
1. Acrylic – Face of Sign
2. Vinyl – Raised Characters, Visual Characters and Pictograms

B. Raised Characters
1. Partial inlay
2. Raised 1/32”
3. Beveled edges

C. Visual Characters and Pictograms
1. Partial inlay

D. Braille
1. Partial inlay
2. Raised
    a. Contracted Grade 2 California Braille

E. Configuration
1. Size: Refer to details
2. Sign Edges: Beveled

F. Installation:
1. Door mounted signs shall be installed with 1” wide x 62 mil thick 3M VHB 5962 Conformable Tape applied continuously along all four sides of sign and set ¼” clear of outside edge of sign.

2. Wall mounted signs shall be installed with tamper resistant stainless steel fasteners at all four sides of sign, typical u.o.n.
   a. Masonry/Stone: Drilled expansion anchors x 1-1/2" embedment
   b. Metal Studs: Self taping x 1" embedment
   c. Wood studs: Self taping x 1" embedment
   d. Wall mounted signs shall be installed with 1" wide x 62 mil thick 3M VHB 5962 Conformable Tape applied continuously along all four sides of sign and set ¼" clear of outside edge of sign.
3. Glass mounted signs shall be installed with 1" wide x 62 mil thick 3M VHB 5962 Conformable Tape applied continuously along all four sides of sign and set ¼" clear of outside edge of sign.
   a. Install blank sign on opposite side of glass which matches size & color of informative sign.

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

2.05 SIGN SCHEDULE:

A. General:
1. Refer to drawings for sign schedules, details, and other information, including but not limited to:
   a. Sign size
   b. Text size
   c. Mounting height
2. Final sign colors shall be selected by **Architect** at time of submittal.

2.06 MATERIAL – FIRE EXTINGUISHER SIGNAGE

A. Fire Extinguisher Signage:
1. Mfgr: Seton
2. Model: 39429
3. Type: Luminous
4. Shape: 2-sided with fastening flanges
5. Size: 7.5" wide x 18" tall overall
6. Material: Glow-in-the-dark Contrasting Color with letters and graphics
7. Text: "Fire Extinguisher"
8. Graphics:
   a. Symbol: Arrow pointing down with text in arrow
   b. Location: Install centered above fire extinguisher; confirm height with Fire Department
9. Braille: None
10. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the **General Contractor** subject to the approval of the **Architect**

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
1. Examine areas and conditions under which work is to be performed.
2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

C. Backing:
1. Coordinate that appropriate backing is installed for sign mounting.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.

B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.
B. Take all necessary measurements in the field to ensure proper dimensions.

3.04 FABRICATION

A. Fabricate signs in compliance with drawings, applicable codes, agencies having jurisdiction and ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines.

3.05 INSTALLATION

A. General:
   1. Prior to installation, carefully inspect and verify that the installed work of other trades is complete to the point where this installation may properly commence.
   2. Verify that specified items may be installed in accordance with the approved design.
   3. All pole mounted sign poles shall be installed in concrete footing and in compliance with plan details.
   4. Signage Mounting:
      a. Locations of all signs must be approved by the **Architect** prior to installation.
      b. Refer to specific sign type for mounting requirements.
      c. Coordinate with Drawings
B. Fastening
   1. Use fasteners as herein specified.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after they receive the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

10 44 00
FIRE EXTINGUISHERS AND FIRE EXTINGUISER CABINETS
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions at the job site.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Bracket and Fire Extinguishers for wall mounting at the following rooms:
      a. As indicated on Drawings
      b. As herein specified
E. Provide and install Fire Extinguisher signage above all wall mounted fire extinguishers and Fire Extinguisher cabinets.
   1. Refer to Section 10 14 00 – Signage.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
   1. NFPA – 10 Table H.2
   2. NFPA – 13
D. Underwriters Laboratory (UL), www.ul.com, www.ulstandardsinfoet.ul.com
   1. UL 8 – Standard for Foam Fire Extinguishers
   2. UL 154 – Standard for Carbon Dioxide Fire Extinguishers
   3. UL 299 – Standard for Dry Chemical Fire Extinguishers
   4. UL 626 – Standard for 2-1/2 Gallon Stored-Pressure, Water-Type Fire Extinguishers
   5. UL 711 – Standard Rating for testing of Fire Extinguishers
   6. UL 1803 – Standard for Factory Follow-up on Third Party Certified Portable Fire Extinguishers
   7. UL 1093 – Standard for Halogenated Agent Fire Extinguishers.
   8. UL 2129 – Standard for Halocarbon Clean Agent Fire Extinguishers
E. Conform to all applicable standards, local governing Fire Marshall & Building official for fire extinguisher types, sizes, locations and construction.
F. Refer to standards herein listed with specific products/materials.

1.03 PERFORMANCE, TESTING AND INSPECTION [Specifier, this portion needs to be completed]

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
Fire Extinguisher Agent	ABC, Multi-purpose dry-chemical	An effective agent in extinguishing class A, B, and C fires. The agent base is ammonium phosphate.	NFPA & UL
Fire Extinguisher Agent	Dry-Chemical – BC	An effective agent in extinguishing class B and C fires. The agent base is sodium bicarbonate.	NFPA & UL

Fire Extinguisher Agent	Carbon Dioxide - CO^2	An effective agent in extinguishing class B and C fires. It will not contaminate nor leave residue on materials which it extinguishes. It is discharged as a white cloud of "snow" which smothers the fire by eliminating oxygen. It is a clean, odorless gas.	NFPA & UL
Fire Extinguisher Agent	Purple-K Dry-Chemical	An effective agent in extinguishing class B and C fires. It is more effective than conventional dry-chemical agents. The agent base is potassium bicarbonate.	NFPA & UL
Fire Extinguisher Agent	FFFP	An effective agent in extinguishing class A and B fires. Superior to water in wetting and penetration. Aids in extinguishing deep-seated class A fires. An aqueous film forms and floats over the fuel surface in extinguishing class B fires. The agent base in Angus Alcoseal® Film Forming Fluoroprotein.	NFPA & UL
Refer to drawings and as herein specified			

C. **Sustainability:**
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings
E. Submit product data
F. Submit installation instructions and drawings

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer / Fabricator shall have been in business for **five (5)** years providing / installing / finishing projects of similar size and complexity.

C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Catalog Standards:
   1. Manufacturer's catalog numbers may be included on Drawings for convenience in identifying specified items. Unless modified by notation on Drawings or specified, catalog description for indicated number constitutes requirements for the item specified.
E. Labeling
   1. The identification of the listing and labeling organization, the fire test, and the performance standard that the fire extinguisher meets or exceeds shall be clearly marked on each fire extinguisher.
   2. An organization listing fire extinguishers used to comply with the requirements of this standard shall utilize a third party certification program for portable fire extinguishers that meets or exceeds ANSI/UL 1803.
   3. Identification of Contents. A fire extinguisher shall have a label, tag, stencil, or similar indicator attached to it providing the following information:
      a. The contents' product name as it appears on the manufacturer's Material Safety Data Sheet (MSDS)
      b. Listing of the hazardous material identification in accordance with hazardous materials identification systems (HMIS) [in Canada, workplace hazardous materials identification systems (WHMIS)] developed by the National Paint & Coatings Association.
      c. List of any hazardous materials that are in excess of 1.0 percent of the contents.
      d. List of each chemical in excess of 5.0 percent of the contents.
      e. Information as to what is hazardous about the agent in accordance with the Material Safety Data Sheet (MSDS).
      f. Manufacturer's or service agency's name, mailing address, and phone number.
F. Extinguishers
   1. The classification of fire extinguishers shall consist of a letter that indicates the class of fire on which a fire extinguisher has been found to be effective, preceded by a rating number (Class A and Class B only) that indicates the relative extinguishing effectiveness.
   2. Fire extinguishers shall not be exposed to temperatures outside of the listed temperature range shown on the fire extinguisher label.

G. Fire Extinguisher Classifications Schedule

Fire Classifications			
	Class A Fires in wood, paper, cloth, trash and other ordinary combustibles	Class B Fires in Flammable liquids.	Class C Fires that involve energized electric equipment
Letter Symbol			
Picture Symbol			
Agents:	See Below	See Below	See Below
Multi-Purpose Dry- Chemical	Yes	Yes	Yes
Water	Yes	No	No
FFFP	Yes	Yes	No
Regular Dry-Chemical	No	Yes	Yes
Purple-K Dry Chemical	No	Yes - Kitchens	Yes - Kitchens
Carbon Dioxide	No	Yes	Yes

H. Miscellaneous criteria:
   1. All units shall be portable, rechargeable fire extinguishers with stainless steel discharge lever and fixed carry handle.
      a. Valve body shall be heavy-duty 'Dot' Steel cylinder.
      b. All units shall have a short hose/horn unless specified otherwise and visual pressure gauge.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Deliver undamaged products to site in manufacturer's sealed containers or wrappings with legends intact. Store on site secure from weather, soil and physical damage.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish one (1) year written warranty signed by manufacturer and installer agreeing to repair and/or replace cabinets, brackets and fire extinguishers which has failed as a result of defects in materials or workmanship.
C. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK / SECTIONS

A. Related work includes, but is not limited to, the following:
   1. Wall Substrate
   2. Wall Framing
B. Related Sections include, but are not limited to, the following:
   1. Division 1
   2. Section 09 22 16 – Non-Structural Metal Framing
   3. Section 09 29 00 – Gypsum Board & Sheathing Substrates
   4. Section 10 14 00 – Signage

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding operation of the equipment.
   2. Complete instructions regarding maintenance of the equipment, materials, finishes, etc.
   3. Refer to Division 1 for closeout submittal procedures.

1.12 SEQUENCING AND SCHEDULING

A. Schedule work and sequence with **General Contractor**.
B. Coordinate scheduling of required testing with **General Contractor**.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility specified items shall be from one manufacturer.
B. Acceptable manufacturer shall be one of the following and as listed herein and in Drawings:
   1. Cabinets / Extinguishers:
      a. Potter – Roemer, (800) 366–3473, www.potterroemer.com

b. Larsen, (612) 571–1181, www.larsensmfg.com
c. J.L. Industries, (213) 726–9070, www.jlindustries.com
2. Signage: Refer to Section 10 14 00
3. Reviewed Equivalent by **Architect**.
   a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
   b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
   c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
D. Refer to drawings, details, and other related specification section whether listed or not.
E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS - FIRE EXTINGUISHER TYPES

A. Schedule:

1. Fire Control Room
   a. Rating: 10B:C
   b. Manufacturer: Potter – Roemer
   c. Model: 3410 x 7" diameter x 24" tall
   d. Type: Carbon Dioxide
   e. Capacity: 10 lbs
   f. Accessories: Discharge Horn
   g. Mounting:
      1. Typically: Wall bracket
      2. Cabinet where indicated: Match with options below for appropriate size accommodation
   h. FM Approved: Yes

2. Storage/Service Bay, Mezzanine
   a. Rating: 3A:40B:C
   b. Manufacturer: Potter – Roemer
   c. Model: 3006 x 5" diameter x 16" tall
   d. Type: ABC Multi-purpose dry chemical
   e. Capacity: 6 lbs
   f. Mounting:
      1. Typically: Wall bracket
      2. Cabinet where indicated: Match with options below for appropriate size accommodation
   g. FM Approved: Yes

2.03 MATERIAL - FIRE EXTINGUISHER BRACKETS

A. Surface mounted bracket
   1. Mount: Wall
   2. Manufacturer: Potter – Roemer
   3. Schedule:

a. Fire extinguisher:	Model:
1. 3306	3904
2. 3410	3904
3. 3352	3904

   4. Finish: Black

2.04 MATERIAL - FIRE EXTINGUISHER SIGNAGE

A. Surface mounted Two-sided sign
   1. Mount: On wall centered and directly above extinguisher / cabinet

2. Model: Refer to Section 10 14 00.

2.05 MATERIAL - DEFIBRILLATOR AND CABINET

A. Defibrillator:
   1. Mfgr: Philips
   2. Model: HeartStart AED **[Specifier confirm]**
   3. Accessories:
      a. Carrying Case
      b. Defibrillator pads:
      c. Training Video
      d. Battery Pack

B. Cabinet:
   1. Manufacturer: Potter – Roemer
   3. Finish: Stainless Steel, 304 - #4 **[Specifier confirm]**
   4. Type:
      a. Surface: HS 7024-D 16” x 22” x 6”

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

B. Surface:
   1. Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer’s recommendations.

3.04 INSTALLATION

A. Install in accordance with manufacturers instructions
B. Install using fire rated cabinets at all fire rated walls.
C. Install fire extinguishers in each Service Bay and Mezzanine classroom where indicated and/or approved by **Architect**.
D. Install so that center of handle of fire extinguisher cabinet is 48" above finished floor line.
E. Fire extinguishers mounted in cabinets or wall recesses shall be placed so that the fire extinguisher operative instructions face outward.
   1. The location of such fire extinguishers shall be marked conspicuously.

3.05 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.

D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
    1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

11 13 00
LOADING DOCK EQUIPMENT
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the Drawings and as necessary to complete the work required by project conditions.
   1. Prefabricated Dock Bumpers

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC), www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version
D. American Institute of Steel Construction (AISC), www.aisc.org
   1. AISC Specification for Structural Steel Buildings
   2. AISC Code of Standard Practice for Steel Buildings and Bridges
   3. AISC Specifications for Structural Joints Using A325 of A490 Bolts
   4. AISC Specifications for Architecturally Exposed Structural Steel
E. American National Standards Institute (ANSI)
   1. ANSI NH14.1, CS202.
F. American Society for Testing and Materials (ASTM), www.astm.org
   1. Comply with the referenced ASTM standards for materials.
   2. ASTM A6 - General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use
G. American Welding Society (AWS), www.aws.org
   1. Perform all welding only with AWS certified welders.
   2. AWS D.1 - Structural Welding Code
H. Verification of accuracy:
   1. Check the alignment, plumb, elevation, and overall accuracy of the erected framing at appropriate stages during construction and at completion of erection.

1.03 PERFORMANCE, TESTING AND INSPECTION

A. General:
   1. Comply with manufacturers standards
B. Standards:
   1. Refer to drawings and as herein specified.
C. Sustainability:
   1. Refer to Division 1 sustainability requirements.
   2. Refer to product criteria identified herein.

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements.
D. Submit Manufacturer's data and shop drawings.
   1. Product Data: Include manufactures product information and other data to show compliance with specifications
      a. Dimensions required to locate structural steel for manufactured items such as mechanical equipment, gates , etc., shall be coordinated and provided by the **General Contractor**. **General Contractor** shall also coordinate and provide dimensions to locate structural steel for supports, etc.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.
B. Coordinate storage of materials with other trades.
C. Store materials safely and securely, protected from weather, theft, vandalism or other damage. Prevent damage to or staining of site surfaces on other materials.

1.07 JOB CONDITIONS

A. Field-verify that all components, backing, concrete recess, etc. provided by others are installed correctly before proceeding with installation of products as herein specified.
B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.
B. Furnish written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship as herein indicated.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.
      a. Dock Bumpers: One (1) year

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to the following:
   1. Cast-in-Place Concrete
   2. Metal Decking
   3. Metal Railings
   4. Pre-Fabricated Metal Building
B. Related Sections include, but are not limited to the following:
   1. Division 1
   2. Section 03 30 00 - Cast-in-Place Concrete
   3. Section 05 30 00 - Metal Decking
   4. Section 05 52 00 Metal Railings
   5. Section 13 34 19 - Pre-Fabricated Metal Building
   6.

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding operation of the equipment.
   2. Complete instructions regarding maintenance of the equipment, materials, finishes, etc.
   3. Refer to Division 1 for closeout submittal procedures.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer.

B. Acceptable manufacturer's shall be one of the following and as herein listed and in Drawings:
   1. Bondor, (800) 42100314 bondorseals.com
   2. DLM, Dock leveling Manufacturing, www.dlminc.net
   3. Poweramp, (414) 255-1510, www.docksystemsinc.com (Dock levelers only)
   4. Fairborn USA, Inc (800) 262-1188 www.fairbornusa.com (Dock Seals & Shelters only)
   5. DDB Unlimited, www.ddbunlimited.com (Water tight exterior cabinets)
   6. Reviewed Equivalent by **Architect**.
      a. Substitutions shall require **Architect's** approval prior to bid date, and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.

D. Refer to drawings, details, and other related specification section whether listed or not.

E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. **Loading Dock Bumpers**
   1. Type: Laminated Dock Bumpers.
   2. Manufacturer: Bondor Manufacturing Company
   3. Bumper Configuration
      a. One bumper full-length of mezzanine gate opening
         1. Size: 6' wide x 10" tall"x 4.5" th
         2. Mounting: Pre-set cast in place bolts
         3. One horizon bumper, center below mezzanine gates (2)]
   4. Installation:
      a. Set top of bumpers @ 1" below floor line
      b. Install with ¾"x5"sq. head machine bolts with 1 ¼" extension of threads for attachment.

2.03 OTHER MATERIALS

A. Recommended by manufacturer and subject to Architect's review and acceptance.
   1. Provide all materials required to complete and make system operational.
   2. Provide all miscellaneous items, fasteners, hardware, anchors listed or not to complete the work.

B. Power
   1. Coordinate Phase, voltage, etc with equipment manufacturer, Electrical Engineer and electrical contractors.

PART 3 - EXECUTION

3.01 INSPECTION / EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.

B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

C. Cooperate and coordinate this work with other trades for anchor bolts, and other required inserts, templates, etc.

3.03 PREPARATION

A. Take all necessary measurements in the field to ensure proper dimensions.

B. Coordinate work under this Section with other trades whose work adjoins, combines, or aligns with same.

C. Prior to installation, ensure surfaces are vertical and true, level or level to graded slope, with maximum surface variation of 1/4" in 10'-0".

1. Variation shall not be collective.

3.04 INSTALLATION

A. Set square and level, anchor securely flush to dock

3.05 FIELD QUALITY CONTROL

A. Monitor work to insure installation and assembly are in accordance with applicable standards.

3.06 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so their rubbish, waste, and debris do not interfere with the work of others.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
   1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the Architect after they receive the **General Contractor's NOTICE** - Certificate of Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all Work of this Section

1.2 SCOPE

A. All labor, materials, tools, equipment, scaffolding or other structures or hoisting, and supervision required for the manufacture, cartage, unloading, storage, installation, cleanup and protection of the pre-engineered metal buildings as specified herein and shown on the plans, details and addenda.

B. The scope of work in the metal building system includes the following:

1. Designed, pre-engineered, and shop fabricated structural steel framing for roofs, walls, metal stud wall framing, and anchor bolt connections, including secondary framing for all equipment.

2. Metal siding and roofing.

3. Metal roofing for Metal Awning Systems, as specified in Section 05 50 00.

4. Gutters and downspouts.

5. Hollow metal doors, frames, and hardware as specified in Sections 08 10 00 and 08 71 00 at exterior walls, as indicated on the Drawings.

6. Aluminum windows and glazing as specified in Section 08 80 00, at exterior walls, as indicated on the Drawings.

7. Louvers at exterior walls, as indicated on the Drawings.

8. Thermal insulation at walls and roof to create a complete thermal enclosure around the metal building perimeter.

9. Prime painting of structural framing, and finish painting of roof and siding panels, canopies and doors.

1.3 RELATED WORK (See also Table of Contents)

A. Furnish anchor bolts, embeds and layout templates to Section 03 30 00 - Concrete for placement in slab as necessary.

B. Section 01 23 00: Alternates.

C. Section 03 10 00: Concrete formwork.

D. Section 03 21 00: Reinforcing Steel.

E. Section 03 30 00: Cast-in-place Concrete.

F. Section 05 40 00: Cold-Formed Metal Framing.

G. Section 05 50 00: Metal Fabrications.

H. Section 08 11 00: Metal Doors and Frames.

I. Section 08 31 00: Access Doors.

J. Section 08 33 00: Overhead Coiling Doors.

K. Section 08 41 00: Aluminum Entrances and Storefront.

L. Section 08 70 00: Finish Hardware.

M. Section 08 80 00: Glazing.

N. Section 09 21 00: Plaster and Gypsum Board Assemblies.

O. Section 09250: Gypsum Board.

P. Section 09 51 00: Acoustical Ceiling

Q. Section 10 22 26: Operable Partition.

R. Section 10 22 13: Wire Mesh Partition.

S. Section 11 11 00: Vehicle Maintenance Equipment

T. Section 41 22 00: Hoists and Cranes.

U. Division 15: Mechanical requirements.

V. Division 15: Fire Protection requirements.

W. Division 16: Electrical requirements.

1.4 QUALITY ASSURANCE

A. Referenced Standards (Latest Edition unless specified otherwise):

1. AISC: "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings".

2. AISC: "Code of Standard Practice for Steel Buildings and Bridges".

3. CBC: "California Building Code".

4. AISI: "Specification for the Design of Cold Formed Steel Structural Members", latest edition.

5. AWS: "Structural Welding Code D.1.1".

6. ASTM A36 - Structural Steel.

7. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

8. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

9. ASTM A325 - High Strength Bolts for Structural Steel Joints.

10. ASTM A386 - Zinc-coating (Hot-Dip) on Assembled Steel Products.

11. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

12. ASTM A653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process. (Formerly known as ASTM A446).

13. ASTM A490 - Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.

14. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

15. ASTM A501 - Hot Formed Welded and Seamless Carbon Steel Structural Tubing/

16. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hop-Dip Process, General Requirements.

17. ASTM A529 - Structural Steel with 42,000 psi (290 MPa) Minimum Yield Point.

18. ASTM A572 - High Strength Low Alloy Columbium-Vanadium Steel of Structural Quality.

19. AWS A2.0 - Standard Welding Symbols.

20. SSPC - Steel Structures Painting Council.

B. Submittals:

1. Product data: Submit manufacturer's specifications and installation instructions for manufactured products.

2. Shop drawings: Submit showing details of construction, layout, anchoring, jointing, and dimensions of fabricated items for review before fabrication and installation. Structural Drawings, calculations and details shall be certified by a Civil Engineer licensed in the State of California.

3. Structural calculations: Submit 3 copies of complete structural design calculations prepared and certified by a Civil Engineer licensed in the State of California. Include vertical loads, lateral seismic loads, and lateral wind load calculations. Calculations shall be complete and shall include roof decks, wall panels, structural members, equipment supports, framing around openings, braces and connections.

    a. Note: Structural calculations shall be submitted with completed Shop Drawings.

    b. Where structural calculations are electronically prepared submit diagrammatic models of each element clearly cross-referenced to calculations.

4. Foundation Loads: Submit complete Building Reactions for all CBC required load combinations for use in designing the foundation system. The Building Reactions shall be certified by a Civil Engineer licensed in the State of California.

5. ICC evaluation report for roof panels used as structural diaphragms to resist Wind or Seismic loads.

6. Samples: Submit color samples of siding, roofing and interior panels. Samples shall be actual paint system and selected colors applied on metal.

C. Inspection:

1. Provide special inspections and testing as described in the "Statement of Structural Special Inspections and Testing" within the structural drawings.

2. Verify that conditions are satisfactory for installation or metal building systems and verify that conditions are satisfactory for installation of components. If unsatisfactory conditions exist, do not commence installation of components until such conditions have been corrected.

1.5 SYSTEM DESCRIPTION

A. Clear span rigid frame.

B. Bay spacing as shown on drawings. Columns and vertical supports shall occur only in locations shown.

C. Primary framing: Rigid frame of rafter beams and columns, canopy beams, intermediate columns, wall columns and wind bracing.

D. Secondary framing: Purlins, girts, eave struts, flange bracing, sill supports, clips, and other items detailed. Provide sag rods to girts at 10'-0" cc maximum.

E. Wall and roof system: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, insulation and accessory components.

F. Roof slope: As shown on Drawings.

G. Insulation: R-13 walls, R-19 roof. Provide vinyl-faced lining; maximum Flame Spread Index 25 and maximum Smoke Density 450, where exposed to the building interior or enclosed attic spaces.

1.6 STRUCTURAL DESIGN REQUIREMENTS

A. General Requirements:

1. The building structure shall be designed to conform with the CBC and with all additional requirements as set forth in this specification:

2. Loads for stress, drift and deflection calculations shall be as specified below.

3. Field measurement: Make field measurement as required prior to fabrication and installation.

4. Coordination: Coordinate with other Work to ensure proper sequencing and fitting of construction.

5. Shop assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordination installation.

B. Loads:

1. Dead Loads:

a. Building Dead Loads

1) Dead Loads shall include the weight of the building system. Including, but not limited to, columns, frames, purlins, roofing and covering members.

b. Collateral Dead Loads

1) Dead Loads shall include the weight of all permanent elements shown on the drawings other than the building system. Including, but not limited to, mechanical equipment and ducting, plumbing, electrical, sprinklers, suspended ceilings, tilt-up walls, overhead cranes, overhead reels, operable walls, fixed equipment, etc., supported on or suspended from the roof, floor or walls.

2) 10 pounds per square foot minimum unless actual loads result in more critical stress or deflection.

3) 150-pound concentrated load applied anywhere on the roof or canopy framing. This load need not be applied to the metal deck.

2. Live Loads:

a. Roof Live Loads shall not be less than any of the following:

1) Uniform Live Load of 20 pounds per square foot on roofs and canopies. This live load may NOT be reduced on the basis of tributary area.

2) 250-pound concentrated load applied anywhere on the roof or canopy framing. This live load is non-concurrent with the live load listed above. This load need not be applied to the metal deck.

b. Mezzanine Live Load: 125 psf

3. Snow Loads:

a. Snow loads for roofs and canopies shall not be less than the following snow load, regardless of roof slope:

1) Uniform snow load, P_f:

P_f = 206 pounds per square foot x Importance Factor

where the Importance Factor is 1.0.

b. Snow Loads shall include effects of unbalanced snow loads, special eave requirements, drift loads, impact loads and vertical obstructions per the Appendix to Chapter 16 of the CBC.

4. Wind Loads:

   a. Wind forces shall be computed per ASCE 7-16 Chapter 26.

   b. Basic Wind Speed

      1) The Basic Wind Speed is defined as the three-second gust wind speed associated with an annual probability of 0.03-0.15 (50-year mean recurrence interval) measured at a point 33 feet above the ground for an area having an Exposure Category C.

      2) The Basic Wind Speed shall be 100 MPH (77 PMPH ASD) minimum. Use of lower wind speeds is not acceptable.

   c. Exposure Category:

      1) The Exposure Category shall be C.

   d. Wind Importance Factor:

      1) The Wind Importance Factor, I_w, shall be 1.00.

5. Seismic Loads:

   a. Seismic forces shall be computed according to ASCE7-10 Chapter 11 with criteria as listed below.

      1) Site Class – per soils report

      2) S_s and S_1 determined from geographic location. Also listed in soils report.

      3) Seismic Design Category = D

      4) I = 1.00; I_p = 1.00

      5) R = 3.5 (moment frame); R = 3.25 (rod bracing)

      6) Ω = 3 (moment frame); Ω = 2 (rod bracing)

      7) Period, T, shall be per ASCE7-10 Section 12.8.2.

   b. The building structure shall be designed to provide lateral resistance to seismic forces generated from, but not limited to the sum of the following:

      1) Dead Loads, including Collateral Loads, as specified above.

      2) Seismic mass due to interior partitions shall not be taken as less than 5 pounds per square foot.

3) Full snow load as specified above if the snow load specified above is 30 pounds per square foot or greater.

6. Auxiliary Loads:

a. Loads from overhead building supported cranes shall be included.

1) Weight of the hoist, trolley, bridge and railways shall be included in the Collateral Dead Load.

2) The Rated Capacity of the crane plus Impact shall be included in the Live Loads.

C. Deflections and Drift:

1. Deflections and Drifts shall be calculated using the forces specified above.

2. Deflections of roof and canopy decks shall not exceed:

a. L/240 of the center-to-center span subject to Dead (including Collateral) plus Live Loads.

b. L/240 of the center-to-center span subject to Dead (including Collateral) plus Snow Loads.

c. L/240 of the center-to-center span subject to Dead (including Collateral) plus Wind Loads.

3. Deflections of structural members shall not exceed:

a. L/240 of the clear span subject to Dead (including Collateral) plus Live Loads.

b. L/240 of the clear span subject to Dead (including Collateral) plus Snow Loads.

c. L/240 of the clear span subject to Dead (including Collateral) plus Wind Loads.

4. Cumulative deflection of members supporting operable partitions shall not exceed one half inch under Live Load plus the Dead Load of the partition.

5. Cumulative deflection of members supporting operable partitions shall not exceed one half inch under Snow Load plus the Dead Load of the partition.

6. Seismic Drift:

a. Drift analysis shall be based upon strength level forces as set forth in this specification.

b. Drift analysis shall be an elastic static analysis neglecting stiffness contributed by elements not part of the lateral force resisting system.

c. Lateral drift due to seismic forces computed at the eave shall be limited to 0.007 times the eave height.

7. Wind Drift:

a. Lateral drift due to wind forces computed at the eave shall be limited to 0.005 times the eave height.

D. Lateral Bracing System Requirements:

1. The use of Cables shall not be allowed for Roof Diaphragm Bracing and Transverse Vertical Bracing.

2. Longitudinal vertical (wall) bracing shall meet the following requirements:

a. Lateral force resisting system shall consist of moment resisting frames.

b. Slenderness ratio (Length/Radius of Gyration) shall be not greater than 150.

c. Frame locations shall be coordinated with the Architectural Drawings.

3. Roof diaphragm bracing shall meet the following requirements: If rod bracing or other tension only braces are used and where the slenderness ratio exceeds 180, the braces shall be designed for 2 times the code specified forces, including the Importance Factor.

4. General Requirements:

a. Bracing and connections shall be capable of transferring loads from structure to foundations in a direct manner. Eccentricities shall be avoided, and shall be accounted for where they occur. Stiffeners shall be added where required so that bending of column and/or beam webs perpendicular to the plane of the webs is avoided.

b. There shall be a complete and continuous "collector" and "chord" system capable of delivering the code specified lateral forces to the bracing systems. Collector and chord members shall be designed to resist axial tension and compression forces in combination with any other loads delivered simultaneously to these members.

c. Adequate tie-downs for overturning forces to the foundations shall be provided.

d. Columns shall be hinged at the base in both directions.

E. Expansion and sliding joints: Where applicable to building length, separation may be provided to allow seismic and thermal movements of framing members in the longitudinal axis of the building. "Double columns" are allowed at the separation. Coordinate locations with Architectural Drawings.

G. Where integral items of work are not included as part of this section, Contractor shall make special effort in coordinating and in detailing the Work. The metal building system is design/build; therefore, not all design details are indicated, or can be indicated, in the Contract Documents for relationship among the various types of Work.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Provide factory wrapping, packaging, and other means necessary to prevent damage or deterioration during shipment, handling and storage.

B. Maintain protective coverings in place and in good repair until removal is necessary for the Work.

C. Store products inside enclosed storage facilities or closed building, supported above grade and slabs-on-grade.

D. Maintain storage spaces and products in dry condition at all times and within temperature extremes recommended by manufacturer. Follow any special instructions by manufacturer.

1.8 PROTECTION

A. Protect products against damage during field handling and installation.

B. Protect adjacent existing and newly placed construction and finishes as necessary to prevent damage during installation of this Work.

1.9 WARRANTY

A. Guarantee for a period of one year from the date of completion that all Work specified in this Section shall be free from defects in materials and workmanship.

B. Guarantee for a period of 20 years from the date of completion that the paint finish shall not fade or discolor, and will perform as specified, and that the roof, siding, and other exterior building components shall not leak water, deteriorate, or otherwise fail to perform as required.

C. In accordance with the terms of the guarantee, locate and repair the defective workmanship, replace the defective material, and remove and replace other Work which has been connected to or superimposed on the Work to be repaired or replaced. Also repair or replace any portion of the Work damaged by the defect or repair of it.

PART 2 - PRODUCTS

2.1 ACCEPTED MANUFACTURERS

A. Acceptable Manufacturers:

1. ARMCO Builiding Systems
2. Butler Manufacturing Company
3. Varco-Pruden
4. Metallic Building Systems
5. Star
6. Nucor
7. American Building Company
8. Approved Equivalent

B. Each manufacturer to modify its standard metal building systems as necessary to comply with the requirements indicated in the Contract Documents.

C. Manufacturer shall be IAS AC472 accredited.

2.2 MATERIALS

A. Roof Panels:

1. The exposed metal roof construction shall be of such configuration to provide the load carrying capabilities and deflection requirements of this Specification.

2. Metal roof panels shall be a minimum 36 inches wide (net coverage) by 1-1/2 inches deep minimum 24 gauge panels of the exterior type to which the thermal insulation and various interior finishes may be field applied. The metal faces shall be of zinc coated steel, and shall be supplied with a factory applied painted finish. Panel shall be sculptured for rigidity, and secured to the purlins with self-drilling structural screws with painted head assembled with a separate EPDM washer.

3. Where roof panels are to be used as structural diaphragms to resist wind or seismic forces, roof decks must have and ICC-ES approval and be installed in conformance with all ICC-ES requirements. Shear values shall not exceed ICC-ES approved values.

B. Purlins (Roof Support Members):

1. The configuration, thickness, and spacing of the purlins shall be the building manufacturer's standard; the depth shall be 8 inches. The allowable design capacity of cold formed purlin members shall be calculated in accordance with the provisions of the AISI "Specification for the Design of Cold Formed Steel Structural Members". The manufacturer shall certify that the purlin bracing system provided conforms to Metal Buildings Manufacturers Association requirements.

2. Any intermediate supports between purlins necessary to support mechanical units above or below the roof shall be provided as part of the work of this section.

C. Wall Panels:

1. Metal curtain wall panels shall be a minimum 36 inches wide (net coverage) by 1-1/2 inches deep minimum 24 gauge panels of the exterior type to which the thermal insulation and various interior finishes may be field applied. The metal faces shall be of zinc coated steel, and shall be supplied with a factory applied painted finish. Panel shall be sculptured for rigidity.

2. The covering width and configuration of the panel shall be the building manufacturer's standard design provided all design criteria, including deflection, are met or exceeded. Side seams shall be overlapping and concealed.

3. The wall panels shall be fastened to supports with screws or bolts. Fasteners within 8 feet of grade shall be tamperproof rivets or security fasteners.

4. The top, bottom and intermediate panel closures, flashings and trim shall be the building manufacturer's standard, matching the material furnished as wall panels.

5. Gutters shall be manufacturer’s standard or wide profile, sized per SMACNA rainfall and drainage criteria for roof area of each building. Fascias will be chosen by Architect from manufacturer's standard lines.

D. Girts:

1. The girt's configuration and thickness shall be the building manufacturer's standard, provided all design criteria, including deflection and girt spacing, are met. Provide sag rods and indicate rod locations on Shop Drawings.

2. Based on a simple span, the deflection of the girts supporting the wall coverings shall be limited by the effect of deflection in the particular type of interior wall finish specified herein. In no case shall deflections exceed limits specified in this Specification. Forces

producing deflections shall be based on the previously prescribed design wind and seismic loads.

3. In addition to or in lieu of manufacturer's standard spacing, girts shall be located at the following elevations: 3'-6" from top of girt to finished floor.

E. Hollow Metal Doors and Frames:

1. Provide hollow metal doors and frames, complete with finish hardware, keyed to match the Owner's master key system.

2. Provide finish hardware in accordance with the referenced Section.

3. Provide steel doors and frames constructed in accordance with the referenced Section.

F. Aluminum Windows:

1. Provide aluminum windows, complete with operable hardware and insect screens, flashings, and framing as necessary to insure rigidity.

   a. Awning
   b. Casement
   c. Fixed

2. Provide insulated glazing in accordance with the referenced Section.

G. Overhead Coiling Doors:

1. Design and provide Overhead Coiling Door framing and mounting requirements to resist Wind Loads as specified in this specification.

2. Provide metal siding or flashing as required to close off framed openings.

H. Paint:

1. All exterior wall and roof panels to be factory coated with a thermosetting type finish of a formulation designed to provide 20 years of film and color life.

2. Structural Steel to be prepared per SSPC-SP 3-63 and primed with a lead-free rust inhibitive alkyd metal primer, color to be selected by Architect. Exposed Exterior Structural Steel shall receive a Finish Paint, as previously noted.

2.3 FABRICATION

A. General:

1. Coordinate metalwork with adjoining work for details of attachment, fittings, etc. Be responsible for fabrication, detailing and correct fitting of steel members to each other and to their supports.

2. Use materials of size and thickness indicated, or if not indicated, of required size and thickness to produce strength and durability in finished product. Work to dimensions indicated or as required, using proven details of fabrication and support. Use type of materials indicated or specified for various components of Work.

3. Form exposed work true to line and level with accurate angles and surfaces and straight, sharp edges. Ease exposed edges, unless otherwise indicated. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Form joints exposed to weather to exclude water.

4. Make permanent connections in ferrous metal surfaces using welds wherever possible; do not use bolts or screws where they can be avoided. Conceal fastenings where practical.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install components and systems to comply with the requirements of the Contract Documents, applicable standards, and governing codes.

B. Install work sloped where indicated; otherwise plumb, level, and true to line with tolerances not exceeding 1/4 inch in runs of 20 feet.

C. Anchor components securely in place; provide for necessary thermal and structural movements.

D. The exterior envelope of the building shall be watertight to the interior; no uncontrolled water shall infiltrate into the building.

E. Do not install any prefinished component which has defects, including damaged finish, dents, warps or bends.

F. In order to minimize the potential of damaging the finish coating, do not remove the protective coating or wrapping until the component is ready for installation.

G. Provide bitumastic paint, 15 mils minimum DFT, between dissimilar materials to prevent galvanic corrosion.

3.2 CLEANING AND PROTECTION

A. Clean exposed surfaces of pre-finished work promptly after completion of installation. Comply with recommendations of the coating manufacturer.

B. Remove shavings from the face of siding and finished surfaces of building to prevent them from rusting and discoloring paint surfaces.

C. Protect the pre-finished work as needed to ensure that the work will be without damage or deterioration at the time of final acceptance.

3.3 REPAIR AND TOUCH UP

A. Remove and replace panels and component parts of the work which have been damaged (including finish) beyond successful repair, as determined by the Architect. Repair minor damage as acceptable to the Architect.

B. Repair minor damage on the painted finish with touch-up paint. Touch-up paint shall be field-applied type, siliconized acrylic or urethane, with exact color, gloss, and appearance match. Touch-up paint only the actual damaged area with very little overlap to undamaged area.

END OF SECTION 13 34 19

PART 1 - GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 015000, Construction Facilities and Temporary Controls.
B. Section 015713, Erosion Control
C. Section 312333, Trenching and Backfilling.
D. Section 321200, Asphalt Concrete Paving.
E. Section 321600, Site Concrete.
F. Section 334000, Site Drainage.

1.03 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting of inadequate compaction or moisture content is the sole responsibility of the contractor.
D. Tests (See Part 3 for Compaction Testing).
E. Contractor shall be solely responsible for all subgrades built. Failures resulting from inadequate compaction or moisture content are the responsibility of the contractor. Contractor shall be solely responsible for any and all repairs.

1.04 SUBMITTALS

A. Refer to Section 013300.
B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.05 WARRANTY

A. Refer to General Conditions and Section 017836.

1.06 REFERENCES AND STANDARDS

A. Geotechnical Engineering Report was prepared by Geocon, dated December, 202. Report is entitled El Dorado County DOT Corporate Yard, Project No. S1534-03-07B, and is on file with Architect. Soils information is taken from this Report. Contractor is responsible for any conclusions drawn from this data; should he prefer not to assume such risk he is under obligation to employ his own experts to analyze available information and/or to make additional explorations, at no cost to Owner, upon which to base his conclusions. Neither Owner, Soils Engineer nor Architect guarantees information will be continuous over entire site of work.
B. Site Visitation: All bidders interfacing with existing conditions shall visit the site prior to bid to verify general conditions of improvements. Discrepancies must be reported prior to the bid for clarification.
C. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
D. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
E. ANSI/ASTM D1557-02e2 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
F. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture

by Nuclear Methods (Shallow Depth).

G. ANSI/ASTM D 422-63(2007) E1 Test Method for Particle Size Analysis of Soil.
H. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
I. CALTRANS Standard Specifications Section 17.
J. CAL-OSHA, Title 8, Section 1590 (e).
K. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.07 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.
B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.08 PROJECT CONDITIONS

A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.
B. Excavation dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for excavation dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.09 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.10 ON SITE UTILITY VERIFICATION AND REPAIR PROCEDURES

A. Underground Utility Locating:
    1. The contractor shall hire an Underground Utility Locating Service to locate existing underground utility pathways in areas effected by the scope of work for excavation.
    2. Contractor must use an underground utility locator service with a minimum of 3 years experience. The equipment operator must have demonstrated experience. Contact Norcal Underground Locating (800/986-6722) or Precision Locating (800/577-7324)
    3. The Underground Utility Locator Service must have the use of equipment with the ability to locate by means of inductive clamping, induction, inductive metal detection, conductive coupling, or TransOnde (Radiodetection) to generate signals, passive locating (free scoping) for “hot” electric, and metal detector.
    4. The Underground Utility Locator Service must be able to locate existing utilities at a depth of at least 72”.
    5. The Underground Utility Locator Service must be able to locate but are not limited to locating the following types of utility pathways:
        a) All conduit pathways containing 110 volt or greater 50-60Hz electrical wire.
        b) All conduit pathways containing an active cable TV system.
        c) All conduit pathways containing wire or conductor in which a signal can be attached and generated without damaging or triggering the existing systems.
        d) All empty conduit pathways or pipe in which a signal probe or sonde (miniature transmitter) can be inserted.
        e) All conduit pathways containing non-conductive cables or wires in which a signal probe or sonde (miniature transmitter) can be inserted.
        f) All plastic and other nonconductive water lines in which a TransOnde Radiodetection) or other “transmitter” can be applied to create a low frequency pressure waive (signal) without damaging or triggering the existing systems.

g) All copper or steel waterlines and plastic or steel gas lines

6. All markings made by the Underground Utility Locator Service or other shall be clear and visible.
7. The contractor shall maintain all markings made by Underground Utility Locator Service or other throughout the entire length of the project.
8. The Underground Utility Locator Service shall provide the contractor with two sets of maps showing the location of utilities and average depth. They will be referenced to permanent buildings. Contractor will deliver one copy to the district at no additional charge.
9. Contractor is responsible to contact Underground Service Alert (U.S.A. 800/227-2600) and receive clearance prior to any excavation operations.
10. Contractor shall inform the (District's Construction Manger)(Architect)(Owner) no later than five (5) days prior to the date scheduled for the utility locator service to be on site.

1.11 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullying of sides of excavation.
E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
H. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.12 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.
B. Excessively wet fill material shall be bladed and aerated per section 3.08, B.

1.13 TESTING

A. General: Refer to Section 014500 – Quality Requirements.
B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and backcharged to Contractor.
    1. If Contractor elects to process or mine onsite materials for use as Suitable Fill, Aggregate Sub Base, Aggregate Base, Rock, Crushed Rock or sand the cost of all testing of this material shall be paid for by the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Engineered Fill Materials: Material used for fill construction, whether native or import shall consist of uncontaminated, predominantly granular, non-expansive native soil or approved import soil. Engineered fill shall consist of granular material, nearly free of organic debris with, an expansion index less than 20, a plasticity index less than 15, with maximum rock size being 6 inches.. Rocks larger than 3 inches are considered oversized material and may not be used as fill material.

D. Water: Furnish all required water for construction purposes, including compaction and dust control. Water shall be potable.

E. Aggregate Base: Provide Class 2 3/4" Aggregate Base conforming to standard gradation as specified in Cal Trans Standard Specifications, Section 26,-1.02A.

PART 3 – EXECUTION

3.01 INSPECTION LAYOUT AND PREPARATION

A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point were this installation may properly commence

B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.

C. Verify that specified items may be installed in accordance with the approved design.

D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 PERFORMANCE

A. GENERAL:

1. General: Do all grading, excavating and cutting necessary to conform finish grade and contours as shown. All cuts shall be made to true surface of subgrade.
2. Archaeological Artifacts: Should any artifacts of possible historic interest be encountered during earthwork operations, halt all work in area of discovery and immediately contact the Architect for notification of appropriate authorities.
3. Degree of Compaction: Percentage of maximum density, hereinafter specified as degree of compaction required, means density equivalent to that percentage of maximum dry density determined by ASTM D1557 Compaction Test method, and such expressed percentage thereof will be minimum acceptable compaction for specified work.
4. Optimum Moisture Content: Optimum moisture content will be determined by Soils Engineer and this information supplied to Contractor. Optimum moisture content shall be maintained until subgrade is covered by surfacing materials.

3.03 DEMOLITION, DISPOSAL AND DISPOSITION OF UNDESIRABLE MAN-MADE FEATURES

A. All other obstructions, such as abandoned utility lines, septic tanks, concrete foundations, and the like shall be removed from site. Excavations resulting from these removal activities shall be cleaned of all loose materials, dish shaped, and widened as necessary to permit access for compaction equipment. Areas exposed by any required over-excavation should be scarified to a depth of 12", moisture-conditioned to optimum moisture content, and recompacted to at least 90% of the maximum dry density.

3.04 TESTING AND OBSERVATION

A. All grading and earthwork operations shall be observed by the Geotechnical Engineer or his representative, serving as the representative of the Owner.

B. Field compaction tests shall be made by the Geotechnical Engineer or his representative. If

moisture content and/or compaction are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified moisture or compaction. Notify Geotechnical Engineer at least 48 hours in advance of any filling operation.

C. Earthwork shall not be performed without the notification or approval of the Geotechnical Engineer or his representative. The Contractor shall notify the Geotechnical Engineer at least two (2) working days prior to commencement of any aspect of the site earthwork.
D. If the Contractor should fail to meet the compaction or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory, as determined by the Geotechnical Engineer or Architect/Engineer.
E. After each rain event Geotechnical Engineer shall test fill material for optimum moisture. Do not place any fill material until desired moisture is achieved.

3.05 CLEARING AND GRUBBING

A. Prior to grading, remove all debris off-site. Remove trees and brush including the root systems. Holes resulting from tree and brush removal should be prepared and backfilled in accordance with paragraphs 3.07, 3.08, 3.09, and 3.10. This may require deepening and/or widening the holes to adequately remove disturbed soil and provide room for compaction equipment. Strip the surface of all organics. Strippings meeting the requirements of Section 329000 may be used in landscape areas only.

3.06 CUTTING

A. Building pads that are located within a cut/fill transition area will have to be overexcavated to provide a semi-uniform fill beneath the building pad. The portions of building pads located in cut areas shall be overexcavated to provide no more than 1 foot difference in fill placed in the same building pad.
B. Do all cutting necessary to bring finish grade to elevations shown on Drawings.
C. When excavation through roots is necessary, cut roots by hand.
D. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.

3.07 SUBGRADE PREPARATION

A. Grade compact and finish all subgrades within a tolerance of 0.10' of grades as indicated on Drawings and so as not to pool water. Subgrade within building pads and concrete walks shall be within 0.05' of grades indicated.
B. Building Pads: After clearing, grubbing and cutting, the exposed surface soils shall be over-excavated to a depth of at least three (3) feet below the bottom of proposed foundations, The sub-excavation shall extend at least 5 feet beyond the proposed exterior edge of perimeter foundations and shall include any exterior columns. Following over-excavation, the exposed soils shall be scarified to a depth of at least 12 inches, thoroughly moisture conditioned and uniformly compacted to at least 90 percent of the ASTM D1557 maximum dry density. Engineered fill shall be placed in horizontal lifts not exceeding 8 inches in loose thickness. Each lift shall be thoroughly moisture conditioned to within 2 percent of the optimum moisture content and uniformly compacted to at least 90 percent of the ASTM D1557 maximum dry density. Place fill material as required to proposed subgrade elevations.
   Asphalt and Concrete Flatwork: After clearing, grubbing and cutting, excavate down to rough subgrade elevation, scarify the existing soils to a minimum depth of 12 inches and uniformly moisture condition to optimum moisture content and compact to at least 90 percent of the maximum dry density per ASTM D1557.
   For areas to be filled to achieve subgrade, scarify the existing soils to a minimum depth of 12 inches and uniformly moisture condition to optimum moisture content and compact to at least 90 percent of the maximum dry density per ASTM D1557. Place fill material in horizontal lifts not exceeding 8 inches in loose thickness. Each lift shall be thoroughly moisture conditioned to at least the optimum moisture content and uniformly compacted to at least 90 percent of the ASTM D1557 maximum dry density. Place fill material as required to proposed subgrade elevations.

D. Subgrade in areas to receive landscaping shall be compacted to (90%).
E. Where Contractor over-excavates building pads through error, resulting excavation shall be recompacted as engineered fill at Contractor's expense.

3.09 PLACING, SPREADING AND COMPACTING FILL MATERIAL IN BUILDING PAD AND PAVEMENT AREAS

A. Selected fill material shall be placed in layers which, when compacted, shall not exceed 8 inches in loose thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity in moisture content.
B. Selected fill material shall be moisture-conditioned to specified moisture content. Selected fill material shall be unfrozen. When moisture content of fill material is below that specified, add water until proper moisture content is achieved. When moisture content is above that specified, aerate by blading or other methods mentioned in 3.08 B until moisture content is satisfactory.
C. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of 90% as determined by the ASTM D1557 Compaction Test. Compact each layer over its entire area until desired density has been obtained.
D. Recompaction of Fill in Trenches and Compaction of Fill Adjacent to Walls: Where trenches must be excavated, backfill with material excavated. Place in lifts that when compacted do not exceed 8” loose lifts, moisture conditioned to optimum moisture content, and compact to a minimum of 90% relative compaction in building pad and paved areas, and to 90% relative compaction in landscape areas. Soil used as trench backfill shall be non-expansive and shall not contain rocks greater than 6 inches in maximum dimension. Trench backfill within the upper 12 inches of subgrade building and pavement areas shall be compacted to a minimum relative compaction of 95 percent of the maximum dry density per ASTM D1557.
E. Jetting of fill materials will not be allowed.

3.10 FINAL SUBGRADE COMPACTION

A. Building Pads and concrete paving: Upper 12" of all final building pads and concrete paving subgrades shall be uniformly compacted at specified moisture content to at least 90% of maximum dry density, as determined by ASTM D1557 Compaction Test, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.
B. Paved Areas: Upper 6" of all final subgrades supporting asphalt pavement sections shall be brought to specified moisture content and shall be uniformly compacted to not less than 95% of maximum dry density, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.
C. Other Fill and Backfill: Upper 12 of all other final subgrades or finish grades shall be compacted to 90% of maximum dry density.
D. Gravel Fill: Do not place compacted gravel fill until after underground work and foundations are in place. Compact gravel fill with vibratory plate or similar equipment to preclude settlement.

3.11 PLACING, SPREADING, AND COMPACTION OF LANDSCAPE BACKFILL MATERIALS

A. All landscaped areas shall receive topsoil. After subgrade under landscape area has been scarified and brought to 90% maximum dry density, top soil shall be placed evenly to depth of 12" at 85% of maximum dry density.
B. Project Inspector must verify that materials are uniformly spread to minimum depth specified.

3.12 SLOPE CONSTRUCTION

A. Cut slopes shall be constructed to no steeper than 2:1 (horizontal:vertical). Fill slopes shall be constructed to no steeper than 2:1 (horizontal:vertical). Prior to placement of fill on an existing slope the existing slope shall be benched. The benches shall be in a ratio of 2 horizontal to 1 vertical. The face of the fill slopes shall be compacted as the fill is placed, or the slope may be overbuilt and then cut back to the design grade. Compaction by track walking will not be allowed.

3.13 FINISH GRADING

A. At completion of project, site shall be finished graded, as indicated on Drawings. Finish grades shall be “flat graded” to grades shown on the drawing. Mounding of finish grades will not be allowed unless otherwise directed on the landscape drawings. Tolerances for finish grades in drainage swales shall be +-0.05’. Tie in new and existing finish grades. Leave all landscaped areas in finish condition for lawn seeding. Landscaped planters shall be graded uniformly from edge of planter to inlets. If sod is used for turf areas the finish grade on which it is placed shall be lowered to allow for sod thickness.
B. All landscape areas shall be left free of rock or foreign material as specified in Section 329000.
C. All landscape areas shall be approved by Architect prior to any planting.

3.14 SURPLUS MATERIAL

A. Excavated material not required for grading or backfill shall be removed from site at contractor’s expense.

3.15 CLEANING

A. Refer to Section 017400.
B. Remove from fill all vegetation, wood, form lumber, casual lumber, and shavings, in contact with ground; buried wood will not be permitted in any fill.

END SECTION

31 23 33
TRENCHING AND BACKFILLING
Shakori Garage Replacement
200035.00

PART 1 – GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The general conditions, supplementary conditions and Division 1 are fully applicable to this section as if repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 015000, Construction Facilities and Temporary Controls.
B. Section 310000, Earthwork.
C. Section 334000, Site Drainage.
D. Section 330000, Site Utilities.
G. Section 321200, Asphalt Concrete Paving

1.03 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
C. Contractor / Installer shall have been in business for five (5) years providing/finishing similar size projects and complexity.

1.04 SUBMITTALS

A. Refer to Section 013300.
B. Submit Manufacturers data and shop drawings.

1.05 WARRANTY

A. Submit fully executed warranty for work and materials in this section per 017836.

1.06 REFERENCES AND STANDARDS

A. California Building Code current edition.
B. California Plumbing Code current edition.

1.07 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.
B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.08 PROJECT CONDITIONS

A. Contractor shall acquaint himself with all existing site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
B. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.
C. Trench dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for trench dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.09 PROTECTION

A. Adequate protection measures shall be provided to protect workers and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations. Repair all trenches in grass areas with new sod (seeding not permitted) and "stake-off" for protection.

B. Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
C. Any construction review of the Contractor's performance conducted by the Architect or Owner is not intended to include review of the adequacy of the Contractor's safety measures, in, on or near the construction site.
D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullying of sides of excavation.
E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. Keep all excavations free from water during entire progress of work, regardless of cause, source or nature of water.
F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance.
H. Trees: Carefully protect existing trees which are to remain.

1.10 TRENCH SAFETY PROVISIONS

A. General Contractor shall be solely responsible for safety design, construction and coordination with agencies having jurisdiction. If such plan varies from shoring system standards established by Construction Safety Orders, plan shall be prepared by registered civil or structural engineer.
B. Nothing herein shall be deemed to allow use of shoring, sloping or protective system less effective than that required by Construction Safety Orders of California State Division of Industrial Safety.
C. When trenching through paved surface, provide steel trench plates to cover open trenches daily until trenches are backfilled.

1.11 SEASONAL LIMITS

A. No backfill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, full operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.
B. Material above optimum moisture shall be processed per section 310000, 3.08, B.

1.12 TESTING

A. General: Refer to Section 014500 – Quality Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Backfill materials: Pipeline and conduit trench backfill as shown on the plans and as specified below.
   1. ¾ inch crush rock.
   2. Native Materials: Soil native to Project Site, free of wood, organics, and other deleterious substances. Rocks shall not be greater than 3-inches.
   3. Sand: Fine granular material, free of organic matter, mica, loam or clay.
   4. Lean Mix Concrete/Controlled Density Backfill: 3 sacks of cement per yard plus sand.
   5. Class 2 aggregate base, ¾” rock, per Caltrans section 26-1.02B
B. Water: Furnish all required water for construction purposes, including compaction and dust control. Water shall be potable.
C. Provide other bedding and backfill materials as described and specified in Section 310000, Section 334000 and Divisions 15 and 16.

PART 3 – EXECUTION

3.01 INSPECTION

A. Verification of Conditions:

1. Examine areas and conditions under which work is to be performed.
2. Identify conditions detrimental to proper or timely completion of work and coordinate with General Contractor to rectify.

3.02 COORDINATION

A. General Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.03 INSTALLATION

A. Perform work in accordance with pipe manufacturer's recommendations, as herein specified and in accordance with drawings.

3.04 TRENCHING

A. Make all trenches open vertical construction with sufficient width to provide free working space at both sides of trench around installed item as required for caulking, joining, backfilling and compacting; not less than 12 inches wider than pipe or conduit diameter, unless otherwise noted.
B. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.
C. Trench straight and true to line and grade with bottom smooth and free of edges or rock points.
D. Where depths are not shown on the plans, trench to sufficient depth to give minimum fill above top of installed item measured from finish grade above the utility as follows:
   1. Sewer pipe: depth to vary
   2. Storm drain pipe: depth to vary
   3. Water pipe - Fire Supply: 48 inches
   4. Water pipe – Domestic Supply: 48 inches

3.05 BACKFILL

A. Pipe Trench Backfill is divided into three zones:
   1. Bedding: Layer of material directly under the pipe upon which the pipe is laid.
   2. Pipe Zone: Backfill from the top of the bedding to 6 inches (compacted) over the top of the pipe.
   3. Upper Zone: Backfill between top of Pipe Zone and to surface of subgrade.
B. Bedding: Type of material and degree of compaction for bedding backfill shall be as defined in the Details and Specifications.
C. Pipe Zone and Upper Zone Backfill:
   1. Type of material and degree of compaction Pipe Zone and Upper Zone Backfill shall be as required by Drawings, Details, & Specifications.
   2. Upper Zone Backfill shall not be placed until conformance of Bedding and Pipe Zone Backfill with specified compaction test requirements has been confirmed.
   3. Backfill shall be brought up at substantially the same rate on both sides of the pipe and care shall be taken so that the pipe is not floated or displaced. Material shall not be dropped directly on pipe.
D. Backfill Compaction:
   1. Backfill shall be placed in layers which, when compacted shall not exceed 8 inches in loose thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity. Do not backfill over, wet, frozen or soft subgrade surfaces. Employ a placement method that does not disturb or damage foundation walls, perimeter drainage, foundation damp-proofing, waterproofing or protective cover.
   2. When moisture content of fill material is below that required to achieve specified density, add water until proper moisture content is achieved. When moisture content is above that required, aerate by blading or other methods until specified moisture content is met, see section 310000, 3.08, B.

3. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to 90% of maximum dry density while at specified moisture content. Compact each layer over its entire area until desired density has been obtained.
4. The top 12 inches of subgrade compaction under pavement shall be compacted to 95% relative compaction.
5. Compaction: All backfill operations shall be observed by the Inspector of Record and/or Geotechnical Engineer. Field density tests shall be made to check compaction of fill material. If densities are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified densities. Notify Inspector and Architect at least 24 hours in advance of any operation.

3.06 TRENCH AND SITE RESTORATION

A. Finished surface of trenches shall be restored to a condition equal to, or better than the condition as existed prior to excavation work.

3.07 PROTECTION

A. Protect existing surfaces, structures, and utilities from damage. Protect work by others from damage. In the event of damage, immediately repair or replace to satisfaction of Owner.
B. Repair existing landscaped areas to as new condition. Replant trees, shrubs or groundcover with existing materials if not damaged or with new materials if required. Replace damaged lawn areas with sod, no seeding will be permitted.
C. Replace damaged pavement with new compatible matching materials. Concrete walks to be removed to nearest expansion joint and entire panel replaced. Asphalt to be cute neatly and replaced with new materials.
D. Any existing materials removed or damaged due to trenching to be returned to new condition.

3.08 SURPLUS MATERIAL

A. Remove excess excavated material, unused materials, damaged or unsuitable materials from site.

3.09 CLEANING

A. Refer to Section 017400.
B. Contractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others throughout the project and at the completion of work.
C. After completion of work in this section, remove all equipment, materials, and debris. Leave entire area in a neat, clean, acceptable condition.

END SECTION

32 12 00
FLEXIBLE (ASPHALT) PAVING
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes asphalt concrete paving and related work as shown and specified.

1.03 SUBMITTALS

A. Paving Materials: Submit certificates that materials comply with specified requirements.
B. Wheel Stops: Per product data and manufacturing installation instructions.
C. Closeout Submittals:
   1. Provide completed Guarantee form per Article 1.5.
D. NOTE: The target air void content for the produced mix shall be 3.0%. The mix design shall target 4.0% air voids, and the binder content shall be adjusted during production to target 3.0% air voids. Adjustments in aggregate gradation shall not be used to achieve 3.0% production air voids. The mix design submittal shall provide information sufficient to estimate the binder content adjustment necessary to target 3.0% air voids, and to demonstrate compliance with all other mixture requirements at 3.0% air voids. The additional binder required to achieve 3.0% air voids during production shall be included in the contract price for Asphalt Concrete and no additional compensation will be allowed therefor.

1.04 GUARANTEE

A. Provide in required form for a period of 2 years from date of acceptance by Owner.

1.05 QUALITY CONTROL

A. Establish, maintain, and change a quality control system to ensure materials and work comply with the specifications. Submit quality control test results as soon as available, but no later than three (3) business days after production and placement.
B. For any single quality characteristic except smoothness, if two (2) consecutive quality control test results do not comply with the action limits or specifications:
   1. Stop production if necessary to correct the non-compliance.
   2. Notify the Engineer of the non-compliance as soon as practicable.
   3. Take corrective action(s) and notify the Engineer of the action(s) taken.
C. Compaction on testing, while not required as part of the quality control system, is recommended. If compaction testing is performed, provide the results, included measured thickness of any cores, as soon as available but no later than two (2) business days after placement.
D. Perform sampling and testing at the minimum frequency specified for the quality characteristics shown in the following table (note: some of these requirements differ from Caltrans requirements):

Quality characteristic	California Test method	AASHTO Test Method	Minimum sampling and testing frequency	Requirements
Aggregate gradation[a]	California Test 202	AASHTO T 27	1 per 1,000 tons, minimum 1 per paving day	± Tolerance[b]
Sand equivalent (min)	California Test 217	AASHTO T 176		47
Asphalt binder content (%)	California Test 379 or 382	AASHTO T 308 Method A		± 0.45
HMA moisture content (%, max)	California Test 226 or 370	AASHTO T 329	1 per 2,500 tons, min 1 per paving day	1.0
Percent of max theoretical density	QC plan		Recommended 2 per business day	92–97
Stabilometer value (min)	California Test 366		One per 4,000 tons or 2 per 5 paving days, whichever is greater	37
Air void content (%)	California Test 367	AASHTO T 269		3 ± 2
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants[c]	California Test 226 or 370		2 per day during production	--
Percent of crushed particles coarse aggregate (%, min) One fractured face Two fractured faces Fine aggregate (%, min) (minus # 4 plus # 8 sieve) One fractured face	California Test 205	AASHTO T 335	As designated in the QC plan. At least once within one month of production for the project. If the mix design is prepared within one month of the project, the testing associated with the mix design will be considered sufficient.	 90 75 70
Los Angeles Rattler (%, max) Loss at 100 rev. Loss at 500 rev.	California Test 211	AASHTO T 96		 12 45
Fine aggregate angularity (%, min)	California Test 234	AASHTO T 304 Method A		45
Voids filled with asphalt (%)	California Test 367			65.0–76.0
Voids in mineral aggregate (% min)	California Test 367			14.0
Dust proportion	California Test 367			0.6–1.3
Smoothness	12’ straight-edge		As necessary	0.01’ parallel to travel, 0.02’ perpendicular
RAP Binder Content (% within mix design average)	AASHTO T 164		At least once per stockpile for each day additional RAP is added to the RAP stockpile(s).	±2.0
RAP Specific Gravity (% within mix design average)	AASHTO T 209			±0.06

[a] Determine combined aggregate gradation containing RAP under California Test 367 / AASHTO T269.
[b] The tolerances must comply with the allowable tolerances in section 2.01.
[c] For adjusting the plant controller at the HMA plant.

PART 2 - PRODUCTS

2.01 BASE COURSE AGGREGATE

1. Aggregate materials for asphalt concrete shall conform to the requirements listed below:

Aggregate Gradation (Percentage Passing) (1/2-inch HMA Type A)

Sieve sizes	Target Value limits	Allowable tolerance
3/4"	100	—
1/2"	95–99	TV ± 6
3/8"	75–95	TV ± 6
No. 4	55–66	TV ± 7
No. 8	38–49	TV ± 5
No. 30	15–27	TV ± 4
No. 200	2.0–8.0	TV ± 2

Aggregate Quality

Quality characteristic	Test method	Requirement
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Minus # 4 sieve, plus # 8 sieve.) One fractured face	California Test 205 / AASHTO T 335	 90 75 70
Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.	California Test 211 / AASHTO T 96	 12 45
Sand equivalent (min.)	California Test 217 / AASHTO T 176	47
Fine aggregate angularity (% min.)	California Test 234 / AASHTO T 304 Method A	45
Flat and elongated particles (% max. by weight @ 5:1)	California Test 235 / ASTM D4791	10

2. Perform a mix design that produces Asphalt Concrete that conforms to the requirements in the following table:

Asphalt Concrete Mix Design Requirements

Quality characteristic	Test method	A
Air void content (%)[a]	California Test 367	4.0
Voids in mineral aggregate (% min.)	California Test 367	14.0
Voids filled with asphalt (%)	California Test 367	65.0–76.0
Dust proportion	California Test 367	0.6–1.3
Stabilometer value (min.) [b]	California Test 366	37
Tensile Strength Ratio (min.) [c]	AASHTO T 283	70

[a] The mix design air void target is 4.0%. The target for production is 3.0%, using additional binder.
[b] California Test 304, Part 2.13. Conformance at 3.0% air voids is required.
[c] If an admixture is required to meet the Tensile Strength Ratio (TSR) requirement, report the TSR without the admixture, the TSR with the admixture, and identify the admixture and rate of application.

3. You may produce Asphalt Concrete using Reclaimed Asphalt Pavement (RAP). Asphalt Concrete produced using RAP must comply with the specifications for Asphalt Concrete, except aggregate quality specifications do not apply to RAP. You may substitute RAP aggregate for a part of the virgin aggregate in HMA in a quantity not exceeding 15.0 percent of the aggregate blend. If RAP is used, provide a minimum of three RAP binder content and specific gravity results with the mix design submittal. The RAP quality requirements are shown in the following table:

Reclaimed Asphalt Pavement Quality

Quality characteristic	Test method	Requirement
Binder content (% within the average value reported)	AASHTO T 164	±2.0
Specific gravity (within the average value reported)	AASHTO T 209	±0.06

4. Paving asphalt shall be Performance Grade PG 64-28 conforming to the requirements of Section 92 of the 2010 Caltrans Standard Specifications.
5. Material for use as tack coat shall conform to Section 94 of the Caltrans Standard Specifications. Choose the type and grade and inform the Engineer. Apply tack coat at the minimum residual rate of 0.04 gallons per square yard to all surfaces on or against which asphalt concrete is placed, except application to aggregate base is not required. With approval of the Engineer, tack coat between lifts of new asphalt concrete is not required provided the surface of the underlying lift is clean and free of substances that may interfere with complete bonding of the overlying layer.
6. Liquid Asphalt shall conform to Section 93 of the Caltrans Standard Specifications, SC-250.

2.02 SEAL COAT:

A. Acceptable Products: OverKote Asphalt Paving Coating, as manufactured by RaynGuard Protective Materials, Inc.
B. Alternate Products: Comparable products manufactured by Reed and Graham, Inc. Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.

2.03 WOOD HEADERS AND STAKES

A. Foundation Grade Redwood.

2.04 LINE PAINT

A. FS TT-P-1952, Class A traffic paint; colors as listed below.

2.05 WHEEL STOPS

A. Acceptable Products: Precast Concrete Bumper Block, product number M20WBB, manufactured by Christy, a division of Oldcastle Precast, Inc., or product number PPC 130, manufactured by Teichert Precast.
B. Alternate Products: Must be equal in appearance, function, and installation. The attributes of products that will be accepted as equal include but are not limited to the following:
   1. Minimum Dimensions: 5 ¼ inches high, 7 ½ inches wide, 36 inches long.
   2. Construction: Minimum 4000 psi concrete with steel reinforcement.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions of work in place before beginning work; report defects.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Take field measurements; report variance between plan and field dimensions.
B. Environmental Requirements:
   1. Base Course: Do not lay during wet weather, on muddy sub-grade, or when atmospheric temperature is below 35 degrees F.
   2. Asphalt Surfacing: Do not apply during wet weather, on wet base course, or when atmospheric temperature is below 40 degrees F.

C. Preparation of Subgrade: Clean, shape and compact to hard surface free from elevations or depressions exceeding 3/8 inch in 10'-0" from true plane. Compact to not less than 95% of maximum dry density per ASTM D1557, as specified under Section 31 00 00 – EARTHWORK AND TRENCHING.
D. No pavement marking to be performed until Architect has approved the marking placement.

3.03 INSTALLATION

A. Required Thickness After Compaction:
   1. Aggregate Base Course: As shown.
   2. Asphalt Concrete Surface Course: As shown.
B. Headers:
   1. General: Install at edge of asphalt paving, except where adjacent to existing pavement, concrete curbs, walks or building. Use ½ inch thick boards where required for bending.
   2. Lines and Levels: Install true to line and grade. Nail stakes at spacing shown, with 2 - 16d galvanized common nails. Cut off tops of stakes at an angle to reduce their visibility on completion.
C. Asphalt Paving:
   1. Aggregate Base Course: Install per CalTrans Standard Specifications, Section 26; compact to relative compaction of not less than 95%, ASTM D1557.
   2. Soil Treatment: Apply toxicant chemicals per manufacturer's instructions over entire base course area just prior to application of asphalt.
   3. Asphalt Binder: Apply as "tack coat" to all vertical surfaces of existing paving, curbs, walks, and construction joints in surfacing against which paving is to be placed. Apply at rate of 0.02 to 0.10 gallons per square yard of surface.
   4. Asphalt Concrete Surface Course:
      a. General: Per CalTRANS Standard Specifications, Section 39-6 except as modified below.
      b. Final Gradation: Smooth, uniform and free of ruts, humps, depressions or irregularities, with a minimum density of 95% of maximum theoretical unit weight as determined by California Test Method No. 304. Maximum variation 1/8 inch in 10'-0" when measured with steel straightedge in any one direction. Test paved areas for proper drainage by applying water to cover area. Correct portions that do not drain properly by patching with plant mix.
   5. Oiled Gravel Areas: Install base course and apply sterilant; refer to Section 02360 – SOIL TREATMENT. Apply primer at rate of 0.30 gallon per square yard. Do not allow traffic on oiled gravel areas until primer has thoroughly dried.
D. Patching: Cut existing paving square and plumb at all edges to be joined by new paving. Prime vertical surfaces before installing new work. Warp carefully to flush surface, with seal over joints, and feather edge. Patch existing paving where cut for installation of piping or conduits under DIVISION 16 - ELECTRICAL.
E. Line Painting:
   1. General: Apply 2 coats of paint to clean, dry surfaces; do not thin paint. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
   2. Apply paint to produce pavement markings with uniform, straight edges and even thickness. Overspray and overspill will not be accepted.
   3. Striping and Symbols: As shown at asphalt and portland cement concrete pavement, walks, stairs, and ramps.
   4. Colors:
      a. Striping and Lettering: White.
      b. Disabled Access: Blue; match Color No. 15090 of Federal Standard 595C.
      c. Passenger loading/unloading zones: white.
      d. Fire Lane: Red.
      e. Black Out Striping: Black.

F. Wheel Stops: Install where shown, secure with epoxy adhesive and 2 reinforcing steel bars ½-inch diameter by 24 inches long, galvanized, driven flush with top of concrete bumper; do not damage bumpers or asphalt concrete paving.
G. Clean up: remove excess material from site.

END SECTION

32 16 00
SITE CONCRETE
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 014500, Testing Lab Services.
B. Section 310000, Earthwork.

1.03 QUALITY ASSURANCE

A. Use only new materials and products.
B. Use materials and products of one manufacturer whenever possible.
C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
D. Sieve analysis from testing laboratories identifying rock/sand percentages within the concrete mix; or class 2 aggregate base shall have the current project name and project location identified on the report. Outdated analytical reports greater than 90 days old will not be accepted

1.04 SUBMITTALS

A. Refer to Section 133300.
B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
C. Materials list: Submit to the Architect a complete list of all materials proposed to be used in this portion of the work. Submitted items should include but are not limited to sand, gravel, admixtures, surface treatments, coloring agents, sealers, fibers, cast-in-place accessories, forming and curing products and concrete mix designs.
D. With concrete submittal, provide documented history of mix design performance.

1.05 WARRANTY

A. Refer to General Conditions and Section 017836.

1.06 REFERENCES AND STANDARDS

A. California Building Code, latest edition.
B. ACI Standards, ACI 211.1, ACI 318-05, ACI 302, IR-04, ACI 301-05, ACI 305R-99, ACI 306R-02, ACI 308-98.
C. ASTM C-94, Specification for Ready-Mixed Concrete.
D. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice (latest edition).
E. ASTM – American Society for Testing and Materials.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.
B. Store materials in protected, dry conditions off of ground and in areas so as to not interfere with the progress of the work.
C. Transport, store and handle in strict accord with the manufacturer's written recommendations.
D. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.
E. Store cement in weather tight building, permitting easy inspection and identification. Protect from dampness. Lumpy or stale cement will be rejected.
F. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregate. Use only one supply source for each aggregate stock pile.

1.08 TESTING

A. General: Refer to Section 014000 – Quality Requirements.
B. Cement and Reinforcing shall be tested in accordance with CBC Section 1916A.

1.09 ADEQUACY AND INSPECTION

A. Design, erect, support, brace and maintain formwork and shoring to safely support all vertical and lateral loads that might be applied until such loads can be carried by concrete.
B. Notify Inspector, Architect at least 48 hours prior to placing of concrete.

1.10 PROTECTION

A. Finish surfaces shall be protected at all times from concrete pour. Inspect forming against such work and establish tight leak-proof seal before concrete is poured. Finish work damaged, defaced or vandalized during the course of construction shall be replaced by contractor at contractor expense.

1.11 FIELD MEASUREMENTS

A. Make and be responsible for all field dimensions necessary for proper fitting, slopes and completion of work. Report discrepancies to Architect before proceeding.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement: Portland cement, ASTM C150, Type II, per ACI 318 Section 3.2.
B. Concrete Aggregates: Normal weight aggregates shall conform to ASTM C33, except as modified by this section. Combined grading shall meet limits of ASTM C33. Lightweight aggregate shall conform to ASTM C330, suitably processed, washed and screened, and shall consist of durable particles without adherent coatings.
C. Water: Clean and free from deleterious amounts of acids, alkalis, scale, or organic materials and per ACI 318 Section 3.4.
D. Gravel Below Slabs: Free-draining ground or crushed rock graded so that 100 percent will pass a one inch sieve with no appreciable material passing a no. 4 sieve.
E. Sand Below Slabs: Clean, washed sand with no organic materials or salts.
F. Fly Ash: Western Fly Ash, conforming to ASTM C618 for Class N or Class F materials (Class C is not permitted). Not more than 15% (by mass) may be substituted for portland cement.
G. Water Reducing Admixture: Admixture to improve placing, reduce water cement ratio, and ultimate shrinkage may be used. Provide WRDA 64 by Grace Construction Products or approved equal. Admixture shall conform to ASTM C494 and ACI 318 Section 3.6. Such admixture must receive prior approval by the Architect, Structural Engineer, and the Testing Lab, and shall be included in original design mix.
H. Air-entraining Admixture: Daravair 1000 by Grace Construction Products or approved equal. Admixture must conform to ASTM C260 and CBC Section 1904 A.2.1.
I. Exterior Flatwork Expansion Joint Sealant: See specification section 079000 – Joint Sealants.
J. Surface Retarder (for exposed aggregate finishes): Rugasol-S by Sika Corporation or approved equal.
K. Form Coating: Material which will leave no residue on concrete surface that will interfere with surface coating, as approved by the Architect.
L. Expansion Joint Material: Preformed 3/8" fiber material, full depth of concrete section, with bituminous binder manufactured for use as concrete expansion joint material, as accepted by the Architect.
M. Reinforcement Bars: New billet steel deformed bars conforming to requirements of ASTM A615 or ASTM A706; Grade 60. Dowels for installation through expansion joints or construction joints to existing sidewalks or concrete features shall be smooth or shall be sleeved on one end for slippage.
N. Reinforcing supports: Galvanized metal chairs or spacers or metal hangers, accurately placed 3'-0" O.C.E.W. Staggered and each support securely fastened to steel reinforcement in place. Bottom bars in footings may be supported with 3" concrete blocks with embedded wire ties.

Concrete supports without wire ties will not be allowed.

O. Flatwork Reinforocing: Micro-Reinforcement System: Fibermesh 150-e3 by PROPEX or equal. 100 percent virgin polypropylene multiflament fbers, containing no reprocessed olefn materials. The fbers shall conform to ASTM C1116 Type III and manufactured specifcally for the secondary reinforcement of concrete
P. Truncated Domes: Vitrified Polymer Composite (VPC), Cast-In-Place Detectable/Tactile Warning Surface Tiles; “Armor-Tile”, “Access Tile Tactile Systems”, or approved equal. Tiles shall comply with Americans with Disabilities Act and the California Code of Regulations (CCR) Title 24, Part 2, Chapter 11B. Install tiles as recommended by manufacturer.
    1. Color: As selected by the Architect
Q. Curing Compound (for exterior slabs only): Burke Aqua Resin Cure by Burke by Edoco, 1100 Clear by W.R. Meadows or accepted equal. Water based membrane-forming concrete curing compound meeting ASTM C 309 and C1315.
R. Concrete Bonding Agent: Weld-Crete by Larson Products Corp., Daraweld C by Grace Construction Products or accepted equal.
S. Patching Mortar: Meadow-Crete GPS, one-component, trowel applied, polymer enhanced, shrinkage-compensated, fiber reinforced, cementitious repair mortar for horizontal, vertical and overhead applications as manufactured by W.R. Meadows or accepted equal.
T. Non-shrink Grout: Masterflow 713 Plus by Master Builders or approved equal. Premixed, non-metallic, no chlorides, non-staining and non-shrinking per CRD-C621, Corps of Engineers specification and ASTM C 1107, Grades B and C.
U. Aggregate Base: Class 2 AB per Caltrans specification section 26-1.02A.
V. Joint sealant for expansion joints: Single component silicone sealant, Type S, ASTM D5893
W. Pre- Formed plastic Expansion Joint; W.R. Meadows 3/8” “Snap Cap”, Tex-Trude expansion joint cap, or an approved equal.

2.02 CONCRETE DESIGN AND CLASS

A. Class “B”: Concrete shall have 1" max. size aggregate, shall have 4000 psi min. at 28 day strength with a maximum water to cementitious ratio no greater than 0.45. Use for exterior slabs, including walks, vehicular paved surfaces, manhole bases, poured-in-place drop inlets, curbs, valley gutters, curb & gutter and other concrete of like nature.
B. Slump Limits: Provide concrete, at point of final discharge, of proper consistency determined by Test Method ASTM C143 with a slumps of 4" plus or minus 1".
C. Mix Design: All concrete used in this work will be designed for strength in accordance with provisions of CBC, Section 1905A.3. Should the Contractor desire to pump concrete, a modified mix design will need to be submitted for review. Fly ash may be used in concrete to improve workability in amounts up to 15% of the total cementitious weight.
D. Air Entrainment; Per the Local Jurisdiction minimum requirements, but no less than 6%.

2.03 MIXING OF CONCRETE

A. Conform to requirements of CBC, Chapter 19A.
B. All concrete shall be mixed until there is uniform distribution of material and mass is uniform and homogenous; mixer must be discharged completely before the mixer is recharged.
C. Concrete shall be Ready-mixed Concrete: Mix and deliver in accordance with the requirements set forth in ASTM C94 and ACI 301. Batch Plant inspection may be waived in accordance with CBC Section 1704A.4A, when approved by Structural Engineer.
    1. Approved Testing Laboratory shall check the first batching at the start of the work and furnish mix proportions to the Licensed Weighmaster.
    2. Ticket shall be transmitted to Project Inspector by truck driver with load identified thereon. Project Inspector will not accept load without load ticket identifying mix and will keep daily record of pours, identifying each truck, its load and time of receipt and will transmit two copies of record to DSA.
    3. Placement of concrete shall occur as rapidly as possible after batching and in a manner which will assure that the required quality of the concrete is maintained. In no case may concrete be placed more than 90 minutes from batch time.

4. Water may be added to the mix only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. In no case shall more than 10 gallons of water shall be added to a full 9 yard load, or 1 gal. per yard on remaining concrete within the drum providing load tag indicates at time of mixing at plant will allow for additional water.

2.04 MATERIALS TESTING

A. Materials testing of concrete and continuous batch plant inspection may be waived in accordance CBC Sections 1704A.4.4 when approved by Structural Engineer.
B. Testing of concrete shall be performed per article 3.07 of this specification.

2.05 EQUIPMENT

A. Handling and mixing of concrete: Project Inspector may order removal of any equipment which in his opinion is insufficient or in any way unsuitable.

PART 3 - EXECUTION

3.01 APPROVAL OF FORMS AND REINFORCEMENTS

A. Forms and reinforcements are subject to approval by the Project Inspector, Architect and Structural Engineer 48 hours prior to placement of concrete. Before placing concrete, clean tools, equipment and remove all debris from areas to receive concrete. Clean all reinforcing and other embedded items off all coatings oil, and mud that may impair bond with concrete.
B. All reinforcing steel shall be adequately supported by approved devices on centers close enough to prevent any sagging.
C. All reinforcing bar lap splices shall be staggered a minimum of 5 ft.
D. Additional reinforcing steel shall be placed around all utility boxes, valve boxes, manhole frames and covers that are located within the concrete placements.
   1. The bars shall be placed so that there will be a minimum of 1 ½" clearance and a maximum of 3" clearance. The reinforcing steel shall be placed mid-depth of concrete slab.
E. At all right angles or intersections of concrete walks, additional 2'x2' #5, 90 degree bars shall be added at all inside corners for additional crack control. The bars shall be placed 2" from concrete forms and supports at mid-depth of slab.

3.02 PROTECTION

A. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
B. In the event of damage, make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.
C. Sub-Grade in vehicular concrete paved areas: Subgrade shall be clean, shaped and compact to hard surface free from elevations or depressions exceeding 0.05' in 10' from true plan. Compact per Section 310000. Compaction and moisture content shall be verified immediately prior to placement of concrete. Proof roll subbase in presence of geotechnical engineer prior to placement of aggregate base.

3.03 CLEANING

A. Reinforcement and all other embedded items at time of placing concrete to be free of rust, dirt oil or any other coatings that would impair bond to concrete.
B. Remove all wood chips, sawdust, dirt, loose concrete and other debris just before concrete is to be poured. Use compressed air for inaccessible areas. Remove all standing water from excavations.

3.04 FORMING

A. Form material shall be straight, true, sound and able to withstand deformation due to loading and effects of moist curing. Materials which have warped or delaminated, or require more than minor patching of contact surfaces, shall not be reused.

B. Build forms to shapes, lines, grades and dimensions indicated. Construct form work to maintain tolerances required by ACI 301. Forms shall be substantial, tight to prevent leakage of concrete, and properly braced and tied together to maintain position and shape. Butt joints tightly and locate on solid backing. Chamfer corners where indicated. Form bevels, grooves and recesses to neat, straight lines. Construct forms for easy removal without hammering, wedging or prying against concrete.
C. Space clamps, ties, hangers and other form accessories so that working capacities are not exceeded by loads imposed from concrete or concreting operations.
D. Build openings into vertical forms at regular intervals if necessary to facilitate concrete placement, and at bottoms of forms to permit cleaning and inspection.
E. Build in securely braced temporary bulkheads, keyed as required, at planned locations of construction joints.
F. Slope tie-wires downward to outside of wall.
G. Brace, anchor and support all cast-in items to prevent displacement or distortion.
H. During and immediately after concrete placing, tighten forms, posts and shores. Readjust to maintain grades, levels and camber.
I. Concrete paving, Curbs, Curb and Gutters, Ramps:
    1. Expansion Joints: Install at locations indicated, and so that maximum distance between joints is 20’ for exterior concrete unless otherwise shown. Expansion joint material shall be full depth of concrete section. Recess for backer rod and sealant where required.
    2. Curbs, Valley Gutter, and Curb & Gutter: Install expansion joints at 60’ on center, except when placing adjacent to concrete walks, the expansion joints shall align with the expansion joints shown for the concrete walks. Expansion joint material shall be full depth of concrete section. Recess for backer rod and sealant will be required.
    3. Isolation Joints: 3/8” felt between walls and exterior slabs or walks so that paved areas are isolated from all vertical features, unless specifically noted otherwise on plans.
    4. Exterior Concrete Paving: Install expansion joints at 20’ on center maximum, both directions, unless shown otherwise on plans.
    5. Ramps; whether shown or not all ramps shall have control joints and expansion joints.
        a. Control joints on ramps shall be aligned and be placed in between with the vertical posts for the handrails. The curbs, if required shall have control joints that align with the handrail posts.
        b. Expansion joints shall be placed at the upper, intermediate, and bottom landings.

3.05 FORM COATING

A. Before placement of reinforcing steel, coat faces of all forms to prevent absorption of moisture from concrete and to facilitate removal of forms. Apply specified material in conformance with manufacturer's written directions.
B. Before re-using form material, inspect, clean thoroughly and recoat.
C. Seal all cut edges.

3.06 INSTALLATION

A. General: Reinforcement shall be accurately placed at locations indicated on the drawings within required tolerances and providing required clearances. Reinforcement shall be secured prior to placement of concrete such that tolerances and clearances are maintained. Coverage shall be in accordance with Section 1907A.7 of the CBC. Keep a person on the job to maintain position of reinforcing as concrete is placed. Reinforcement must be in place before concreting is begun. Install dowels as shown on drawings. Give notice whenever pipes, conduits, sleeves, and other construction interferes with placement; obtain method of procedure to resolve interferences. All expansion and construction joints in concrete shall have dowels of size and spacing as shown, or as approved by Architect.
B. Placing Tolerances:
    1. Per ACI 301 or CRSI/WCRSI Recommended Practice for Placing Reinforcing Bars, unless otherwise shown.
    2. Clear distance between parallel bars in a layer shall be no less than 1”, the maximum bar

diameter not 1 ½ times the maximum size of coarse aggregate.

C. Splices:
   1. General: Unless otherwise shown on drawings, splice top reinforcing at midspan between supports, splice bottom reinforcing at supports and stagger splices at adjacent splices 5 foot minimum. Bar laps shall be wired together. Reinforcing steel laps shall be as follows:
      a. Lap splices in concrete: Lap splice lengths shall not be less than 62 bar diameter for No. 5 bar, 56” minimum for No. 6 bars. No. 4 bar shall have a minimum of 24” splice. 93 bar diameters for No. 7 bars and larger.
      b. All splices shall be staggered at 5 feet minimum.

3.07 INSPECTION

A. Approval of reinforcing steel, after installation, must be received from Inspector 48 hrs. in advance of beginning of concrete placement operations.

3.08 PLACING OF CONCRETE

A. Adjacent finish surfaces shall be protected at all times during the concrete pour and finishing. Verify that all formwork is tight and leak-proof before concrete is poured. Finish work defaced during the concrete pour and finishing shall be replaced at no extra cost to the owner.
B. Transport concrete from mixer to place of final deposit as rapidly as practicable by methods which will prevent separation or loss of ingredients. Deposit as close as practicable in final position to avoid re-handling or flowing. Partially hardened concrete must not be deposited in work. Concrete shall not be wheeled directly on top of reinforcing steel.
C. Placing: Once started, continue concrete pour continuously until section is complete between predetermined construction joints. Prevent splashing of concrete onto adjacent forms or reinforcement and remove such accumulation of hardened or partially hardened concrete from forms or reinforcement before work proceeds in that area. Free fall of concrete shall not to exceed 4'-0" in height. If necessary, provide lower openings in forms to inject concrete and to reduce fall height.
D. Remove form spreaders as placing of concrete progresses.
E. Place footings as monolithic and in one continuous pour.
F. Keep excavations free of standing water, but moisture condition sub-grade before concrete placement.
G. Compacting: All concrete shall be compacted by mechanical vibrators. Concrete shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms. Vibrating shall not be applied to concrete which has already begun to initially set nor shall it be continued so long as to cause segregation of materials.
H. Grout under column bearing plates: Dry pack with specified Non-shrink Grout, as recommended by manufacturer. Use as little water as practicable. Ram grout solid into place.
I. Concrete Flatwork:
   1. All flatwork shall be formed and finished to required line and grades. Flatwork shall be true and flat with a maximum tolerance of 1/8" in 10’for flatness. Flatwork which is not flat and are outside of the maximum specified tolerances shall be made level by the Contractor at no additional expense to the Owner.
   2. Thoroughly water and soak the flatwork subgrade as required to achieve required moisture content prior to the concrete pour. Provide damming as required to keep water within the formed area and to allow for proper saturation of the subgrade.
   3. Concrete vibrator shall be used to assist concrete placement. Contractor shall have spare concrete vibrator on site during concrete placement.
J. Placing in hot weather: Comply with ACI 305R-91. Concrete shall not exceed 85 degrees F at time of placement. Concrete shall be delivered, placed and finished in a sufficiently short period of time to avoid surface dry checking. Concrete shall be kept wet continuously after tempering until implementation of curing compound procedure in accordance with this specification.
K. Placing in cold weather: Comply with ACI 306R-02. Protect from frost or freezing. No antifreeze admixtures are permitted. When deposited concrete during freezing or near-freezing weather, mix shall have temperature of at least 50 degrees F but not more than 90 degrees F. Concrete

shall be maintained at temperature of at least 50 degrees F for not less than 72 hours after placing or until it has thoroughly hardened. Provide necessary thermal coverings for any flat work exposed to freezing temperatures.

L. Horizontal construction joint: Keep exposed concrete face of construction joints continuously moist from time of initial set until placing of concrete; thoroughly clean contact surface by chipping entire surface not earlier than 5 days after initial pour to expose clean hard aggregate solidly embedded, or by approved method that will assure equal bond, such as green cutting. If contact surface becomes contaminated with soil, sawdust or other foreign matter, clean entire surface and re-chip entire surface to assure proper adhesion.

3.09 CONCRETE FINISHES

A. Concrete Slab Finishing: Finish slab as required by ACI 302.1R. Use manual screeds, vibrating screeds to place concrete level and smooth. Use “jitterbugs” or other special tools designed for the purpose of forcing the course aggregate below the surface leaving a thick layer of mortar 1 inch in thickness. After tamping the concrete, wood float surface to a true and even plane. After floating with a wood bull float, make 2 passes with a steel Fresno trowel to start sealing the concrete surface. While concrete is still wet but sufficiently hardened to bear a persons weight on knee boards, start troweling with a steel hand trowel or a machine trowel in larger areas. Use sufficient pressure to bring moisture to surface. After surface moisture has disappeared, finish concrete utilizing steel, hand or power trowel. Surface shall be free from trowel marks, depressions, ridges or other blemishes. Tolerance for flatness shall be 1/8" in 10'. Provide final finish as follows:
   1. Flatwork, medium broom finish: Typical finish to be used at all exterior walks, stairs and ramps. Brooming direction shall run perpendicular to slope to form non-slip surface.
   2. Under no circumstances can water be added to the top surface of freshly placed concrete.

B. Curb Finishing: Steel trowel.

C. Joints and Edges: Mark-off exposed joints, where indicated, with ¼” radius x 1” deep jointer or edging tool. Joints to be clean, cut straight, parallel or square with respect to concrete walk edge. Tool all edges of exposed expansion and contraction joints, walk edges, and wherever concrete walk adjoins other material or vertical surfaces.
   1. The expansion joints shall be full depth as shown in the plan details. Failure to do so will result in non-compliance and shall be immediately machine cut by the contractor at his expense.

E. Stair Treads and Risers: Tool exterior stair tread nosing per ADA requirements and as detailed. Paint or stain tooled area at every stair tread nosing or as detailed. Stair tread nosing shall contain no pockets, voids or spalls. Patching is not allowed. Damaged nosing shall be replaced.

3.10 CURING

A. Cured Concrete in Forms: Keep forms and top on concrete between forms continuously wet until removal of forms, 7 days minimum. Maintain exposed concrete in a continuous wet condition for 14 days following removal of forms.

B. Flatwork/Variable Height Curbs, Curb and gutter, Valley Gutter: Cure utilizing Curing Compound. If applicable, the Contractor shall verify that the approved Curing Compound is compatible with the approved colorant system. Upon completion of job, wash clean per manufacturer’s recommendations.
   1. Curing compound shall be applied in a wet puddling application. Spotty applications shall be reason for rejection and possibly concrete removal and replacement at the contractor’s expense with no compensation from the owner.

C. No Curing Compound shall be applied to areas scheduled to receive resilient track surface including, curbs, ramps, run ways, etc.

3.11 DEFECTIVE CONCRETE

A. Determination of defective concrete shall be made by the Architect or Engineer. His opinion shall be final in identifying areas to be replaced, repaired or patched.

B. The Owner reserves the right to survey the flatwork, if it is determined to be outside of the

maximum tolerance for flatness. If the flatwork is found to be out of tolerance, then the Contractor will be required to replace concrete. The Contractor will be responsible for reimbursing the Owner for any surveying costs incurred. Determination of flatwork flatness, surveying and any remedial work must be completed far enough in advance so that the project schedule is maintained, delays are avoided and the new flatwork or flatwork repairs are properly cured.

C. As directed by Architect, cut out and replace defective concrete. All defective concrete shall be removed from the site. No patching is to be done until surfaces have been examined by Architect and permission to begin patching has been provided.
D. Permission to patch any area shall not be considered waiver of right, by the Owner, to require removal of defective work, if patching does not, in opinion of Architect, satisfactorily restore quality and appearance of surface.
E. Defective concrete is:
    1. Concrete that does not match the approved mix design for the given installation type.
    2. Concrete not meeting specified 28-day strength.
    3. Concrete which contains rock pockets, voids, spalls, transverse cracks, exposed reinforcing, or other such defects which adversely affect strength, durability or appearance.
    4. Concrete which is incorrectly formed, out of alignment or not plumb or level.
    5. Concrete containing embedded wood or debris.
    6. Concrete having large or excessive patched voids which were not completed under Architect's direction.
    7. Concrete not containing required embedded items.
    8. Excessive Shrinkage, Traverse cracking, Crazing, Curling; or Defective Finish. Remove and replace if repair to an acceptable condition is not feasible.
    9. Concrete that is unsuitable for placement or has set in truck drum for longer than 90 minutes from the time it was batched.
    10. Expansion joint felt that is not isolating the full depth of the concrete section, and recessed as required for backer rod and sealant where required.
    11. Concrete that is excessively wet or excessively dry and will not meet the minimum or maximum slump required per mix design.
    12. Finished concrete with oil stains from equipment use, and or rust spots that cannot be removed.
    13. Control joints (weakened planed joints) that do not meet the required minimum depth shown on the drawings.
F. Patching: Install specified Patching Mortar per manufacturer’s recommendations. REPAIRS TO DEFECTIVE CONCRETE WHICH AFFECT THE STRENGTH OF ANY STRUCTURAL CONCRETE MEMBER OR COMPONENT ARE SUBJECT TO APPROVAL BY THE ARCHITECT AND ENGINEER.

3.12 CONCRETE TESTING

A. Comply with CBC Section 1903A, 1905A.3, 1916A and as specified in B. below. Costs of tests will be borne by the Owner.
B. Four identical cylinder samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, or not less than once for each 50 cubic yards of concrete, or not less than once for each 2,000 square feet of surface area for slabs or walls. In addition, samples for strength tests for each class of concrete shall be taken for seven-day tests at the beginning of the concrete work or whenever the mix or aggregate is changed.
C. Strength tests will be conducted by the Testing Lab on one cylinder at seven (7) days and two cylinders at twenty-eight (28) days. The fourth remaining cylinder will be available for testing at fifty-six (56) days if the 28-day cylinder test results do not meet the required design strength.
D. On a given project, if the total volume of concrete is such that the frequency of testing required by paragraph B. above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.

E. Cost of retests and coring due to low strength or defective concrete will be paid by Owner and back-charged to the Contractor.
F. Each truck shall be tested for slump before concrete is placed.

3.13 REMOVAL OF FORMS

A. Remove without damage to concrete surfaces.
B. Sequence and timing of form removal shall insure complete safety of concrete structure.
C. Forms shall remain in place for not less than the following periods of time. These periods represent cumulative number of days during which temperature of air in contact with concrete is 60 degrees F and above.
1. Vertical forms of foundations, walls and all other forms not covered below: 5 days.
2. Slab edge screeds or forms: 7 days.
3. Concrete columns and beam soffits: 28 days.
D. Concrete shall not be subjected to superimposed loads (structure or construction equipment) until it has attained its full design strength and not for a period of at least 21 days after placing. Concrete systems shall not be subjected to construction loads in excess of design loads.

3.14 CLEANING

A. Refer to Section 017400.
B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
C. Clean excess material from surface of all concrete walks and utility structures.
D. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END SECTION

33 00 00
SITE UTILITIES
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 SCOPE OF WORK

A. The work includes, but is not necessarily limited to, the following:
   1. Domestic water piping system.
   2. Fire protection piping systems.
   3. Sewer piping system.

B. Other items that may be specified or shown on the Drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 015000, Construction Facilities and Temporary Controls.
B. Section 312333, Trenching and Backfilling.
C. Section 321600, Site Concrete.
D. Section 330000, Earthwork.

1.04 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the drawings to be salvaged and re-used.

1. Sun damaged or discolored PVC pipe will be rejected.

B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
C. The representatives of the Owner’s testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner’s testing lab representatives nor the testing by the Owner’s testing lab shall excuse the contractors or subcontractors for defects or deficiencies discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction or incorrect grades will be the responsibility of the contractor.
E. Per 2010 NFPA 13 provide Contractor's material and test certificate to the Owner, Architect, Project Inspector and Local Fire Authority.

1.05 SUBMITTALS

A. Refer to Section 013300.
B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
C. Provide sieve analysis from accredited testing lab on pipe bedding material. Analysis shall have a current date not older than project contract signing date.
D. Substitution: Provide all data of proposed material being submitted as a substitution. Provide comparison with specified product data and identify all differences. Failure to provide comparison will be reason for rejection.

1.06 FEES, PERMITS, AND UTILITY SERVICES

A. Obtain and pay for permits and service charges required for installation of Work. Arrange for required inspections and secure written approvals from authorities having jurisdiction.
B. Upon completion of work within right-of-way, provide copies of written final approval to the Architect.

1.07 WARRANTY

A. Refer to General Conditions and Section 017836.

1.08 REFERENCES AND STANDARDS

A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
E. ANSI/ASTM D 422-63 Test Method for Particle Size Analysis of Soil.
F. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
G. CALTRANS Standard Specifications.
H. CAL-OSHA, Title 8, Section 1590 (e).
I. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.
J. NFPA 13, 24 and 25, latest editions.
K. California State Health and Safety Code Section 116875, Lead Free Public Water Systems.
L. California Plumbing Code, latest edition.

1.09 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.
B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.10 PROJECT CONDITIONS

A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.

1.11 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.12 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullying of sides of excavation.
E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid

creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.

F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
H. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.13 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.14 RECORD DRAWINGS

A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.
B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
C. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.
D. Properly identify on as-builts and provide dimensions for all stubs for future connections. Provide concrete markers 6” dia. 12” deep, flush with finish grade at the ends of all stubbed pipes.

PART 2 – PRODUCTS

2.01 MATERIALS - GENERAL

A. Provide each item listed herein or shown on drawings of quality noted or approved equal. All material shall be new, full weight, standard in all respects and in first-class condition. Insofar as possible, all materials used shall be of same brand or manufacture throughout for each class of material or equipment. Materials shall be of domestic manufacture and shall be tested within Continental United States.
B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein.
C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.
D. All materials in this section used for any public water system or domestic water for human consumption shall be lead free.
    1. For the purposes of this section, “lead free” means not more than 0.2 percent lead when used with respect to solder and flux and not more than 8 percent when used with respect to pipes and pipe fittings.
    2. All pipe, pipe or plumbing fitting or fixtures, solder, or flux shall be certified by an independent American National Standards Institute (ANSI) accredited third party, including, but not limited to, NSF International, as being in compliance with this section.
E. All materials used for fire system piping shall be UL and FM approved.

2.02 VALVE BOXES

A. Provide at each valve or cock in ground a Christy, Brooks, or equal to Christy G05CT, concrete valve box with cover marked for service, domestic water shall be marked “Water” and fire supply shall be marked “Fire”. Furnish extension handles for each size square nut valve, and provide “fork” handle for each size of “wheel handle” valve as required. Do not locate valve boxes in walk, or covered passages, curbs, or curb & gutters, unless necessary. If valve location is within

concrete or asphalt paved surface valve box shall be as detailed on plans for such condition. Provide valve box extensions as required to set bottom of valve box to bottom of piping in which valve is installed. Provide Owner with set of special wrenches and/or tools as required for operation of valves.

2.03 PIPES AND FITTINGS

A. Sanitary Sewer: PVC sewer pipe and fittings with Ring-Tite joints, ASTM D3034 SDR35.
   1. ABS Pipe for site plumbing.
B. Domestic water Lines 3 1/2" and smaller: Type K copper tubing, hard temper, with wrought copper fittings. Schedule 80 PVC, ASTM D 1784, ASTM D 1785, SDR-21 PVC ASTM D2241.
C. Water lines 4" and larger: AWWA C-900 Class 150/DR18 with rubber gasket joints.
D. Fire lines 4" and larger: AWWA C-900 Class 200/DR14 with rubber gasket joints.
E. Sewer force main piping: schedule 80 pvc.
F. Solder: Lead Free. 95/5; 95% Tin / 5% Antimony.
G. Ductile Iron Pipe; AWWA Class 51, Cement Lined
H. Ductile Iron Pipe Fittings; AWWA C110, C153, Ebba Iron, Star Romac, Sigma, or approved equal.
I. PVC Mechanical Fittings; Ebba Iron, , Star; Romac; Sigma or approved equal.
J. Ductile Iron Pipe/PVC C-900 Pipe Restrained Fittings; Ebba Iron # 3800 Mega Coupling, Ebba Iron 1100CH Split Restrained Harness for pipe couplings. StarGrip Series 4000
K. Ductile Iron Pipe/PVC C900, C905 Restrained Degreedand Blind Cap Fittings,; Mega Lug; Sigma; Romac; or an approved equal
L. Mechanical Fitting Bolts; Bolts and nuts shall be carbon steel with a minimum 60,000 psi tensile strength conforming to ASTM A 307, Grade A. Bolts shall be standard ANSI B1.1 Class 2A course threads. Nuts shall conform to ASTM A 563 and be standard ANSI B1.1, Class 2A course thread. All bolts and nuts shall be zinc coated.
M. Fasteners Anti-Rust Coatings; After assembly, coat all fasteners with an Asphaltic Bituminous coatings conforming to latest edition NFPA 24.
N. Ductile Iron Pipe Wrap; 8 mil polyethylene pipe wrap conforming to ANSI/AWWA C105/A21.5 standards.
O. Pipe Insulation; Pipe exposed to atmospheric conditions ½" thru 4" NPT; Johns Manville rigid fiberglass insulation, Micro Lok HP; Owens Corning Fiberglas SSL II; Conforming to ASTM C 612, Type 1A or type 1B.
P. Aluminum field applied pipe insulation jacket; comply with ASTM B209, ASTM C1729, ASTM C1371 Manufacturers; Childers Metals; ITW Insulation Systems Aluminum Jacketing; or an approved equal.
   1. Finish shall be flat mill finish
   2. Factory Fabricated Fitting Covers; 45 and 90 degree elbows, tee's, valve covers, end caps, unions, shall be of the same thickness and finish of jacket.
   3. The fittings shall be composed of 2-pieces
   4. Adhesives; per the manufacturers requirements
   5. Joint Sealant; shall be silicone, and shall be aluminum in color.

2.04 SANITARY SEWER MANHOLES

A. Shall be constructed as shown on plan details.

2.05 CLEANOUTS

A. Cleanouts of same diameter as pipe up to 8" in size shall be installed in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18" from building so as to provide sufficient space for rodding. No horizontal run over 100 feet shall be without cleanout whether shown on drawings or not.
B. All cleanout boxes shall be traffic rated with labeled lid, Christy G05CT or approved equal. Lid shall be vandal proof with stainless steel screws.

2.06 UNIONS

A. Furnish and install one union at each threaded or soldered connection to equipment and 2 unions, one on each side of valves on pipes ½" to 3".

B. Locate unions so that piping can be easily disconnected for removal of equipment or valve. Provide type specified in following schedule:

Type of Pipe Union	
Steel Pipe:	150 lb. Screwed malleable ground joint, brass, brass-to-iron seat, black or galvanized to match pipe.
Copper tubing:	Brass ground joint with sweat connections.
PVC Sch 80 pipe:	PVC union, FIPT X FIPT

2.07 VALVES

A. Provide valves as shown and other valves necessary to segregate branches or units. Furnish valves suitable for service intended. Valves shall be properly packed and lubricated. Valves shall be non-rising stem. Place unions adjacent to each threaded or sweat fitting valve. Install valves with bonnets vertical. All valves shall be lead free.

B. Valves ½" thru 2"; shall be made of bronze, full size of pipe and lead free. Nibco S-113-FL Series; American G-300 Series; Matco 511 FL Series; Apollo 102T-FL Series. Brass valves of brass parts within valves will not be accepted.

C. Valves, 2 ½" thru 3" shall be class 150; Shall be made of bronze, full size of pipe; Jenkins Fig. 2310 J; Lunkinheimer Fig. 2153; Crane Fig. 437; Stockham Fig. B-128.

D. Valves, Flanged; 4" thru 12" Ductile Iron Resilient Wedge Gate Valve; Nibco F 609 RW; American 2500 Series; Kennedy 8561; Mueller 2360 Series.

2.08 FIRE HYDRANTS

A. Per local jurisdiction.

2.09 POST INDICATOR

A. Post Indicator shall be Mueller Co. A-20806 (adjustable) with tamper switch.or an approved equal.

2.10 BACKFLOW PREVENTERS

Double Check Valve, Double Check Detector and Reduced Pressure Backflow Preventers

A. Backflow preventers shall be as approved by the local agency and by the State of California's Department of Health Services most recent list of approved reduced pressure backflow preventers. All approved backflow preventers shall have ductile iron bodies.
   1. Provide Backflow preventer blankets with locking device. Weatherguard R-30 insulated or equal.
   2. Provide ball valve at all test ports with brass plug in valve.
   3. Provide a minimum of 2 valve tamper switches on fire prevention Backflows.

2.11 TAPPING SLEEVE

A. Shall be used on pipe sizes 6" thru 12" and shall be made with stainless steel material including stainless steel bolts. Flanges shall be ductile iron or high carbon steel. Gaskets shall seal full circumference of pipe. Shall be manufactured for operating pressure of 200 psi, and shall pass test pressure of 300 psi. Romac SST series; Smithblair 662; Mueller H304; Ford "FAST" tapping sleeve.

2.12 SERVICE SADDLES

A. Shall be used on pipe size 2" thru 4". Body shall be made from ductile iron with epoxy coating or bronze. Cascade Style CSC-1; A.Y. McDonald model 3891 AWWA/3892 FNPT; Smith-Blair #317; Ford S70, S71, S90, (style B).

2.13 TRACER WIRE

A. No. 10 THW solid copper wire. Solder all joints

PART 3 - EXECUTION

3.01 DRAWINGS AND COORDINATION

A. General arrangement and location of piping, etc., are shown on Drawings or herein specified. Install work in accord therewith, except for minor changes that may be necessary on account of other work or existing conditions. Before excavation, carefully examine other work that may conflict with this work. Install this work in harmony with other craft and at proper time to avoid delay of work.

B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.

C. In advance of construction, work out minor changes if conflicts occur with electrical or mechanical. Relocate services to suit actual conditions and work of other trades to avoid conflict therewith. Any adjustments or additional fittings to make adjustments shall not be cause for additional costs to the owner.

D. Execute any work or apparatus shown on drawings and not mentioned in specifications, or vice versa. Omission from Drawings or Specifications of any minor details of construction, installation, materials, or essential specialties does not relieve Contractor of furnishing same in place complete.

E. Graded pipes shall take precedence. If conflict should occur while placing the domestic water and fire service piping, the contractor shall provide any and all fittings necessary to route the water lines over such conflicting pipes at no additional costs to the owner.

3.02 ACCESS

A. Continuously check for clearance and accessibility of equipment or materials specified herein to be placed. No allowance of any kind shall be made for negligence on part of Contractor to foresee means of installing his equipment or materials into proper position.

3.03 EXCAVATING AND BACKFILLING

A. Excavation and Bedding:
   1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width to be a minimum of 12" wider than outside diameter of pipe. Follow manufacturer's recommendations for use of each kind and type of pipe.
   2. Bedding: Provide a bedding as noted on drawing details for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, which ever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joint.
   3. If the trenches for the site utilities falls within areas to be lime treated, the piping shall be installed prior to any lime treatment operations, providing the elevation of the piping is below the treatment section.
      a. If trenching is necessary in areas that have been previously lime treated the contractor shall backfill the trench with class 2 aggregate base, with minimum section equal to the lime treated section and compacted to 95%.

B. Laying of Pipe:
   1. General: Inspect pipe prior to placing. Sun damaged pipe will be rejected. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe bell upgrade, true to line and grade.
      a. ...Sewer pipe shall be laid in strict conformity to the prescribed line and grade, with grade bars set and each pipe length checked to the grade line. Three consecutive points on the same rate of slope shall be used at all times to detect any variation from a straight grade.

In any case of discrepancy, work shall be stopped and the discrepancy immediately reported to the Owner's Representatives. In addition, when requested by the Owner's Representative, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer pipe between manholes. The maximum deviation from grade shall not be in excess of 1/4 inch. In returning the pipe to grade, no more than ¼" depression shall result.

b. The Contractor shall expose the end of existing pipe to be extended, for verification of alignment and elevation, prior to trenching for any pipe which may be affected. All costs of such excavation and backfill shall be included in the price paid for the various items of work.

c. ...A temporary plug, mechanical type shall be installed on sewer pipe at the point of connection to existing facilities. If connecting to a public facility the plug shall conform to the requirements of the local jurisdiction. This plug shall remain in place until the completion of the balling and flushing operation.

2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.

C. Backfilling:
1. General: Do not start backfill operations until required testing has been accomplished.
2. Compaction and Grading: Remainder of backfill shall be in accordance with Section 312333 – TRENCHING AND BACKFILLING.
3. If trenching in area previously lime or cement treated backfill top of trench section, same depth as lime or cement treatment with Class 2 Aggregate Base compacted to 95% minimum relative compaction.

3.04 INSTALLATION OF WATER PIPING

A. Immediately cap or plug ends of, and opening in, pipe and fittings to exclude dirt until final connections made. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.
B. General: Should existing conditions or other work prevent the running of pipes or the setting of equipment at the points indicated by drawings, changes as authorized by the Architect shall be made without additional cost to the Owner.
C. All bolts used on mechanical fittings shall be thoroughly coated with an asphaltic bituminous coating conforming to 2007 NFPA 10.3.5.2 and 10.8.3.5.
D. All buried metal shall be incased with 8 mil polyethylene wrap so that no soil is in contact with metal. Ends of polyethylene wrap shall be taped to provide seal with pipe.
E. Do not install water lines in same trench with non-metallic sewer lines unless bottom of water pipe at all points is at least 12" above top of sewer line and water line is placed on solid shelf excavated at one side of common trench with a minimum of 12 inch horizontal separation.
F. Under no circumstance shall a fitting be located directly under a structural footing without prior approval from the Architect.
G. In locations where existing domestic pipe is rerouted, the new pipe shall be assembled using restrained fittings at all joints including factory pipe joints. Tapped restrained blind flanges shall be temporarily installed at each end of the assembled pipes until testing and chlorination is completed and approved.

3.05 CLOSING IN OF UNINSPECTED WORK

A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected, tested, and approved. Should work be enclosed or covered up before it has been approved, uncover work at own expense. After it has been inspected, tested and approved, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.06 CARE AND CLEANING

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave

entire work in new condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures and trim that are installed as part of this work. Leave systems and equipment in satisfactory new operating condition.

B. Drain and flush piping to remove grease and foreign matter.
C. Sewer piping shall be balled and flushed.
D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.
E. Flush fire service piping 3 times in the presence of the project inspector. Each flushing shall be 3 minutes minimum.

3.07 SEWER INTERNAL INSPECTIONS

A. Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which resulted from the new installation, shall also be removed. Pipes shall be cleaned by the controlled balling and flushing method. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility.

3.08 TEST OF PIPING

A. Pressure Test piping at completion of roughing-in, in accord with following schedule, and show no loss in pressure or visible leaks after minimum duration or four (4) hours at test pressures indicated.
B. Chlorination tests shall be performed after all fixtures and any required mechanical devices are installed and the entire system is complete and closed up.
C. In cases where new domestic water piping is assembled for re-routing of existing domestic water pipe , the contractor shall perform the following testing prior to connecting the new water pipe to the existing system.
   1. The pipe shall be pressure tested and per the test schedule.
   2. The pipe shall be pressure tested down within the trench.
   3. The contractor shall dig a temporary ditch below the existing pipe to drain to a sump that is lower than the bottom of the trench and to the side of the trench. The sump shall be 30% larger than the total volume of water within the testing pipe assembly.
   4. After pressure testing and chlorination has taken place and accepted, the contractor shall drain the pipe into the sump and pump the sump out as it is filling.
   5. The temporary test fittings at each end of the pipe assembly shall be removed and the final restrained couplings installed.
   6. The existing piping shall be cut and the water within the pipe shall drain below the pipe to the temporary sump. Pump the sump as it is being filled up. Take extreme caution not to contaminate the existing pipe with any contaminates within the trench.
   7. Before making the final coupling connections, the restrained couplings at each end of the new pipe shall be thoroughly swabbed inside the fitting with a solution of chlorine mixed with water at a rate of 1part chlorine to 4 parts potable water.
   8. After final connections are made, a visual inspection shall be made after fittings are wiped off. If after 1 hr, no noticeable drips are noted the pipe can be backfilled.
   9. The contractor shall flush all water piping affected by chlorination until it is within acceptable levels approved by certified testing lab.

TEST SCHEDULE

System Tested	Test Pressure PSIG Test With
Public Water Mains	Per local jurisdiction requirements.
Private Domestic Water Piping:	150 Lbs. Water 4 hrs.
Fire Protection Piping:	200 Lbs. Water pressure, 4 hrs duration with no pressure loss.
Sanitary Sewer Piping:	Sewer system shall be tested for leakage per local

jurisdiction requirements.

B. Testing equipment, materials, and labor shall be furnished by contractor.

3.09 WATER SYSTEM STERILIZATION

A. Public Water Mains: Shall be flushed and disinfected per the local jurisdiction requirements
B. Clean and disinfect all site water systems connected to the domestic water systems in accordance with AWWA Standard C651 and as required by the local Building and Health Department Codes, and EPA.
   1. Clean and disinfect industrial water system in addition to the domestic water system.
   2. Disinfect existing piping systems as required to provide continuous disinfection upstream to existing valves. At Contractors option, valves may be provided to isolate the existing piping system from the new piping system.
C. Domestic water sterilization shall be performed by a licensed “qualified applicator” as required by CAL-EPA Pesticide Enforcement Branch for disinfecting and sterilizing drinking water.
D. Disinfecting Agent: Chlorine product that is a registered product with Cal-EPA for use in California potable water lines, such as Bacticide, CAL-EPA Registration No. 37982-20001.
E. Contractor to provide a 1” service valve connected to the system at a point within 2’-0” of its junction with the water supply line. After sterilization is complete Contractor to provide cap at valve.
F. Sterilization Procedure to be as follows:
   1. Flush pipe system by opening all outlets and letting water flow through the system until clear water flows from all outlets.
   2. Inject disinfecting agent to provide a minimum chlorine residual concentration of at least 50 parts per million (ppm) of free chlorine at each outlet.
   3. Provide sign at all outlets which reads “Water Sterilization in Progress – Do not operate”. Remove signs at conclusion of test.
   4. Close all outlets and valves, including valve connecting to water supply line and 1” service valve. Retain treated water in pipe for a minimum of twenty-four hours. Should chlorine residual at pipe extremities be less than 50 PPM at this time, pipe shall be re-chlorinated. As an option, the water systems may be filled with a water-chlorine solution containing a minimum of 200 PPM of chlorine and allowed to stand for three hours.
   5. After chlorination, flush lines of chlorinated water and refill from domestic supply. Continue flushing until residual chlorine is less than or equal to 0.2 ppm, or a residual the same as that of the test water.
G. Chemical and bacteriological tests shall be conducted by a state-certified laboratory and approved by the local authorities having jurisdiction.
H. Submit written report to Health Department as required by State Regulations. Provide a copy of report to Architect prior to completion of project.
I. The costs of sterilization and laboratory testing shall be paid for by the contractor.

3.10 CLEANING

A. Refer to Section 017400.
B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

END SECTION

33 40 00
SITE DRAINAGE
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 015000, Construction Facilities and Temporary Controls.
B. Section 312333, Trenching and Backfilling.
C. Section 321200, Asphalt Concrete Paving.
D. Section 321600, Site Concrete

1.03 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction are the responsibility of the contractor.

1.04 SUBMITTALS

A. Refer to Section 013300.
B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.05 WARRANTY

A. Refer to General Conditions and Section 017836.

1.06 REFERENCES AND STANDARDS

A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
E. ANSI/ASTM D 422-63 Test Method for Particle Size Analysis of Soil.
F. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
G. CALTRANS Standard Specifications.
H. CAL-OSHA, Title 8, Section 1590 (e).
I. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.
J. California Plumbing Code current edition.

1.07 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.
B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.08 PROJECT CONDITIONS

A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.

1.09 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.10 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
D. Provide shoring, sheeting, sheet piles and/or bracing to prevent caving, erosion or gullying of sides of excavation.
E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
H. Trees: Carefully protect existing trees that are to remain.

1.11 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.12 TESTING

A. General: Refer to Section 014000 – Quality Requirements.
B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and backcharged to Contractor.

1.13 RECORD DRAWINGS

A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.
B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
C. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.

D. Properly identify all stubs for future connections, as to location and use, by setting of concrete marker at finished grade in the manner suitable to Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Pipe: Use one of the following, unless noted on the Drawings otherwise.
   1. Polyvinyl Chloride Pipe (PVC): SDR35 conforming to ASTM D3034 with elastomeric joints conforming to ASTM D3212 for pipe to 12". Sun damaged pipe will be rejected.
   2. High density polyethylene pipe (HDPE): The pipe shall be corrugated exterior/smooth interior pipe. 12” to 60" maximum diameter shall conform to AASHTO M294, water tight per ASTM D3212 with water tight gasket fittings.

B. Perforated Pipe (for subdrains): Shall be ADS N12 pipe, 3 hole, ASTM F 405, AASHTO M 252; PCV ASTM D3034 SDR-35 storm drain pipe

C. Manhole: Shall be as shown on the drawing details.

D. Drop Inlet: Shall be as shown on the drawing details.

E. Curb Inlet: Shall be as shown on the drawing details.

F. Mortar: For pipe connections to concrete drainage structures, conform to ASTM C270 type N mortar. Place within one half hour after adding water.

G. Crushed Rock: Imported washed crushed rock. Minimum 100% passing 3/4 inch sieve.

H. Trench drain: Polycast, Polydrain or equal and as shown on drawings.

I. Area Drains: Shall be as shown on the drawing details.

J. Floor Drains: Shall be as shown on the drawing details.

K. Clean-outs: Shall be as shown on the drawing details.

L. Planter drains: Shall be as detailed on the drawing details.

M. Filter Fabric: Mirafi 140N.

PART 3 - EXECUTION

3.01 INSPECTION LAYOUT AND PREPARATION

A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point were this installation may properly commence

B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.

C. Verify that specified items may be installed in accordance with the approved design.

D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 INSTALLATION

A. General: Installation shall be in strict conformance with referenced standards, the manufacturer’s written directions, as shown on the drawings and as herein specified.

B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.

C. Excavation and Bedding:
   1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width in accordance with pipe manufacturer’s recommendations and as per the drawings. Follow manufacturer's recommendations for use of each kind and type of pipe.
   2. Bedding: Provide bedding as detailed on plans for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, which ever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joint.

3. If the trenches for the site drainage fall within areas to be lime treated, the piping shall be installed prior to any lime treatment operations.
    a. If additional piping is added to previously lime treated areas, the contractor shall backfill the trench with class 2 aggregate base and compact to 95%.

D. Laying of Pipe:
1. General: Inspect pipe prior to placing. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe upgrade, true to line and grade.
2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution or as recommended by manufacture. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.
3. Pipe shall be bedded uniformly throughout its length.
4. Pipe elevation shall be within 0.02 feet of design elevation as shown on plans.
5. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the governing agency.

E. Backfilling:
1. General: Do not start backfill operations until required testing has been accomplished.
2. Trenches and Excavations: Backfill with material as detailed on plans, filling both sides of the pipe at the same time, carefully tamping to hold pipe in place without movement. Refer to Section 312333 – TRENCHING AND BACKFILLING for fill above this layer.

F. Grouting of Pipes: Grout pipes smooth and water tight at drop inlet, manholes, and curb inlets. Grout back side of hood at curb inlets all grouting shall be smooth and consistent.

G. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the local agency.

H. Cutting and Patching: Remove and replace existing surface features per applicable specification section (i.e. asphaltic concrete or concrete paving) where pipe is installed in areas of existing improvements.

3.03 TOLERANCES

A. Storm Drain structure grates
1. In landscape and lawn areas +- 0.05’.
2. In sidewalk and asphalt pavement +-0.025’.
3. In curb and gutter application +-0.0125’.

B. Cleanout Boxes and Lids
1. In landscape areas; 0.10 higher than surrounding finish grade, +-0.05’.
2. In sidewalks and asphalt pavement; Flush with surrounding finish grade, +-0.025’.

3.04 DEWATERING

A. Contractor to provide trench dewatering as necessary, no matter what the source is, at no additional cost to the owner.

B. If the previously excavated material from trenching is too wet to achieve trench backfill compaction the contractor shall make a reasonable effort to aerate and dry the material per section 310000, 3.08, B

3.05 FLUSHING

A. The Contractor shall thoroughly ball and flush the storm drain system to remove all dirt and debris. Discharge water to an approved location.

3.06 CLEANING

A. Refer to Section 017400.

B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

C. Clean the dirt, rocks, and debris from the drop inlets and storm drain manholes.

END SECTION

33 51 00
NATURAL GAS SERVICE
Shakori Garage Replacement
200035.00

PART 1 - GENERAL

1.01 PRINCIPAL WORK IN THIS SECTION

A. The requirements of the **Owner's** General and Supplementary Conditions, and Division 0 and Division 1 general requirements apply to the work of this Section.
B. Coordinate the work of this Section with related trades.
C. Verify applicable dimensions, clearances and heights at the jobsite.
D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
   1. Performance of all work necessary for installation of a new natural gas piping, valves, stubs and as indicated in Drawings.
      a. The location and extent of piping is shown on the Plans, including but not limited to trench excavation and design, furnishing and installation of gas lines and stubs.
   2. Scope of work and responsibility must be coordinated with utility company having jurisdiction.

1.02 REFERENCE STANDARDS

A. 2019 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
B. (CCR) Title 24, (CBSC) Chapter 11 – California Green Building Standards Code
   1. Non-residential new construction
      a. All occupancy types
C. American National Standards Institute (ANSI), www.ansi.org
D. International Association of Plumbing and Mechanical Officials (IAMPO)
   1. IAMPO – Standards as adopted by Agency having jurisdiction
E. "Standard Specifications"
   1. Is understood to refer to the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation (CALTRANS), latest adopted edition.
   2. In case of conflict between the Standard Specifications and these Specifications, which ever is greater and more stringent shall govern.
F. Utility company having jurisdiction: (Agency having jurisdiction)
   1. Southwest Gas Corporation]
   2. When reference is made to the Standards it shall be understood that reference is to the Standard Specifications and Standard Detail Drawings of the jurisdiction herein indicated

1.03 PERFORMANCE, TESTING AND INSPECTION

A. **General:**
   1. Comply with manufacturer's standards.
   2. Comply with Building Code.
   3. Job site inspections shall be done as herein specified and as listed in drawings.
   4. Testing shall be done as herein specified and as listed in drawings.

B. **Standards:**

Item	Name of Test	Performance	Testing Std.
System	Installation	Comply	Utility company having jurisdiction
			Plumbing Code
			IAMPO IS Standards
	Products	Comply – as approved by (AGC) Agency having jurisdiction in conjunction with Plumbing Code	IAMPO PS Standards
			IAMPO IGC Standards
Refer to drawings and as herein specified			

C. **Construction Testing:**

Item	Name of Test	Performance Results	Testing Std.
Piping	Gas pressure	Meets design criteria	Refer to drawings
	Gas leakage	No leaks	Per agency having jurisdiction
	System	Comply	Building code and IAMPO Section IS 12-85 of the IAMPO Installation Standards.

D. **Construction Testing / Inspection by others:**

Item	Name of Test	Performance Results	By Whom
Gas piping system	Installation per agency requirements	Comply	Agency having jurisdiction

1.04 SUBMITTALS

A. Refer to Division 1 for substitution, deviation and/or submittal procedures.
B. Submit O&M (Operation and Maintenance) manuals in accordance with Division 1 requirements and as herein specified.
C. Refer to Division 1 for sustainability requirements
D. Submit Manufacturer's data and shop drawings.

1.05 QUALITY ASSURANCE

A. Refer to Division 1 for quality control requirements.
B. Contractor / Installer shall have been in business for five (5) years providing/finishing similar size projects and complexity.
C. Manufacturer shall have been in business for **five (5)** years providing/installing/finishing projects of similar size and complexity.
D. Stipulations:
    1. Gas Meters
        a. Gas meters are to be easily securable and accessible from adjacent accessible roadways and protected with bollards.
        b. Gas meters and related utility company gas lines are to be per the utility company recommendations.
        c. Gas meters are to have seismic valve installed on the house side of the gas service.
        d. Gas regulators shall be marked, placed above ground, above reach, and securable.
    2. Proper separation should be maintained from all in-ground electrical conduits, water lines and other in-ground utilities.
E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
    Agenda for meeting shall include, but not be limited to;
    1. Coordination and compliance with agency having jurisdiction requirements

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Refer to Division 1 for product delivery, storage and handling requirements.

1.07 JOB CONDITIONS

B. Field-verify that all components, utilities, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.08 PROTECTION

A. Protect finish surfaces at all times from surfaces and material adjacent to them.
B. Finish work defaced with other materials on surface shall be replaced.
C. Protect work under this section from damage by other trades.

1.09 GUARANTEE / WARRANTY

A. Refer to Division 1 for closeout submittal procedures.

B. Furnish **one (1)** year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
   1. Upon notification of **Owner** within the warranty period, such defects shall be repaired and replaced at no cost to the **Owner**.

1.10 RELATED WORK/SECTIONS

A. Related work includes, but is not limited to, the following:
   1. Existing Utilities
   2. Rough Grading
   3. Rock Removal
   4. Connection to Building Gas Lines.

B. Related Sections include, but are not limited to, the following:
   1. Division 1
   2. Section 02 41 00 – Site Demolition
   3. Section 31 00 00 – Site Work General Requirements
   4. Section 31 23 00 – Excavation and Fill

1.11 OPERATION AND MAINTENANCE DATA

A. Submit as part of project closeout:
   1. Complete instructions regarding operation of the equipment.
   2. Complete instructions regarding maintenance of the equipment, materials, finishes, etc.
   3. Refer to Division 1 for closeout submittal procedures.

1.12 PERMITS AND FEES

A. The **General Contractor** shall obtain and pay for all permits and/or fees to provide gas service to the building as shown on the Drawings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Single source responsibility, specified items shall be from one manufacturer for each product type.

B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
   1. Refer to documents and as herein specified
   2. Reviewed Equivalent by **Architect**.
      a. Substitutions and deviations shall require **Architect's** approval and shall be given in letterform.
      b. Refer to Division 1 for substitution, deviation and/or submittal procedures.
      c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.

C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.

D. Refer to drawings, details, and other related specification section whether listed or not.

E. Details shall set basic requirements for size and configuration of systems.

2.02 MATERIALS

A. Natural Gas Pipe and Appurtenances
   1. Piping and appurtenances for natural gas systems shall conform to the applicable codes and agencies having jurisdiction.
   2. Refer to drawings.

2.03 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION/EXAMINATION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with **General Contractor** to rectify.
   3. Do not install work of this Section until all unsatisfactory conditions have been corrected. Commencing work denotes acceptance of existing conditions.

3.02 COORDINATION

A. Refer to Division 1 for project coordination requirements.
B. **General Contractor** shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
C. Confirm that Utility company will trench, install gas piping up to and including meter, and backfill the gas service as shown.
D. The **General Contractor** is to coordinate with Utility Company the scheduling of this work so as it does not impact the overall construction schedule or other trades.

3.03 PREPARATION

A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations

3.04 INSTALLATION

A. General:
   1. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
B. Installation and testing of on-site natural gas piping and appurtenances shall conform to the requirements of the Plumbing Code, and as herein indicated.
   1. Refer also to drawings.

3.05 PROTECTION AND CLEAN UP

A. Refer to Division 1 for protection and cleaning requirements.
B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
   1. Clean up all debris left by the installation of the gas service.
   2. Repair any damage to new or existing facilities resulting from work in this Section.
C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Architect** and at no cost to the **Owner**.
F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
   1. Leave entire area in a neat, clean, acceptable condition.
G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 closeout submittal procedures.
H. Provide record drawings in accordance with Division 1 closeout submittal procedures.
I. Close out, on-site inspection will be at the discretion of the **Architect** after he receives the **General Contractor's NOTICE** of "Certificate of Substantial Completion".

END OF SECTION

SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Escutcheons.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BrassCraft Manufacturing Co.; a Masco company.
2. Dearborn Brass.
3. Jones Stephens Corp.
4. Keeney Manufacturing Company (The).
5. Mid-America Fittings, Inc.
6. ProFlo; a Ferguson Enterprises, Inc. brand.

2.2 ESCUTCHEONS

A. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; exposed-rivet hinge; and spring-clip fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
b. Insulated Piping: One-piece stamped steel or split-plate, stamped steel with exposed-rivet hinge with polished, chrome-plated finish.
c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with finish.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stamped steel or split-plate, stamped steel with exposed-rivet hinge with polished, chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with finish.
f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stamped steel or split-plate, stamped steel with exposed-rivet hinge with polished, chrome-plated finish.

C. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

3.2 FIELD QUALITY CONTROL

A. Using new materials, replace broken and damaged escutcheons and floor plates.

END OF SECTION

SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pressure gages.
2. Gage attachments.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Ametek U.S. Gauge.
b. Ashcroft Inc.
c. Ernst Flow Industries.
d. Flo Fab Inc.
e. Marsh Bellofram.
f. Miljoco Corporation.
g. Noshok.
h. Palmer Wahl Instrumentation Group.
i. REOTEMP Instrument Corporation.
j. Tel-Tru Manufacturing Company.
k. Trerice, H. O. Co.
l. WATTS.
m. Weiss Instruments, Inc.
n. Weksler Glass Thermometer Corp.
o. WIKA Instrument Corporation.
p. Winters Instruments - U.S.

2. Standard: ASME B40.100.
3. Case: type(s); cast aluminum or drawn steel; nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.

7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
8. Pointer: Dark-colored metal.
9. Accuracy: Grade B, plus or minus 2 percent of middle half of scale range.

2.2 GAGE ATTACHMENTS

A. Snubbers: ASME B40.100, brass; with NPS 1/4, ASME B1.20.1 pipe threads and -type surge-dampening device. Include extension for use on insulated piping.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.

B. Install pressure gages in the following locations:

1. Building water service entrance into building.
2. Inlet and outlet of each pressure-reducing valve.
3. Suction and discharge of each domestic water pump.

C. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

D. Adjust faces of meters and gages to proper angle for best visibility.

END OF SECTION

SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bronze ball valves.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Domestic water valves intended to convey or dispense water for human consumption must comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or must be certified to be in compliance with NSF 61 and NSF 372 (by an ANSI-accredited third-party certification body) that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.18 for cast copper solder-joint connections.
3. ASME B16.22 for wrought copper and copper alloy solder-joint connections.
4. ASME B16.34 for flanged and threaded end connections
5. ASME B31.9 for building services piping valves.

C. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream piping unless otherwise indicated.

F. Valves in Insulated Piping:

1. Provide 2-inch extended neck stems.

2. Extended operating handles with nonthermal-conductive covering material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

A. Bronze Ball Valves, Two Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
   b. Center Line; a Crane Co. brand.
   c. Hammond Valve.
   d. Jenkins Valves; a Crane Co. brand.
   e. Milwaukee Valve Company.
   f. NIBCO INC.
   g. Red-White Valve Corp.
   h. Stockham; a Crane Co. brand.
   i. Viega LLC.
   j. WATTS.
   k. Zurn Industries, LLC.

2. Standard: MSS SP-110; MSS SP-145.
3. CWP Rating: 600 psig.
4. Body Design: Two piece.
5. Body Material: Bronze.
6. Ends: Threaded or soldered.
7. Seats: PTFE.
8. Stem: Bronze or brass.
9. Ball: Chrome-plated brass.
10. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves. Remove defective valves from site.

3.2 INSTALLATION OF VALVES

A. Install valves with unions or flanges at each piece of equipment arranged to allow space for service, maintenance, and equipment removal without system shutdown.

B. Provide support to piping adjacent to valves such that no force is imposed upon valves.

C. Locate valves for easy access.

D. For valves in horizontal piping, install valves with stem at or above center of pipe.

E. Install valves in position to allow full valve actuation movement.

F. Adhere to manufacturer's written installation instructions. When soldering or brazing valves, do not heat valves above maximum permitted temperature. Do not use solder with melting point temperature above valve manufacturer's recommended maximum.

G. Adjust or replace valve packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves exhibiting leakage.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valves with specified CWP ratings are unavailable, provide the same types of valves with higher CWP ratings.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
4. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze ball valve, one piece with bronze trim. Provide with solder -joint ends.
2. Bronze ball valves, two piece with full port, and bronze or brass trim. Provide with solder -joint ends.
3. Bronze ball valves, three piece with full port, and bronze or brass trim.

END OF SECTION

SECTION 220523.14 - CHECK VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bronze, swing check valves.

1.2 ACTION SUBMITTALS

A. Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Domestic water piping check valves intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), requirements of authorities having jurisdiction, and NSF 61/NSF 372, or to be certified in compliance with NSF 61/NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.18 for cast-copper solder joint.
3. ASME B16.22 for wrought copper solder joint.
4. ASME B16.51 for press joint.
5. ASME B31.9 for building services piping valves.

C. AWWA Compliance: Comply with AWWA C606 for groove-end connections.

D. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are unacceptable.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE SWING CHECK VALVES

A. Bronze, Swing Check Valves with Bronze Disc, Class 125:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
b. Crane Valves; a Crane Co. brand.
c. Jenkins Valves; a Crane Co. brand.
d. Jomar Valve.
e. Keckley Company.
f. Lance Valves.
g. Milwaukee Valve Company.
h. NIBCO INC.
i. Red-White Valve Corp.
j. Shurjoint-Apollo Piping Products USA Inc.
k. Stockham; a Crane Co. brand.
l. Val-Matic Valve & Manufacturing Corp.
m. Victaulic Company.

2. Description:

a. Standard: MSS SP-80, Type 3.
b. CWP Rating: 200 psig.
c. Body Design: Horizontal flow.
d. Body Material: ASTM B62, bronze.
e. Ends: Threaded or soldered. See valve schedule articles.
f. Disc: Bronze.

PART 3 - EXECUTION

3.1 INSTALLATION OF VALVES

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Provide support of piping adjacent to valves such that no force is imposed upon valves.

C. Locate valves for easy access and where not blocked by equipment, other piping, or building components.

D. Install valves so that stems are horizontal or slope upward from centerline of pipe.

E. Install valves in position that does not project into aisles or block access to other equipment.

F. Install valves in position to allow full stem and manual operator movement.

G. Verify that joints of each valve have been properly installed and sealed to assure there is no leakage or damage.

H. Check Valves: Install check valves for proper direction of flow.

1. Swing Check Valves: In horizontal position with hinge pin level.

I. Adhere to manufacturer's installation instructions. When soldering or brazing valves, do not heat valves above maximum permitted temperature. Do not use solder with melting point temperature above valve manufacturer's recommended maximum.

3.2 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

B. End Connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded, soldered, or press-end connections.

3.4 HIGH-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE - 150 TO 200 PSIG

A. Pipe NPS 2 and Smaller:

1. Horizontal and Vertical Applications: Bronze, swing check valves with bronze disc, Class 125, with soldered end connections.

3.5 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze, swing check valves with bronze disc, Class 125, with soldered end connections.
2. Bronze, swing check valves with press-end connections.

END OF SECTION

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Thermal hanger-shield inserts.
3. Fastener systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details and include calculations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment.

2.2 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel except stainless steel in Brine area.

B. Stainless-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

C. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel except stainless steel in Brine area.

2.3 THERMAL HANGER-SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. Pipe Shields Inc.
6. Piping Technology & Products, Inc.
7. Rilco Manufacturing Co., Inc.
8. Value Engineered Products, Inc.

B. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

C. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

D. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hilti, Inc.
b. ITW Ramset/Red Head; Illinois Tool Works, Inc.
c. MKT Fastening, LLC.
d. Simpson Strong-Tie Co., Inc.

B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. B-line, an Eaton business.
    b. Empire Tool and Manufacturing Co., Inc.
    c. Hilti, Inc.
    d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
    e. MKT Fastening, LLC.

2. Indoor Applications: Zinc-coated stainless steel.

2.5 MATERIALS

A. Aluminum: ASTM B 221.

B. Carbon Steel: ASTM A 1011/A 1011M.

C. Structural Steel: ASTM A 36/A 36M carbon-steel plates, shapes, and bars; black and galvanized.

D. Stainless Steel: ASTM A 240/A 240M.

E. Grout: ASTM C 1107/C 1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.

C. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

F. Install lateral bracing with pipe hangers and supports to prevent swaying.

G. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.

H. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

J. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

5. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for .

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified in Section 099123 "Interior Painting." Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A 780/A 780M.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel and attachments for general service applications.

F. Use stainless-steel pipe hangers and stainless-steel or corrosion-resistant attachments for hostile environment applications; Brine area.

G. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

H. Use padded hangers for piping that is subject to scratching.

I. Use thermal hanger-shield inserts for insulated piping and tubing.

J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.

5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
10. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.

11. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
12. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.

M. Use powder-actuated fasteners mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe labels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
2. Brady Corporation.
3. Brimar Industries, Inc.
4. Carlton Industries, LP.
5. Champion America.
6. Craftmark Pipe Markers.
7. emedco.
8. Kolbi Pipe Marker Co.
9. LEM Products Inc.
10. Marking Services Inc.
11. Seton Identification Products; a Brady Corporation company.

B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:

1. Pipe size.

2. Flow-Direction Arrows: Include flow-direction arrows on[**main**] distribution piping. Arrows may be either integral with label or applied separately.
3. Lettering Size: Size letters in accordance with ASME A13.1 for piping.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF PIPE LABELS

A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.

B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Within 3 ft. of each valve and control device.
2. Within 3 ft. of equipment items and other points of origination and termination.
3. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.

C. Flow-Direction Flow Arrows: Use arrows, in compliance with ASME A13.1, to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

D. Pipe-Label Color Schedule:

1. Domestic Cold-Water Piping: White letters on an ANSI Z535.1 safety-green background.

END OF SECTION

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.4 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.

1. All Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.

C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.

D. Foam insulation materials do not use CFC or HCFC blowing agents in the manufacturing process.

E. Glass-Fiber, Preformed Pipe: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to850 deg F in accordance with ASTM C411 Comply with ASTM C547.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Johns Manville; a Berkshire Hathaway company.
    b. Knauf Insulation.
    c. Manson Insulation Inc.
    d. Owens Corning.

2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ-SSL.
3. Fabricated shapes in accordance with ASTM C450 and ASTM C585.
4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Brand; H. B. Fuller Construction Products.
    b. Foster Brand; H. B. Fuller Construction Products.
    c. Mon-Eco Industries, Inc.

2.4 SEALANTS

A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.

a. Mon-Eco Industries, Inc.

B. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand; H. B. Fuller Construction Products.
b. Foster Brand; H. B. Fuller Construction Products.

2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.

2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.

2.6 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. 3M Industrial Adhesives and Tapes Division.
b. Avery Dennison Corporation, Specialty Tapes Division.
c. Ideal Tape Co., Inc., an American Biltrite Company.
d. Knauf Insulation.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.7 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Johns Manville; a Berkshire Hathaway company.
b. RPR Products, Inc.

2. Stainless Steel: ASTM A240/A240M, Type 304; 0.015 inch thick, wide with .

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range of between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.

D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with contract documents.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

K. Cut insulation in a manner to avoid compressing insulation.

L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.

N. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.3 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.

3.5 INSTALLATION OF GLASS-FIBER AND MINERAL WOOL INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

C. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated sections are not available, install fabricated sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.6 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Underground piping.
2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.7 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation is the following:

a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

2. NPS 1-1/4 and Larger: Insulation is the following:

a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

END OF SECTION

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.
4. Dielectric fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

2.2 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tube: ASTM B88, Type K.

B. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings.

C. Wrought Copper Unions: ASME B16.22.

D. Copper Tube, Pressure-Seal-Joint Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
b. Conex Banninger - USA.
c. Elkhart Products Corporation; a part of Aalberts Integrated Piping Systems.
d. Mueller Industries, Inc.
e. NIBCO INC.
f. Viega LLC.

2. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end.
3. Minimum 200-psig working-pressure rating at 250 deg F.

2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B32, lead-free alloys.

B. Flux: ASTM B813, water flushable.

2.4 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Plastic-to-Metal Transition Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. aquatherm.
   b. Colonial Engineering, Inc.
   c. NIBCO INC.
   d. Spears Manufacturing Company.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. A.Y. McDonald Mfg. Co.
   b. Capitol Manufacturing Company.
   c. Central Plastics Company.
   d. HART Industrial Unions, LLC.
   e. Jomar Valve.
   f. Matco-Norca.
   g. WATTS.
   h. Wilkins.
   i. Zurn Industries, LLC.

2. Standard: ASSE 1079.

3. Pressure Rating: 125 psig minimum at 180 deg F.
4. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Elster Perfection; a Honeywell Corporation.
   b. Grinnell G-Fire by Johnson Controls Company.
   c. Matco-Norca.
   d. Precision Plumbing Products.
   e. Sioux Chief Manufacturing Company, Inc.
   f. Victaulic Company.

2. Standard: IAPMO PS 66.
3. Electroplated steel nipple complying with ASTM F1545.
4. Pressure Rating and Temperature: 300 psig at 225 deg F.
5. End Connections: Male threaded or grooved.
6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be one of the following:

1. Soft copper tube, ASTM B88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
2. PVC, Schedule 80; socket fittings; and solvent-cemented joints.

E. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:

1. Hard copper tube, ASTM B88, Type L; wrought-copper, solder-joint fittings; and soldered joints.

F. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be one of the following:

1. Hard copper tube, ASTM B88, Type L; wrought-copper, solder-joint fittings; and soldered joints.
2. Hard copper tube, ; copper pressure-seal-joint fittings; and pressure-sealed joints.

3. Hard copper tube, ASTM B88, Type L; grooved-joint, copper-tube appurtenances; and grooved joints.

3.2 EARTHWORK

A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.3 INSTALLATION OF PIPING

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install valves according to the following:

1. Section 220523.12 "Ball Valves for Plumbing Piping."
2. Section 220523.14 "Check Valves for Plumbing Piping."

D. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."

E. Install domestic water piping level without pitch and plumb.

F. Install piping to permit valve servicing.

G. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

K. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B828 or CDA's "Copper Tube Handbook."

E. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by manufacturer.

F. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.5 INSTALLATION OF TRANSITION FITTINGS

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. Fittings for NPS 2 and Larger: Sleeve-type coupling.

3.6 INSTALLATION OF DIELECTRIC FITTINGS

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric nipples.

3.7 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Install hangers for copper, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support vertical runs of copper tubing to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.8 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
2. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.9 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
    b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Repeat procedures if biological examination shows contamination.
    e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water pressure-reducing valves.
2. Balancing valves.
3. Temperature-actuated, water mixing valves.
4. Strainers for domestic water piping.
5. Hose bibbs.
6. Wall hydrants.
7. Water-hammer arresters.
8. Trap-seal primer device.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 WATER PRESSURE-REDUCING VALVES

A. Water Regulators :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
b. Cash Acme, A Division of Reliance Worldwide Corporation.

c. WATTS.
d. Zurn Industries, LLC.

2. Standard: ASSE 1003.
3. Pressure Rating: Initial working pressure of 150 psig.
4. Body: Bronze for NPS 2 and smaller; for NPS 2-1/2 and NPS 3.
5. Valves for Booster Heater Water Supply: Include integral bypass.
6. End Connections: Threaded or solder for NPS 2 and smaller; flanged or solder for NPS 2-1/2 and NPS 3.

2.4 BALANCING VALVES

A. Memory-Stop Balancing Valves :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
b. Crane; a Crane Co. brand.
c. Hammond Valve.
d. Jenkins Valves; a Crane Co. brand.
e. Milwaukee Valve Company.
f. NIBCO INC.
g. Red-White Valve Corp.
h. Stockham; a Crane Co. brand.

2. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
3. Pressure Rating: 400-psig minimum CWP.
4. Size: NPS 2 or smaller.
5. Body: Copper alloy.
6. Port: Standard or full port.
7. Ball: Chrome-plated brass or stainless steel.
8. Seats and Seals: Replaceable.
9. End Connections: Solder joint or threaded.
10. Handle: Vinyl-covered steel with memory-setting device.

2.5 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Primary, Thermostatic, Water Mixing Valves TMV:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Acorn Engineering Company; a Division of Morris Group International.
b. Apollo Valves; a part of Aalberts Integrated Piping Systems.
c. Cash Acme, A Division of Reliance Worldwide Corporation.
d. Lawler Manufacturing Company, Inc.
e. Leonard Valve Company.
f. POWERS; A WATTS Brand.
g. Symmons Industries, Inc.
h. WATTS.
i. Zurn Industries, LLC.

2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig minimum unless otherwise indicated.
4. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded union inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: 80 deg F.
9. Valve Finish: Rough bronze.

2.6 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Keckley Company.
    b. Titan Flow Control, Inc.
    c. WATTS.
    d. Zurn Industries, LLC.

2. Pressure Rating: 125 psig minimum unless otherwise indicated.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations unless otherwise indicated.
5. Perforation Size:

    a. Strainers NPS 2 and Smaller: 0.062 inch.

2.7 HOSE BIBBS

A. Hose Bibbs HB:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Jay R. Smith Mfg Co; a division of Morris Group International.
    b. MIFAB, Inc.
    c. Prier Products, Inc.
    d. WATTS.
    e. Woodford Manufacturing Company.
    f. Zurn Industries, LLC.

2. Standard: ASME A112.18.1 for sediment faucets.
3. Body Material: Bronze.
4. Seat: Bronze, replaceable.
5. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
6. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
7. Pressure Rating: 125 psig.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.

9. Finish for Service Areas: Rough bronze.
10. Operation for Service Areas: Wheel handle.
11. Operation for Finished Rooms: Wheel handle.
12. Include operating key with each operating-key hose bibb.

2.8 WALL HYDRANTS

A. Nonfreeze Wall Hydrants HB:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Jay R. Smith Mfg Co; a division of Morris Group International.
    b. Josam Company.
    c. MIFAB, Inc.
    d. Prier Products, Inc.
    e. WATTS.
    f. Woodford Manufacturing Company.
    g. Zurn Industries, LLC.

2. Standard: ASME A112.21.3M for exposed-outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Outlet, Exposed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
7. Nozzle and Wall-Plate Finish: .

2.9 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters WHA:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AMTROL, Inc.
    b. Jay R. Smith Mfg Co; a division of Morris Group International.
    c. Josam Company.
    d. MIFAB, Inc.
    e. Precision Plumbing Products.
    f. Sioux Chief Manufacturing Company, Inc.
    g. WATTS.
    h. Zurn Industries, LLC.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Piston.
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.10 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device TPV:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Jay R. Smith Mfg Co; a division of Morris Group International.
   b. Josam Company.
   c. MIFAB, Inc.
   d. Precision Plumbing Products.
   e. Sioux Chief Manufacturing Company, Inc.
   f. WATTS.
   g. Zurn Industries, LLC.

2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

A. Water Regulators: Install with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gauges on inlet and outlet.

B. Balancing Valves: Install in locations where they can easily be adjusted. Set at indicated design flow rates.

C. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.

D. Y-Pattern Strainers: For water, install on supply side of each water pressure-reducing valve.

E. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.

F. Supply-Type, Trap-Seal Primer Device: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

3.2 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 ADJUSTING

A. Set field-adjustable pressure set points of water pressure-reducing valves.

B. Set field-adjustable flow set points of balancing valves.

C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections.

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

END OF SECTION

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hubless, cast-iron soil pipe and fittings.
2. PVC pipe and fittings.

1.2 ACTION SUBMITTALS

A. Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10 ft. head of water.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings:

1. Marked with CISPI collective trademark.
2. ASTM A888 or CISPI 301.

C. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ANACO-Husky.
b. Charlotte Pipe and Foundry Company.
c. Dallas Specialty & Mfg. Co.

d. Fernco Inc.
e. Ideal Clamp Products, Inc.
f. Josam Company.
g. Matco-Norca.
h. MIFAB, Inc.
i. Mission Rubber Company, LLC; a division of MCP Industries.
j. NewAge Casting.
k. Tyler Pipe; a subsidiary of McWane Inc.

2. Standards: ASTM C1277 and CISPI 310.
3. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

2.3 PVC PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Charlotte Pipe and Foundry Company.
2. GF Piping Systems.
3. JM Eagle; J-M Manufacturing Co., Inc.
4. Mueller Industries, Inc.
5. National Pipe and Plastic, Inc.
6. North America Pipe Corporation.
7. Rocky Mountain Colby Pipe Company.
8. Silver-line Plastics.

B. Solid-Wall PVC Pipe: ASTM D2665 drain, waste, and vent.

C. PVC Socket Fittings: ASTM D2665, made in accordance with ASTM D3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

D. Adhesive Primer: ASTM F656.

E. Solvent Cement: ASTM D2564.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.

    a. Straight tees, elbows, and crosses may be used on vent lines.

3. Do not change direction of flow more than 90 degrees.
4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

    a. Reducing size of waste piping in direction of flow is prohibited.

I. Lay buried building waste piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

J. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Waste Piping: Two percent downward in direction of flow.
3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.

K. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

L. Install aboveground ABS piping in accordance with ASTM D2661.

M. Install aboveground PVC piping in accordance with ASTM D2665.

N. Install underground PVC piping in accordance with ASTM D2321.

O. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.

a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.

2. Install drains in sanitary waste gravity-flow piping.

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of concrete walls, ceilings, and floors.

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

3.2 JOINT CONSTRUCTION

A. Hubless, Cast-Iron Soil Piping Coupled Joints:

1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

B. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings in accordance with the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join in accordance with ASTM D2855 and ASTM D2665 appendixes.

C. Joint Restraints and Sway Bracing:

1. Provide joint restraints and sway bracing for storm drainage piping joints to comply with the following conditions:

a. Provide rigid sway bracing for pipe and fittings 4 inches and larger, upstream and downstream of all changes in direction 45 degrees and greater.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Install hangers for cast-iron soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support vertical runs of cast-iron soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.4 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

3.5 IDENTIFICATION

A. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.6 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

E. Repair damage to adjacent materials caused by waste and vent piping installation.

3.7 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller are to be any of the following:

1. Service Class cast-iron soil pipe and fittings; gaskets; and gasketed joints.

2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

C. Aboveground, vent piping NPS 4 and smaller is to be any of the following:

1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

D. Underground, soil, waste, and vent piping NPS 4 and smaller are to be the following:

1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

E. Underground, soil and waste piping NPS 5 and larger are to be the following:

1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

END OF SECTION

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cleanouts.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 PIPING CONNECTIONS

A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 221319.13 - SANITARY DRAINS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Floor drains.
2. Floor sinks.
3. Trench drains.

1.2 DEFINITIONS

A. ABS: Acrylonitrile-butadiene styrene.

B. FRP: Fiberglass-reinforced plastic.

C. HDPE: High-density polyethylene.

D. PE: Polyethylene.

E. PP: Polypropylene.

F. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 FLOOR DRAINS

A. Cast-Iron Floor Drains :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Commercial Enameling Company.
b. Jay R. Smith Mfg. Co.
c. Josam Company.
d. MIFAB, Inc.
e. Prier Products, Inc.
f. Sioux Chief Manufacturing Company, Inc.
g. Wade; a subsidiary of McWane Inc.
h. WATTS.

i. Zurn Industries, LLC.

2. Standard: ASME A112.6.3.
3. Pattern: Area drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.
6. Anchor Flange: Required.
7. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
8. Top Loading Classification: Heavy Duty.
9. Trap Material: Cast iron.

2.2 FLOOR SINKS

A. Cast-Iron Floor Sinks :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Commercial Enameling Company.
   b. Jay R. Smith Mfg. Co.
   c. Josam Company.
   d. MIFAB, Inc.
   e. Prier Products, Inc.
   f. Sioux Chief Manufacturing Company, Inc.
   g. Wade; a subsidiary of McWane Inc.
   h. WATTS.
   i. Zurn Industries, LLC.

2. Standard: ASME A112.6.7.
3. Anchor Flange: Required.
4. Outlet: Bottom, no-hub, connection.
5. Coating on Interior Surfaces: Acid-resistant enamel.

2.3 TRENCH DRAINS

A. Trench Drains :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Jay R. Smith Mfg. Co.
   b. Josam Company.
   c. MIFAB, Inc.
   d. Sioux Chief Manufacturing Company, Inc.
   e. Wade; a subsidiary of McWane Inc.
   f. WATTS.
   g. Zurn Industries, LLC.

2. Standard: ASME A112.6.3 for trench drains.
3. Flange: Anchor Seepage.
4. Outlet: End.
5. Grate Material: Stainless steel.

6. Top Loading Classification: Heavy Duty.
7. Trap Material: Stainless steel.
8. Trap Pattern: Standard P-trap.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
3. Set with grates depressed according to the following drainage area radii:

    a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

4. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.

    a. Maintain integrity of waterproof membranes where penetrated.

5. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

B. Install trench drains at low points of surface areas to be drained.

1. Set grates of drains flush with finished surface, unless otherwise indicated.
2. Install on support devices, so that top will be flush with adjacent surface.

3.2 CONNECTIONS

A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Comply with requirements in Section 221319 "Sanitary Waste Piping Specialties" for backwater valves, air admittance devices and miscellaneous sanitary drainage piping specialties.

C. Install piping adjacent to equipment to allow service and maintenance.

3.3 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 221513 - GENERAL-SERVICE COMPRESSED-AIR PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes piping and related specialties for general-service compressed-air systems, as follows:

1. Pipes, tubes, and fittings.
2. Valves.
3. Quick couplings.

B. Related Requirements:

1. Section 221519 "General-Service Packaged Air Compressors and Receivers" for general-service air compressors and accessories.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Pressure regulators. Include rated capacities and operating characteristics.
2. Quick couplings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Compressed-air piping system to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7. See Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

1. The term "withstand" means "the piping system will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the piping system will be fully operational after the seismic event."
2. Component Importance Factor: 1.0.

B. ASME Compliance:

1. Comply with ASME B31.3, "Process Piping," for low-pressure, compressed-air piping.
2. Comply with ASME B31.9, "Building Services Piping," for low-pressure, compressed-air piping.

2.2 PIPES, TUBES, AND FITTINGS

A. Schedule 40, Steel Pipe: ASTM A53/A53M, Type E or S, Grade B, black or hot-dip zinc coated with ends threaded in accordance with ASME B1.20.1.

1. Steel Nipples: ASTM A733, made of ASTM A53/A53M or ASTM A106, Schedule 40, galvanized seamless steel pipe. Include ends matching joining method.
2. Malleable-Iron Fittings: ASME B16.3, Class 150 or 300, threaded.
3. Steel Flanges: ASME B16.5, Class 150 or 300, carbon steel, threaded.

2.3 VALVES

A. Metal Ball, Butterfly, Check, and Gate Valves: Comply with requirements in Section 220523.12 "Ball Valves for Plumbing Piping," Section 220523.13 "Butterfly Valves for Plumbing Piping," Section 220523.14 "Check Valves for Plumbing Piping," and Section 220523.15 "Gate Valves for Plumbing Piping."

2.4 QUICK COUPLINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Aeroquip Performance Products; Eaton, Hydraulics Sector.
2. Bowes Manufacturing Inc.
3. Foster Manufacturing, Inc.
4. Milton Industries, Inc.
5. Parker Hannifin Corp.
6. Rectus Corp.
7. Schrader-Bridgeport/Standard Thomson.
8. TOMCO Products Inc.
9. Tuthill Corporation.

B. General Requirements for Quick Couplings: Assembly with locking-mechanism feature for quick connection and disconnection of compressed-air hose.

C. Automatic-Shutoff Quick Couplings: Straight-through brass body with O-ring or gasket seal and stainless steel or nickel-plated-steel operating parts.

1. Socket End: With one-way valve and threaded inlet for connection to piping or threaded hose fitting.
2. Plug End: Straight-through type with barbed outlet for attaching hose.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Low-Pressure Compressed-Air Distribution Piping: Use the following piping materials for each size range:

1. NPS 2 and Smaller: Schedule 40, galvanized-steel pipe; threaded, malleable-iron fittings; and threaded joints.

3.2 VALVE APPLICATIONS

A. Metal General-Duty Valves: Comply with requirements and use valve types specified in "Valve Applications" Article in Section 220523.12 "Ball Valves for Plumbing Piping," Section 220523.13 "Butterfly Valves for Plumbing Piping," Section 220523.14 "Check Valves for Plumbing Piping," and Section 220523.15 "Gate Valves for Plumbing Piping," according to the following:

1. Low-Pressure Compressed Air: Valve types specified for low-pressure compressed air.
2. Equipment Isolation NPS 2 and Smaller: Safety-exhaust, copper-alloy ball valve with exhaust vent and pressure rating at least as great as piping system operating pressure.

3.3 INSTALLATION OF PIPING, GENERAL

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of compressed-air piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping protected from physical contact by building occupants, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless otherwise indicated.

D. Where installing piping adjacent to equipment and machines, allow space for service and maintenance.

E. Install nipples, flanges, unions, transition and special fittings, and valves with pressure ratings same as or higher than system pressure rating unless otherwise indicated.

F. Equipment and Specialty Flanged Connections:

1. Use steel companion flange with gasket for connection to steel pipe.

G. Install eccentric reducers where compressed-air piping is reduced in direction of flow, with bottoms of both pipes and reducer fitting flush.

H. Install branch connections to compressed-air mains from top of main. Provide drain leg and drain trap at end of each main and branch and at low points.

I. Install pressure gauge on discharge piping from each air compressor and on each receiver. Comply with requirements in Section 220519 "Meters and Gages for Plumbing Piping."

J. Install piping to permit valve servicing.

K. Install piping free of sags and bends.

L. Install fittings for changes in direction and branch connections.

M. Install seismic restraints on piping. Seismic-restraint devices are specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

N. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Brazed Joints for Copper Tubing: Join in accordance with AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

E. Soldered Joints: Apply ASTM B813, water-flushable flux, unless otherwise indicated, to tube end. Join in accordance with ASTM B828 or CDA's "Copper Tube Handbook."

F. Flanged Joints: Use asbestos-free, nonmetallic gasket suitable for compressed air. Join flanges with gasket and bolts in accordance with ASME B31.9 for bolting procedure.

G. Dissimilar Metal Piping Material Joints: Use dielectric fittings.

3.5 INSTALLATION OF VALVES

A. General-Duty Valves: Comply with requirements in Section 220523.12 "Ball Valves for Plumbing Piping," Section 220523.13 "Butterfly Valves for Plumbing Piping," Section 220523.14 "Check Valves for Plumbing Piping," and Section 220523.15 "Gate Valves for Plumbing Piping."

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

B. Comply with requirements in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment" for hangers, supports, and anchor devices.

C. Install hangers for steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

D. Support horizontal piping within 12 inches of each fitting and coupling.

E. Support vertical runs of steel piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

F. Individual, Straight, Horizontal Piping Runs:

1. 100 Ft. or Less: MSS Type 1, adjustable, steel clevis hangers.
2. Longer Than 100 Ft.: MSS Type 43, adjustable roller hangers.

G. Multiple, Straight, Horizontal Piping Runs 100 Ft. or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

H. Base of Vertical Piping: MSS Type 52, spring hangers.

3.7 LABELING AND IDENTIFICATION

A. Install identifying labels and devices for general-service compressed-air piping, valves, and specialties. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment."

END OF SECTION

SECTION 221519 - GENERAL-SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Oil-flooded, rotary-screw air compressors.
2. Inlet-air filters.
3. Air-cooled, compressed-air aftercoolers.
4. Refrigerant compressed-air dryers.

1.2 DEFINITIONS

A. Actual Air: Air delivered from air compressors. Flow rate is delivered compressed air measured in acfm.

B. Standard Air: Free air at 68 deg F and 1 atmosphere before compression or expansion and measured in scfm.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PACKAGED AIR COMPRESSORS AND RECEIVERS

A. General Description: Factory-assembled, -wired, -piped, and -tested; electric-motor-driven; air-cooled; continuous-duty air compressors and receivers that deliver air of quality equal to intake air.

B. Control Panels: Automatic control station with load control and protection functions. Comply with NEMA ICS 2 and UL 508.

1. Enclosure: NEMA ICS 6, Type 12 control panel unless otherwise indicated.

2. Motor Controllers: Full-voltage, combination magnetic type with undervoltage release feature and motor-circuit-protector-type disconnecting means and short-circuit protective device.
3. Control Voltage: 120-V ac or less, using integral control power transformer.
4. Motor Overload Protection: Overload relay in each phase.
5. Instrumentation: Include discharge-air pressure gage, air-filter maintenance indicator, hour meter, compressor discharge-air and coolant temperature gages, and control transformer.

C. Receivers: Steel tank constructed according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

1. Pressure Rating: At least as high as highest discharge pressure of connected compressors, and bearing appropriate code symbols.
2. Interior Finish: Corrosion-resistant coating.
3. Accessories: Include safety valve, pressure gage, drain, and pressure-reducing valve.

D. Mounting Frame: Fabricate mounting and attachment to pressure vessel with reinforcement strong enough to resist packaged equipment movement during a seismic event when base is anchored to building structure.

2.2 OIL-FLOODED, ROTARY-SCREW AIR COMPRESSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atlas Copco.
2. CompAir, Ltd.
3. Gardner Denver, Inc.
4. Ingersoll-Rand.
5. Kaeser Compressors, Inc.
6. Quincy Compressor.
7. Sullair Corporation.
8. Insert manufacturer's name.

B. Compressor(s): Oil-flooded, rotary-screw type with lubricated helical screws and lubricated gear box.

1. Coupling: Nonlubricated, flexible type.
2. Cooling/Lubrication System: Unit-mounted, air-cooled exchanger package prepiped to unit; with air pressure circulation system with coolant stop valve, full-flow coolant filter, and thermal bypass valve.
3. Air Filter: Dry type, with maintenance indicator and cleanable, replaceable filter element.
4. Air/Coolant Receiver and Separation System: 150-psig- rated steel tank with ASME safety valve, coolant-level gage, multistage air-coolant separator element, minimum pressure valve, blowdown valve, discharge check valve, coolant stop valve, full-flow coolant filter, and thermal bypass valve.
5. Capacity Control: Capacity modulation between zero and 100 percent air delivery, with operating pressures between 50 and 100 psig. Include necessary control to hold constant pressure. When air demand is zero, unload compressor by using pressure switch and blowdown valve.

2.3 INLET-AIR FILTERS

A. Description: Combination inlet-air filter-silencer, suitable for remote installation, for each air compressor.

1. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
2. Capacity: Match capacity of air compressor, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.

2.4 AIR-COOLED, COMPRESSED-AIR AFTERCOOLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air/Tak, Inc.
2. Arrow Pneumatics, Inc.
3. Curtis-Toledo.
4. FS-Curtis Air Compressors.
5. Gardner Denver, Inc.
6. Hankison International.
7. Ingersoll-Rand.
8. McIntire Company.
9. Pneumatech Inc.
10. Saylor-Beall Manufacturing Company.
11. SPX Hankison.
12. Van Air Systems, Inc.
13. Zeks Compressed Air Solutions.

B. Description: Electric-motor-driven, fan-operation, finned-tube unit; rated at 250 psig and leak tested at 350-psig minimum air pressure; in capacities indicated. Size units to cool compressed air in compressor-rated capacities to 10 deg F above summertime maximum ambient temperature. Include moisture separator and automatic drain.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Equipment Mounting:

1. Comply with requirements for vibration isolation and seismic control devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment"

B. Install compressed-air equipment anchored to substrate.

C. Arrange equipment so controls and devices are accessible for servicing.

D. Maintain manufacturer's recommended clearances for service and maintenance.

E. Install the following devices on compressed-air equipment:

1. Thermometer, Pressure Gage, and Safety Valve: Install on each compressed-air receiver.
2. Pressure Regulators: Install downstream from air compressors.
3. Automatic Drain Valves: Install on aftercoolers, receivers, and dryers. Discharge condensate over nearest floor drain.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 221513 "General-Service Compressed-Air Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to machine, allow space for service and maintenance.

3.3 IDENTIFICATION

A. Identify general-service air compressors and components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain air compressors and aftercoolers.

END OF SECTION

SECTION 224500 - EMERGENCY PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Eyewash equipment.

1.2 DEFINITIONS

A. Portable, Self-Contained Emergency Plumbing Fixture: Fixture with flushing-fluid supply.

B. Tepid: Between 60 and 100 deg F.

1.3 ACTION SUBMITTALS

A. Product data.

B. Shop Drawings:

1. Plans, elevations, sections, and mounting details.
2. Diagrams for power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ANSI/ISEA Z358.1 for emergency plumbing fixtures including third-party certification of fixtures.

B. Comply with requirements in ICC A117.1 for plumbing fixtures for people with disabilities.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 EYEWASH EQUIPMENT

A. Eyewash Units - Standalone, Heated:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Bradley Corporation.
b. Guardian Equipment Co.
c. Speakman Company.
d. Haws Corporation.

2. Capacity: Not less than 0.4 gpm for at least 15 minutes.
3. Heated water supply tank.
4. 120V, corded.

PART 3 - EXECUTION

3.1 INSTALLATON OF EMERGENCY PLUMBING FIXTURE

A. Assemble emergency plumbing fixture piping, fittings, control valves, and other components.

B. Install fixtures level and plumb.

C. Fasten fixtures to substrate.

D. Fill self-contained fixtures with flushing fluid.

3.2 PIPING CONNECTIONS

A. Where installing piping adjacent to emergency plumbing fixtures, allow space for service and maintenance of fixtures.

3.3 ELECTRICAL CONNECTIONS

A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted in accordance with NFPA 70.

3.4 FIELD QUALITY CONTROL

A. Mechanical-Component Testing: After plumbing connections have been made, test for compliance with requirements. Verify ability to achieve indicated capacities.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
4. Emergency plumbing fixtures and water-tempering equipment will be considered defective if they do not pass tests and inspections.

3.5 ADJUSTING

A. Operate and adjust emergency plumbing fixtures and controls. Replace damaged and malfunctioning fixtures and controls.

B. Adjust or replace fixture flow regulators for proper flow.

C. Adjust equipment temperature settings.

3.6 CLEANING AND PROTECTION

A. Clean emergency plumbing fixtures with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed emergency plumbing fixtures and fittings.

C. Do not allow use of emergency plumbing fixtures for temporary facilities or during construction.

END OF SECTION

SECTION 230548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Spring hangers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Consequential Damage: Provide additional seismic restraints for suspended HVAC components or anchorage of floor-, roof-, or wall-mounted HVAC components as indicated in ASCE/SEI 7-05 so that failure of a non-essential or essential HVAC component will not cause failure of any other essential architectural, mechanical, or electrical building component.

2.2 SPRING HANGERS

A. Combination Coil-Spring Hanger with Spring in Compression: .

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Ace Mountings Co., Inc.
b. CADDY; brand of nVent Electrical plc.
c. California Dynamics Corporation.
d. Kinetics Noise Control, Inc.
e. Mason Industries, Inc.
f. Novia; A Division of C&P.
g. Vibration Eliminator Co., Inc.
h. Vibration Isolation.
i. Vibration Management Corp.
j. Vibration Mountings & Controls, Inc.

2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.

4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
8. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES.

B. Hanger-Rod Stiffeners: Install where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.2 INSTALLATION OF VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICES

A. Provide vibration-control devices for systems and equipment where indicated in Equipment Schedules or Vibration-Control Devices Schedules, where indicated on Drawings, or where Specifications indicate they are to be installed on specific equipment and systems.

B. Provide seismic-restraint devices for systems and equipment where indicated in Equipment Schedules or Seismic-Restraint Devices Schedules, where indicated on Drawings, where Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.

C. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

D. Equipment Restraints:

1. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES that provides required submittals for component.

E. Install seismic-restraint cables so they do not bend across edges of adjacent equipment or building structure.

F. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES that provides required submittals for component.

G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

3.3 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Provide flexible connections in piping systems where they cross structural seismic joints and other point where differential movement may occur. Provide adequate flexibility to accommodate differential movement as determined in accordance with ASCE/SEI 7. Comply with requirements in Section 232113 "Hydronic Piping" and Section 232116 "Hydronic Piping Specialties" for piping flexible connections.

3.4 ADJUSTING

A. Adjust isolators after system is at operating weight.

B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Brady Corporation.
    b. Brimar Industries, Inc.
    c. Carlton Industries, LP.
    d. Champion America.
    e. Craftmark Pipe Markers.
    f. emedco.
    g. Kolbi Pipe Marker Co.
    h. LEM Products Inc.
    i. Marking Services, Inc.
    j. Seton Identification Products; a Brady Corporation company.
2. Letter and Background Color: As indicated for specific application under Part 3.
3. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
6. Fasteners: Stainless steel rivets or self-tapping screws.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS

A. Permanently fasten labels on each item of mechanical equipment.

B. Sign and Label Colors:

1. White letters on an ANSI Z535.1 safety-blue background.

C. Locate equipment labels where accessible and visible.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Testing, Adjusting, and Balancing of Air Systems:

    a. Constant-volume air systems.

2. Testing, adjusting, and balancing of equipment.
3. HVAC-control system verification.

1.2 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.

F. TDH: Total dynamic head.

G. UFAD: Underfloor air distribution.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Certified TAB reports.

C. Sample report forms.

1.4 FIELD CONDITIONS

A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, gauge cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data, including fan curves.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.

H. Examine operating safety interlocks and controls on HVAC equipment.

I. Examine control dampers for proper installation for their intended function of isolating, throttling, diverting, or mixing air flows.

J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Duct systems are complete with terminals installed.
b. Volume, smoke, and fire dampers are open and functional.
c. Fans are operating, free of vibration, and rotating in correct direction.
d. Automatic temperature-control systems are operational.

e. Windows and doors are installed.
f. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Cut insulation, ducts, pipes, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. Where holes for probes are required in piping or hydronic equipment, install pressure and temperature test plugs to seal systems.

B. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

C. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 TESTING, ADJUSTING, AND BALANCING OF HVAC EQUIPMENT

A. Test, adjust, and balance HVAC equipment indicated on Drawings, including, but not limited to, the following:

1. Fans and ventilators.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' Record drawings duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Check dampers for proper position to achieve desired airflow path.

G. Check for airflow blockages.

H. Check condensate drains for proper connections and functioning.

I. Check for proper sealing of air-handling-unit components.

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
    b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses close to the fan and prior to any outlets, to obtain total airflow.
    c. Where duct conditions are unsuitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.

2. Measure fan static pressures as follows:

    a. Measure static pressure directly at the fan outlet or through the flexible connection.
    b. Measure static pressure directly at the fan inlet or through the flexible connection.
    c. Measure static pressure across each component that makes up the air-handling system.
    d. Report artificial loading of filters at the time static pressures are measured.

3. Review Contractor-prepared shop drawings and Record drawings to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
4. Obtain approval from Construction Manager for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.
2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, speed, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.7 HVAC CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify HVAC control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controller set points are as indicated.
4. Verify the operation of lockout or interlock systems.
5. Verify the operation of valve and damper actuators.
6. Verify that controlled devices are properly installed and connected to correct controller.
7. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
8. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.8 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 10 percent or minus 5 percent. If design value is less than 100 cfm, within 10 cfm.
2. Air Outlets and Inlets: Plus 10 percent or minus 5 percent. If design value is less than 100 cfm, within 10 cfm.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.9 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Contractor's name and address.
6. Report date.
7. Signature of TAB supervisor who certifies the report.
8. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
9. Notes to explain why certain final data in the body of reports vary from indicated values.

D. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

    a. System identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Fuel type in input data.
    g. Output capacity in Btu/h.
    h. Ignition type.
    i. Burner-control types.
    j. Motor horsepower and speed.
    k. Motor volts, phase, and hertz.
    l. Motor full-load amperage and service factor.
    m. Sheave make, size in inches, and bore.
    n. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Test Data (Indicated and Actual Values):

    a. Total airflow rate in cfm.
    b. Entering-air temperature in deg F.
    c. Leaving-air temperature in deg F.
    d. Low-fire fuel input in Btu/h.
    e. High-fire fuel input in Btu/h.

f. Operating set point in Btu/h.

E. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and speed.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Fan speed.

END OF SECTION

SECTION 230923.12 - CONTROL DAMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electric and electronic control-damper actuators.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of damper and actuator:

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE 62.1 Compliance: Applicable outdoor ventilation requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. Code Compliance: Comply with governing energy code.

E. Ground Fault: Properly ground products to prevent failing due to ground fault conditions.

F. Backup Power Source: Serve control-damper actuators from a backup power source where associated with systems and equipment served by a backup power source.

G. Environmental Conditions: For actuators not available with integral enclosures complying with requirements indicated, house in protective secondary enclosures complying with requirements.

H. Selection Criteria:

1. Multi-Blade Damper Configuration: As follows unless otherwise indicated on Drawings:

a. Two-Position Control: Opposed.
b. Equipment Isolation Applications: Opposed.
c. All Other Applications: Opposed.

2. Pressure and Temperature: Control dampers suitable for operating conditions encountered by the application and following conditions unless otherwise indicated on Drawings:

    a. Outdoor Air: -10 degF.
    b. Exhaust Air: 100%RH, corrosive in Brine area.

3. Fail-Safe Positions: As follows unless otherwise indicated on Drawings:

    a. Outdoor Air: Close.
    b. Exhaust Air: Open.

4. Select dampers with smooth and stable operation throughout full range of operation over varying pressures and temperatures encountered.
5. Sizing: As follows unless otherwise indicated on Drawings

    a. Two-Position Dampers: Full size of duct or equipment connection unless otherwise indicated.

2.2 GENERAL CONTROL-DAMPER ACTUATORS REQUIREMENTS

A. Select actuators to operate related damper(s) with sufficient reserve power to provide smooth modulating action or two-position action and proper speed of response at velocity and pressure conditions to which the damper is subjected.

B. Select actuators with sufficient power and torque to close off against the maximum system pressures encountered. Actuators are to be sized to close off against the fan shutoff pressure as a minimum requirement.

C. The total damper area operated by an actuator is not to exceed 80 percent of manufacturer's maximum area rating.

D. Provide one actuator for each damper assembly where possible. Operate multiple actuators required to drive a single damper assembly in unison.

E. Avoid the use of excessively oversized actuators, which could overdrive and cause linkage failure when the damper blade has reached either its full open or closed position.

F. Use jackshafts and shaft couplings in lieu of blade-to-blade linkages when driving axially aligned damper sections.

G. Provide mounting hardware and linkages for connecting actuator to damper.

H. Select actuators to fail in desired position in the event of a power and signal failure.

I. Actuator Fail-Safe Positions: As indicated below:

    1. Exhaust Air: Open.
    2. Outdoor Air: Close.

2.3 ELECTRIC AND ELECTRONIC CONTROL-DAMPER ACTUATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belimo Aircontrols (USA), Inc.
2. Honeywell Building Solutions; Honeywell International, Inc.
3. Johnson Controls, Inc.
4. Schneider Electric USA, Inc.
5. Siemens Industry, Inc., Building Technologies Division.

B. Type: Motor operated, with or without gears, electric and electronic.

C. Voltage: 120V

1. Actuator to deliver torque required for continuous uniform movement of controlled device from limit to limit when operated at rated voltage.
2. Actuator to function properly within a range of 85 to 120 percent of nameplate voltage.

D. Local Field Adjustment: Make spring-return actuators easily switchable from fail-safe open to fail-safe closed in the field without replacement.

E. Two-Position Actuators: Single direction, spring return or reversing type.

F. Integral Overload Protection:

1. Provide against overload throughout the entire operating range in both directions.
2. Electronic overload, digital rotation sensing circuitry, mechanical end switches, or magnetic clutches are acceptable methods of protection.

G. Damper Attachment:

1. Unless otherwise required for damper interface, provide actuator designed to be directly coupled to damper shaft without need for connecting linkages.
2. Attach actuator to damper drive shaft in a way that ensures maximum transfer of power and torque without slippage.
3. Bolt and setscrew method of attachment is acceptable only if provided with at least two points of attachment.

H. Temperature and Humidity:

1. Temperature: Suitable for operating temperature range encountered by application with minimum operating temperature range of minus 20 to plus 120 deg F.
2. Humidity: Suitable for humidity range encountered by application; minimum operating range is to be from 5 to 95 percent relative humidity, noncondensing.

I. Enclosure:

1. Suitable for ambient conditions encountered by application.
2. NEMA 250, Type 4 for indoor applications, except;

3. NEMA 250, Type 4X for outdoor and Brine area.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Furnish and install products required to satisfy most stringent requirements indicated.

B. Properly support dampers and actuators, tubing, wiring, and conduit to comply with requirements indicated. Brace all products to prevent lateral movement and sway or a break in attachment when subjected to a seismic, wind, or others forces common to the application.

C. Seal penetrations made in fire-rated and acoustically rated assemblies.

D. Fastening Hardware:

1. Wrenches, pliers, or other tools that will cause injury to or mar surfaces of rods, nuts, and other parts are prohibited for assembling and tightening nuts.
2. Tighten bolts and nuts firmly and uniformly. Do not overstress threads by excessive force or by oversized wrenches.
3. Lubricate threads of bolts, nuts, and screws with graphite and oil before assembly.

E. Install products in locations that are accessible and that will permit calibration and maintenance from floor, equipment platforms, or catwalks. Where ladders are required for Owner's access, confirm unrestricted ladder placement is possible under occupied condition.

F. Corrosive Environments:

1. Use products that are suitable for environment to which they will be subjected.
2. Use Type 316 stainless steel tubing and fittings when in contact with a corrosive environment; Brine areas.
3. When conduit is in contact with a corrosive environment, use Type 316 stainless steel conduit and fittings or conduit and fittings that are coated with a corrosive-resistant coating that is suitable for environment.
4. Where actuators are located in a corrosive environment and are not corrosive resistant from manufacturer, field install products in NEMA 250, Type 4X enclosure constructed of Type 316L stainless steel.

3.2 CONTROL DAMPERS

A. Clearance:

1. Locate dampers for easy access and provide separate support of dampers that cannot be handled by service personnel without hoisting mechanism.
2. Install dampers with at least 24 inches of clear space on sides of dampers requiring service access unless more space is recommended by manufacturer. Provide code required clearances as applicable.

B. Service Access:

1. Install dampers and actuators to be accessible for visual inspection and service.

C. Install dampers straight and true, level in all planes, and square in all dimensions.

D. Install supplementary structural reinforcement for large multiple-section dampers if factory-furnished support alone cannot handle loading.

E. Attach field-installed actuator(s) to damper drive shaft.

F. For duct-mounted and equipment-mounted dampers installed outside of equipment, install a visible and accessible indication of damper position from outside.

3.3 ELECTRICAL CONNECTIONS

A. Install electrical power to field-mounted control devices requiring electrical power.

B. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260523 "Control-Voltage Electrical Power Cables."

C. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

D. Furnish and install raceways. Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems."

E. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

F. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate to be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.4 CONTROL CONNECTIONS

A. Install control signal wiring to field-mounted control devices.

B. Furnish and install raceways. Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems."

3.5 CLEANING

A. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from exposed surfaces.

3.6 STARTUP

A. Control-Damper Checkout:

1. Check installed products before continuity tests, leak tests, and calibration.
2. Check dampers for proper location and accessibility.
3. Verify that control dampers are installed correctly for flow direction.
4. Verify that proper blade alignment, either parallel or opposed, has been provided.
5. Verify that damper frame attachment is properly secured and sealed.
6. Verify that damper actuator and damper linkage attachment are secure.
7. Verify that actuator wiring is complete, enclosed, and connected to correct power source.
8. Verify that damper blade travel is smooth and unobstructed throughout operating range.

3.7 ADJUSTMENT, CALIBRATION, AND TESTING:

A. Stroke and adjust control dampers following manufacturer's recommended procedure, from 100 percent open to 100 percent closed back to 100 percent open.

B. Check and document open and close cycle times for applications with a cycle time of less than 30 seconds.

END OF SECTION

SECTION 233416 - CENTRIFUGAL HVAC FANS

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. Square in-line centrifugal fans.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
2. Rated capacities, operating characteristics, and furnished specialties and accessories.
3. Certified fan performance curves with system operating conditions indicated.
4. Certified fan sound-power ratings.
5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
6. Material thickness and finishes, including color charts.
7. Fan speed controllers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit components.

C. Seismic Performance: Centrifugal fans shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. See Section 230548 "Vibration and Seismic Controls for HVAC."

1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Component Importance Factor: 1.0.

D. Capacities and Characteristics:

1. Fan Type: Square in-line centrifugal.
2. Housing Material: Reinforced steel .
3. Housing Coating: Hot-dip galvanized.
4. Vibration Isolators:

a. Type: Restrained spring.
b. Static Deflection: 1 inch.

2.2 SQUARE IN-LINE CENTRIFUGAL FANS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carnes Company.
2. Greenheck Fan Corporation.
3. Loren Cook Company.
4. PennBarry.

B. Description: Square in-line centrifugal fans.

C. Housing:

1. Housing Material: Reinforced steel.
2. Housing Coating: Hot-dip galvanized.
3. Housing Construction: Side panels shall be easily removable for service. Include inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.

D. Accessories:

1. Access for Inspection, Cleaning, and Maintenance: Comply with requirements in ASHRAE 62.1.
2. Variable-Speed Controller: Solid-state ECM control to reduce speed from 100 to less than 50 percent.
3. Companion Flanges: For inlet and outlet duct connections.
4. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install centrifugal fans level and plumb.

B. Lift and support units with manufacturer's designated lifting or supporting points.

C. Equipment Mounting:

1. Comply with requirements for vibration isolation and seismic-control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

D. Unit Support: Install centrifugal fans level on structural brackets or hangers. Coordinate with duct connections. Coordinate wall penetrations and flashing with wall construction.

E. Install units with clearances for service and maintenance.

F. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK AND PIPING CONNECTIONS

A. Install ducts adjacent to fans to allow service and maintenance.

3.3 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

3.4 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.5 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Verify that shipping, blocking, and bracing are removed.
3. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
4. Verify that cleaning and adjusting are complete.
5. For direct-drive fans, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation.

6. For belt-drive fans, disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
7. Adjust belt tension.
8. Adjust damper linkages for proper damper operation.
9. Verify lubrication for bearings and other moving parts.
10. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
11. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
12. Shut unit down and reconnect automatic temperature-control operators.
13. Remove and replace malfunctioning units and retest as specified above.

3.6 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Lubricate bearings.

D. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.7 CLEANING

A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Fans and components will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

3.9 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION

SECTION 260010 - SUPPLEMENTAL REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Supplemental requirements generally applicable to the Work specified in Division 26. This Section is also referenced by related Work specified in other Divisions.

B. Related Requirements:

1. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 REFERENCES

A. Abbreviations and Acronyms for Electrical Terms and Units of Measure:

1. 8P8C: An 8-position 8-contact modular jack.
2. A: Ampere, unit of electrical current.
3. AC or ac: Alternating current.
4. AFCI: Arc-fault circuit interrupter.
5. AIC: Ampere interrupting capacity.
6. AL, Al, or ALUM: Aluminum.
7. ASD: Adjustable-speed drive.
8. ATS: Automatic transfer switch.
9. AWG: American wire gauge; see ASTM B258.
10. BAS: Building automation system.
11. BIL: Basic impulse insulation level.
12. BIM: Building information modeling.
13. CAD: Computer-aided design or drafting.
14. CATV: Community antenna television.
15. CB: Circuit breaker.
16. cd: Candela, the SI fundamental unit of luminous intensity.
17. CO/ALR: Copper-aluminum, revised.
18. COPS: Critical operations power system.
19. CU or Cu: Copper.
20. CU-AL or AL-CU: Copper-aluminum.
21. dB: Decibel, a unitless logarithmic ratio of two electrical, acoustical, or optical power values.
22. dB(A-weighted) or dB(A): Decibel acoustical sound pressure level with A-weighting applied in accordance with IEC 61672-1.
23. dB(adjusted) or dBa: Decibel weighted absolute noise power with respect to 3.16 pW (minus 85 dBm).
24. dBm: Decibel absolute power with respect to 1 mW.
25. DC or dc: Direct current.
26. DCOA: Designated critical operations area.

27. DDC: Direct digital control (HVAC).
28. EGC: Equipment grounding conductor.
29. ELV: Extra-low voltage.
30. EMF: Electromotive force.
31. EMI: Electromagnetic interference.
32. EPM: Electrical preventive maintenance.
33. EPS: Emergency power supply.
34. EPSS: Emergency power supply system.
35. ESS: Energy storage system.
36. EV: Electric vehicle.
37. EVPE: Electric vehicle power export equipment.
38. EVSE: Electric vehicle supply equipment.
39. fc: Footcandle, an internationally recognized unit of illuminance equal to one lumen per square foot or 10.76 lx. The simplified conversion 1 fc = 10 lx in the Specifications is common practice and considered adequate precision for building construction activities. When there are conflicts, lux is the primary unit; footcandle is specified for convenience.
40. FLC: Full-load current.
41. ft: Foot.
42. ft-cd: Foot-candle, the antiquated U.S. Standard unit of illuminance, equal to one international candle measured at a distance of one foot, that was superseded in 1948 by the unit "footcandle" after the SI unit candela (cd) replaced the international candle; see "fc,"
43. GEC: Grounding electrode conductor.
44. GFCI: Ground-fault circuit interrupter.
45. GFPE: Ground-fault protection of equipment.
46. GND: Ground.
47. HACR: Heating, air conditioning, and refrigeration.
48. HDPE: High-density polyethylene.
49. HID: High-intensity discharge.
50. HP or hp: Horsepower.
51. HVAC: Heating, ventilating, and air conditioning.
52. Hz: Hertz.
53. IBT: Intersystem bonding termination.
54. inch: Inch. To avoid confusion, the abbreviation "in." is not used.
55. IP: Ingress protection rating (enclosures); Internet protocol (communications).
56. IR: Infrared.
57. IS: Intrinsically safe.
58. IT&R: Inspecting, testing, and repair.
59. ITE: Information technology equipment.
60. kAIC: Kiloampere interrupting capacity.
61. kcmil or MCM: One thousand circular mils.
62. kV: Kilovolt.
63. kVA: Kilovolt-ampere.
64. kVAr or kVAR: Kilovolt-ampere reactive.
65. kW: Kilowatt.
66. kWh: Kilowatt-hour.
67. LAN: Local area network.
68. lb: Pound (weight).
69. lbf: Pound (force).
70. LCD: Liquid-crystal display.
71. LCDI: Leakage-current detector-interrupter.
72. LED: Light-emitting diode.
73. Li-ion: Lithium-ion.
74. lm: Lumen, the SI derived unit of luminous flux.

75. LNG: Liquefied natural gas.
76. LP-Gas: Liquefied petroleum gas.
77. LRC: Locked-rotor current.
78. LV: Low voltage.
79. lx: Lux, the SI derived unit of illuminance equal to one lumen per square meter.
80. m: Meter.
81. MCC: Motor-control center.
82. MDC: Modular data center.
83. MG set: Motor-generator set.
84. MIDI: Musical instrument digital interface.
85. MLO: Main lugs only.
86. MV: Medium voltage.
87. MVA: Megavolt-ampere.
88. mW: Milliwatt.
89. MW: Megawatt.
90. MWh: Megawatt-hour.
91. NC: Normally closed.
92. Ni-Cd: Nickel-cadmium.
93. Ni-MH: Nickel-metal hydride.
94. NIU: Network interface unit.
95. NO: Normally open.
96. NPT: National (American) standard pipe taper.
97. OCPD: Overcurrent protective device.
98. ONT: Optical network terminal.
99. PC: Personal computer.
100. PCS: Power conversion system.
101. PCU: Power-conditioning unit.
102. PF or pf: Power factor.
103. PHEV: Plug-in hybrid electric vehicle.
104. PLC: Programmable logic controller.
105. PLFA: Power-limited fire alarm.
106. PoE: Power over Ethernet.
107. PV: Photovoltaic.
108. PVC: Polyvinyl chloride.
109. pW: Picowatt.
110. RFI: (electrical) Radio-frequency interference; (contract) Request for interpretation.
111. RMS or rms: Root-mean-square.
112. RPM or rpm: Revolutions per minute.
113. SCADA: Supervisory control and data acquisition.
114. SCR: Silicon-controlled rectifier.
115. SPD: Surge protective device.
116. sq.: Square.
117. SWD: Switching duty.
118. TCP/IP: Transmission control protocol/Internet protocol.
119. TEFC: Totally enclosed fan-cooled.
120. TR: Tamper resistant.
121. TVSS: Transient voltage surge suppressor.
122. UL: (standards) Underwriters Laboratories, Inc.; (product categories) UL, LLC.
123. UL CCN: UL Category Control Number.
124. UPS: Uninterruptible power supply.
125. USB: Universal serial bus.
126. UV: Ultraviolet.
127. V: Volt, unit of electromotive force.
128. V(ac): Volt, alternating current.

129. V(dc): Volt, direct current.
130. VA: Volt-ampere, unit of complex electrical power.
131. VAR: Volt-ampere reactive, unit of reactive electrical power.
132. VFC: Variable-frequency controller.
133. VOM: Volt-ohm-multimeter.
134. VPN: Virtual private network.
135. VRLA: Valve regulated lead acid; also called "sealed lead acid (SLA)" or "valve regulated sealed lead acid."
136. W: Watt, unit of real electrical power.
137. Wh: Watt-hour, unit of electrical energy usage.
138. WPT: Wireless power transfer.
139. WPTE: Wireless power transfer equipment.
140. WR: Weather resistant.

B. Abbreviations and Acronyms for Electrical Raceway Types:

1. EMT: Electrical metallic tubing.
2. EMT-A: Aluminum electrical metallic tubing.
3. EMT-S: Steel electrical metallic tubing.
4. EMT-SS: Stainless steel electrical metallic tubing.
5. ENT: Electrical nonmetallic tubing.
6. EPEC: Electrical HDPE underground conduit.
7. EPEC-40: Schedule 40 electrical HDPE underground conduit.
8. EPEC-80: Schedule 80 electrical HDPE underground conduit.
9. EPEC-A: Type A electrical HDPE underground conduit.
10. EPEC-B: Type B electrical HDPE underground conduit.
11. ERMC: Electrical rigid metal conduit.
12. ERMC-A: Aluminum electrical rigid metal conduit.
13. ERMC-S: Steel electrical rigid metal conduit.
14. ERMC-S-G: Galvanized-steel electrical rigid metal conduit.
15. ERMC-S-PVC: PVC-coated-steel electrical rigid metal conduit.
16. ERMC-SS: Stainless steel electrical rigid metal conduit.
17. FMC: Flexible metal conduit.
18. FMC-A: Aluminum flexible metal conduit.
19. FMC-S: Steel flexible metal conduit.
20. FMT: Steel flexible metallic tubing.
21. FNMC: Flexible nonmetallic conduit. See "LFNC."
22. HDPE: See EPEC.
23. IMC: Steel electrical intermediate metal conduit.
24. LFMC: Liquidtight flexible metal conduit.
25. LFMC-A: Aluminum liquidtight flexible metal conduit.
26. LFMC-S: Steel liquidtight flexible metal conduit.
27. LFMC-SS: Stainless steel liquidtight flexible metal conduit.
28. LFNC: Liquidtight flexible nonmetallic conduit.
29. LFNC-A: Layered (Type A) liquidtight flexible nonmetallic conduit.
30. LFNC-B: Integral (Type B) liquidtight flexible nonmetallic conduit.
31. LFNC-C: Corrugated (Type C) liquidtight flexible nonmetallic conduit.
32. PVC: Rigid PVC conduit.
33. PVC-40: Schedule 40 rigid PVC conduit.
34. PVC-80: Schedule 80 rigid PVC Conduit.
35. PVC-A: Type A rigid PVC concrete-encased conduit.
36. PVC-EB: Type EB rigid PVC concrete-encased underground conduit.
37. RGS: See ERMC-S-G.
38. RMC: See ERMC.
39. RTRC: Reinforced thermosetting resin conduit.

40. RTRC-AG: Low-halogen, aboveground reinforced thermosetting resin conduit.
41. RTRC-AG-HW: Heavy wall, low-halogen, aboveground reinforced thermosetting resin conduit.
42. RTRC-AG-SW: Standard wall, low-halogen, aboveground reinforced thermosetting resin conduit.
43. RTRC-AG-XW: Extra heavy wall, low-halogen, aboveground reinforced thermosetting resin conduit.
44. RTRC-BG: Low-halogen, belowground reinforced thermosetting resin conduit.

C. Abbreviations and Acronyms for Electrical Single-Conductor and Multiple-Conductor Cable Types:

1. AC: Armored cable.
2. CATV: Coaxial general-purpose cable.
3. CATVP: Coaxial plenum cable.
4. CATVR: Coaxial riser cable.
5. CI: Circuit integrity cable.
6. CL2: Class 2 cable.
7. CL2P: Class 2 plenum cable.
8. CL2R: Class 2 riser cable.
9. CL2X: Class 2 cable, limited use.
10. CL3: Class 3 cable.
11. CL3P: Class 3 plenum cable.
12. CL3R: Class 3 riser cable.
13. CL3X: Class 3 cable, limited use.
14. CM: Communications general-purpose cable.
15. CMG: Communications general-purpose cable.
16. CMP: Communications plenum cable.
17. CMR: Communications riser cable.
18. CMUC: Under-carpet communications wire and cable.
19. CMX: Communications cable, limited use.
20. DG: Distributed generation cable.
21. FC: Flat cable.
22. FCC: Flat conductor cable.
23. FPL: Power-limited fire-alarm cable.
24. FPLP: Power-limited fire-alarm plenum cable.
25. FPLR: Power-limited fire-alarm riser cable.
26. IGS: Integrated gas spacer cable.
27. ITC: Instrumentation tray cable.
28. ITC-ER: Instrumentation tray cable, exposed run.
29. MC: Metal-clad cable.
30. MC-HL: Metal-clad cable, hazardous location.
31. MI: Mineral-insulated, metal-sheathed cable.
32. MTW: (machine tool wiring) Moisture-, heat-, and oil-resistant thermoplastic cable.
33. MV: Medium-voltage cable.
34. NM: Nonmetallic sheathed cable.
35. NMC: Nonmetallic sheathed cable with corrosion-resistant nonmetallic jacket.
36. NMS: Nonmetallic sheathed cable with signaling, data, and communications conductors, plus power or control conductors.
37. NPLF: Non-power-limited fire-alarm circuit cable.
38. NPLFP: Non-power-limited fire-alarm circuit cable for environmental air spaces.
39. NPLFR: Non-power-limited fire-alarm circuit riser cable.
40. NUCC: Nonmetallic underground conduit with conductors.
41. OFC: Conductive optical fiber general-purpose cable.

42. OFCG: Conductive optical fiber general-purpose cable.
43. OFCP: Conductive optical fiber plenum cable.
44. OFCR: Conductive optical fiber riser cable.
45. OFN: Nonconductive optical fiber general-purpose cable.
46. OFNG: Nonconductive optical fiber general-purpose cable.
47. OFNP: Nonconductive optical fiber plenum cable.
48. OFNR: Nonconductive optical fiber riser cable.
49. P: Marine shipboard cable.
50. PLTC: Power-limited tray cable.
51. PLTC-ER: Power-limited tray cable, exposed run.
52. PV: Photovoltaic cable.
53. RHH: (high heat) Thermoset rubber, heat-resistant cable.
54. RHW: Thermoset rubber, moisture-resistant cable.
55. SA: Silicone rubber cable.
56. SE: Service-entrance cable.
57. SER: Service-entrance cable, round.
58. SEU: Service-entrance cable, flat.
59. SIS: Thermoset cable for switchboard and switchgear wiring.
60. TBS: Thermoplastic cable with outer braid.
61. TC: Tray cable.
62. TC-ER: Tray cable, exposed run.
63. TC-ER-HL: Tray cable, exposed run, hazardous location.
64. THW: Thermoplastic, heat- and moisture-resistant cable.
65. THHN: Thermoplastic, heat-resistant cable with nylon jacket outer sheath.
66. THHW: Thermoplastic, heat- and moisture-resistant cable.
67. THWN: Thermoplastic, moisture- and heat-resistant cable with nylon jacket outer sheath.
68. TW: Thermoplastic, moisture-resistant cable.
69. UF: Underground feeder and branch-circuit cable.
70. USE: Underground service-entrance cable.
71. XHH: Cross-linked polyethylene, heat-resistant cable.
72. XHHW: Cross-linked polyethylene, heat- and moisture-resistant cable.

D. Abbreviations and Acronyms for Electrical Flexible Cord Types:

1. SEO: 600 V extra-hard-usage, hard-service cord with thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer covering for damp locations.
2. SEOW: 600 V extra-hard-usage, hard-service cord with thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer covering for damp or wet locations.
3. SEOO: 600 V extra-hard-usage, hard-service cord with oil-resistant thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer covering for damp locations.
4. SEOOW: 600 V extra-hard-usage, hard-service cord with oil-resistant thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer covering for damp or wet locations.
5. SJEO: 300 V hard-usage, junior hard-service cord with thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer cover for damp locations.
6. SJEOW: 300 V hard-usage, junior hard-service cord with thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer cover for damp or wet locations.

7. SJEOO: 300 V hard-usage, junior hard-service cord with oil-resistant thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer cover for damp locations.
8. SJEOOW: 300 V hard-usage, junior hard-service cord with oil-resistant thermoplastic elastomer insulation and oil-resistant thermoplastic elastomer outer cover for damp or wet locations.
9. SJO: 300 V hard-usage, junior hard-service cord with thermoset insulation and oil-resistant thermoset outer cover for damp locations.
10. SJOW: 300 V hard-usage, junior hard-service cord with thermoset insulation and oil-resistant thermoset outer cover for damp or wet locations.
11. SJOO: 300 V hard-usage, junior hard-service cord with oil-resistant thermoset insulation and oil-resistant thermoset outer cover for damp locations.
12. SJOOW: 300 V hard-usage, junior hard-service cord with oil-resistant thermoset insulation and oil-resistant thermoset outer cover for damp or wet locations.
13. SJTO: 300 V hard-usage, junior hard-service cord with thermoplastic insulation and oil-resistant thermoplastic outer cover for damp locations.
14. SJTOW: 300 V hard-usage, junior hard-service cord with thermoplastic insulation and oil-resistant thermoplastic outer cover for damp or wet locations.
15. SJTOO: 300 V hard-usage, junior hard-service cord with oil-resistant thermoplastic insulation and oil-resistant thermoplastic outer cover for damp locations.
16. SJTOOW: 300 V hard-usage, junior hard-service cord with oil-resistant thermoplastic insulation and oil-resistant thermoplastic outer cover for damp or wet locations.
17. SO: 600 V extra-hard-usage, hard-service cord with thermoset insulation and oil-resistant thermoset outer covering for damp locations.
18. SOW: 600 V extra-hard-usage, hard-service cord with thermoset insulation and oil-resistant thermoset outer covering for damp or wet locations.
19. SOO: 600 V extra-hard-usage, hard-service cord with oil-resistant thermoset insulation and oil-resistant thermoset outer covering for damp locations.
20. SOOW: 600 V extra-hard-usage, hard-service cord with oil-resistant thermoset insulation and oil-resistant thermoset outer covering for damp or wet locations.
21. STO: 600 V extra-hard-usage, hard-service cord with thermoplastic insulation and oil-resistant thermoplastic outer covering for damp locations.
22. STOW: 600 V extra-hard-usage, hard-service cord with thermoplastic insulation and oil-resistant thermoplastic outer covering for damp or wet locations.
23. STOO: 600 V extra-hard-usage, hard-service cord with oil-resistant thermoplastic insulation and oil-resistant thermoplastic outer covering for damp locations.
24. STOOW: 600 V extra-hard-usage, hard-service cord with oil-resistant thermoplastic insulation and oil-resistant thermoplastic outer covering for damp or wet locations.

E. Definitions:

1. 8-Position 8-Contact (8P8C) Modular Jack: An unkeyed jack with up to eight contacts commonly used to terminate twisted-pair and multiconductor Ethernet cable. Also called a "TIA-1096 miniature 8-position series jack" (8PSJ), or an "IEC 8877 8-pole jack."

    a. Be careful when suppliers use "RJ45" generically. Obsolete RJ45 jacks used for analog telephone cables have rejection keys. 8P8C jacks used for digital telephone cables and Ethernet cables do not have rejection keys.

2. Basic Impulse Insulation Level (BIL): Reference insulation level expressed in impulse crest voltage with a standard wave not longer than 1.5 times 50 microseconds and 1.5 times 40 microseconds.
3. Cable: In accordance with NIST NBS Circular 37 and IEEE standards, in the United States for the purpose of interstate commerce, the definition of "cable" is (1) a conductor with insulation, or a stranded conductor with or without insulation (single-conductor cable); or (2) a combination of conductors insulated from one another (multiple-conductor cable).
4. Communications Jack: A fixed connecting device designed for insertion of a communications cable plug.
5. Communications Outlet: One or more communications jacks, or cables and plugs, mounted in a box or ring, with a suitable protective cover.
6. Conductor: In accordance with NIST NBS Circular 37 and IEEE standards, in the United States for the purpose of interstate commerce, the definition of "conductor" is (1) a wire or combination of wires not insulated from one another, suitable for carrying an electric current; (2) (National Electrical Safety Code) a material, usually in the form of wire, cable, or bar, suitable for carrying an electric current; or (3) (general) a substance or body that allows a current of electricity to pass continuously along it.
7. Designated Seismic System: A system component that requires design in accordance with Chapter 13 of ASCE/SEI 7 and for which the Component Importance Factor is greater than 1.0.
8. Direct Buried: Installed underground without encasement in concrete or other protective material.
9. Enclosure: The case or housing of an apparatus, or the fence or wall(s) surrounding an installation, to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. Types of enclosures and enclosure covers include the following:

    a. Cabinet: An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung.
    b. Concrete Box: A box intended for use in poured concrete.
    c. Conduit Body: A means for providing access to the interior of a conduit or tubing system through one or more removable covers at a junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.
    d. Conduit Box: A box having threaded openings or knockouts for conduit, EMT, or fittings.
    e. Cutout Box: An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure.
    f. Device Box: A box with provisions for mounting a wiring device directly to the box.
    g. Extension Ring: A ring intended to extend the sides of an outlet box or device box to increase the box depth, volume, or both.
    h. Floor Box: A box mounted in the floor intended for use with a floor box cover and other components to complete the floor box enclosure.
    i. Floor-Mounted Enclosure: A floor box and floor box cover assembly with means to mount in the floor that is sealed against the entrance of scrub water at the floor level.

j. Floor Nozzle: An enclosure used on a wiring system, intended primarily as a housing for a receptacle, provided with a means, such as a collar, for surface-mounting on a floor, which may or may not include a stem to support it above the floor level, and is sealed against the entrance of scrub water at the floor level.
k. Junction Box: A box with a blank cover that joins different runs of raceway or cable and provides space for connection and branching of the enclosed conductors.
l. Outlet Box: A box that provides access to a wiring system having pryout openings, knockouts, threaded entries, or hubs in either the sides or the back, or both, for the entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting an outlet box cover, but without provisions for mounting a wiring device directly to the box.
m. Pedestal Floor Box Cover: A floor box cover that, when installed as intended, provides a means for typically vertical or near-vertical mounting of receptacle outlets above the floor's finished surface.
n. Pull Box: A box with a blank cover that joins different runs of raceway and provides access for pulling or replacing the enclosed cables or conductors.
o. Raised-Floor Box: A floor box intended for use in raised floors.
p. Recessed Access Floor Box: A floor box with provisions for mounting wiring devices below the floor surface.
q. Recessed Access Floor Box Cover: A floor box cover with provisions for passage of cords to recessed wiring devices mounted within a recessed floor box.
r. Ring: A sleeve, which is not necessarily round, used for positioning a recessed wiring device flush with the plaster, concrete, drywall, or other wall surface.
s. Ring Cover: A box cover, with raised center portion to accommodate a specific wall or ceiling thickness, for mounting wiring devices or luminaires flush with the surface.
t. Termination Box: An enclosure designed for installation of termination base assemblies consisting of bus bars, terminal strips, or terminal blocks with provision for wire connectors to accommodate incoming or outgoing conductors, or both.

10. Emergency Systems: Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction that are designed to ensure continuity of lighting, electrical power, or both, to designated areas and equipment in the event of failure of the normal supply for safety to human life.
11. Essential Electrical Systems: (healthcare facilities) Those systems designed to ensure continuity of electrical power to designated areas and functions of a healthcare facility during disruption of normal power sources, and also to minimize disruption within the internal wiring system.
12. Fault Limited: Providing or being served by a source of electrical power that is limited to not more than 100 W when tested in accordance with UL 62368-1.

    a. The term "fault limited" is intended to encompass most Class 1, 2, and 3 power-limited sources complying with Article 725 of NFPA 70; Class ES1 and ES2 electrical energy sources that are Class PS1 electrical power sources (e.g., USB); and Class ES3 electrical energy sources that are Class PS1 and PS2 electrical power sources (e.g., PoE). See UL 62368-1 for discussion of classes of electrical energy sources and classes of electrical power sources.

13. High-Performance Building: A building that integrates and optimizes on a life-cycle basis all major high-performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.
14. Jacket: A continuous nonmetallic outer covering for conductors or cables.
15. Luminaire: A complete lighting unit consisting of a light source such as a lamp, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light.
16. Mode: The terms "Active Mode," "Off Mode," and "Standby Mode" are used as defined in the Energy Independence and Security Act (EISA) of 2007.
17. Multi-Outlet Assembly: A type of surface, flush, or freestanding raceway designed to hold conductors, receptacles, and switches, assembled in the field or at the factory.
18. Plenum: A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system.
19. Receptacle: A fixed connecting device arranged for insertion of a power cord plug. Also called a power jack.
20. Receptacle Outlet: One or more receptacles mounted in a box with a suitable protective cover.
21. Sheath: A continuous metallic covering for conductors or cables.
22. UL Category Control Number (CCN): An alphabetic or alphanumeric code used to identify product categories covered by UL's Listing, Classification, and Recognition Services.
23. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:

    a. Control Voltage: Having electromotive force between any two conductors, or between a single conductor and ground, that is supplied from a battery or other Class 2 or Class 3 power-limited source.
    b. Line Voltage: (1) (controls) Designed to operate using the supplied low-voltage power without transformation. (2) (transmission lines, transformers, SPDs) The line-to-line voltage of the supplying power system.
    c. Extra-Low Voltage (ELV): Not having electromotive force between any two conductors, or between a single conductor and ground, exceeding 30 V(ac rms), 42 V(ac peak), or 60 V(dc).
    d. Low Voltage (LV): Having electromotive force between any two conductors, or between a single conductor and ground, that is rated above 30 V but not exceeding 1000 V.
    e. Medium Voltage (MV): Having electromotive force between any two conductors, or between a single conductor and ground, that is rated about 1 kV but not exceeding 69 kV.
    f. High Voltage: (1) (circuits) Having electromotive force between any two conductors, or between a single conductor and ground, that is rated above 69 kV but not exceeding 230 kV. (2) (safety) Having sufficient electromotive force to inflict bodily harm or injury.

24. Wire: In accordance with NIST NBS Circular 37 and IEEE standards, in the United States for the purpose of interstate commerce, the definition of "wire" is a slender rod or filament of drawn metal. A group of small wires used as a single wire is properly called a "stranded wire." A wire or stranded wire covered with insulation is properly called an "insulated wire" or a "single-conductor cable." Nevertheless, when the context indicates that the wire is insulated, the term "wire" will be understood to include the insulation.

1.3 COORDINATION

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify Owner no fewer than seven days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.
3. Coordinate interruption with systems impacted by outage including, but not limited to, the following:

    a. Exercising generators.
    b. Emergency lighting.
    c. Elevators.
    d. Fire-alarm systems.

B. Arrange to provide temporary electrical power in accordance with requirements specified in Division 01.

1.4 SEQUENCING

A. Conduct and submit results of power system studies before submitting Product Data and Shop Drawings for electrical equipment.

1.5 FIELD CONDITIONS

A. Modeling, analysis, product selection, installation, and quality control for Work specified in Division 26 must comply with requirements specified in Section 260011 "Facility Performance Requirements for Electrical."

B. Service Conditions for Electrical Power Equipment: Besides conditions specified in Section 260011 "Facility Performance Requirements for Electrical," specified electrical power equipment must be suitable for operation under service conditions specified as usual service conditions in applicable NEMA PB series, IEEE C37 series, and IEEE C57 series standards, except for the following:

1. Maintenance Bldg:

    a. Ambient temperature not exceeding 122 deg F .
    b. Exposure to hot and humid climate or to excessive moisture, including steam, salt spray, and dripping water.

PART 2 - PRODUCTS

2.1 SUBSTITUTION LIMITATIONS FOR ELECTRICAL EQUIPMENT

A. Substitution requests for electrical equipment will be entertained under the following conditions:

1. Substitution requests may be submitted for consideration prior to the Electrical Preconstruction Conference if accompanied by value analysis data indicating that substitution will comply with Project performance requirements while significantly increasing value for Owner throughout life of facility.
2. Substitution requests may be submitted for consideration concurrently with submission of power system study reports when those reports indicate that substitution is necessary for safety of maintenance personnel and facility occupants.
3. Contractor is responsible for sequencing and scheduling power system studies and electrical equipment procurement. After the Electrical Preconstruction Conference, insufficient lead time for electrical equipment delivery will not be considered a valid reason for substitution.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL WORK

A. Unless more stringent requirements are specified in the Contract Documents or manufacturers' written instructions, comply with NFPA 70 and NECA NEIS 1 for installation of Work specified in Division 26. Consult Architect for resolution of conflicting requirements.

3.2 FIELD QUALITY CONTROL

A. Administrant for Field Tests and Inspections of Lighting Installations:

1. Owner will engage qualified lighting testing and inspecting agency to administer and perform tests and inspections.
2. Engage qualified lighting testing and inspecting agency to administer and perform tests and inspections.
3. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
4. Administer and perform tests and inspections.

3.3 CLEANING

A. Waste Management:

1. Clean and dispose of all work debris daily, at the end of each work day.

3.4 CLOSEOUT ACTIVITIES

A. Demonstration:

1. Demonstrate to Owner's maintenance and clerical personnel how to operate the following systems and equipment:

   a. Lighting control devices specified in Section 260923 "Lighting Control Devices."

2. Allow Owner to record demonstrations.

B. Training:

1. Train Owner's maintenance personnel on the following topics:

   a. How to implement Facility EPM Program.
   b. How to operate normal and emergency electrical systems, including justifications for, and limitations of, protective device settings recommended in study report specified in Section 260573.16 "Coordination Studies."
   c. Electrical power safety fundamentals refresher including arc-flash hazard safety features of electrical power distribution equipment in facility, interpreting arc-flash warning labels, selecting appropriate personal protective equipment, and understanding significance of findings documented in study report specified in Section 260573.19 "Arc-Flash Hazard Analysis."
   d. How to adjust, operate, and maintain devices specified in Section 260923 "Lighting Control Devices."
   e. How to adjust, operate, and maintain equipment specified in Section 262300 "Low-Voltage Switchgear."
   f. How to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessoriesspecified in Section 262413 "Switchboards."
   g. How to adjust, operate, and maintain control modules specified in Section 262416.16 "Electronically Operated Circuit-Breaker Panelboards."
   h. How to adjust, operate, and maintain devices specified in Section 264313 "Surge Protective Devices for Low-Voltage Electrical Power Circuits."
   i. How to adjust, operate, and maintain luminaires specified in Section 265619 "LED Exterior Lighting."

2. Allow Owner to record training sessions.

END OF SECTION

SECTION 260011 - FACILITY PERFORMANCE REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Field conditions and other facility performance requirements applicable to Work specified in Division 26.

1.2 FIELD CONDITIONS

A. Seismic Hazard Design Loads:

1. Unless otherwise indicated on Contract Documents, specified Work must withstand seismic hazard design loads determined in accordance with requirements specified in this Section, adjusted for installed elevation above or below grade.

a. The term "withstand" means "unit must remain in place without separation of parts from unit when subjected to specified seismic hazard design loads and unit must be fully operational after seismic event."

2. Perform calculations to obtain force information necessary to properly select seismic-restraint devices, fasteners, and anchorage. Perform calculations using methods acceptable to applicable code authorities and as presented in ASCE/SEI 7-05. Where "ASCE/SEI 7" is used throughout this Section, it must be understood that the edition referred to in this subparagraph is the edition intended as reference throughout the Section Text.

a. Data indicated below to be determined by Delegated Design Contractor must be obtained by Contractor and must be included in individual component submittal packages.
b. Coordinate seismic design calculations with wind-load calculations for equipment mounted outdoors.

B. Wind Hazard Design Loads:

1. Perform calculations to obtain force information necessary to properly select wind-load restraint devices, fasteners, and anchorage. Perform calculations using methods acceptable to applicable code authorities and as presented in ASCE/SEI 7-05. Where "ASCE/SEI 7" is used throughout this Section, it must be understood that the edition referred to in this subparagraph is intended as referenced throughout the Section Text unless otherwise indicated.

a. Data indicated below that are specific to individual pieces of equipment must be obtained by Contractor and must be included in individual component submittal packages.

b. Coordinate design wind-load calculations with seismic-load calculations for equipment requiring both seismic- and wind-load reinforcement. Comply with requirements in other Sections in addition to those in this Section.

C. Altitude:

1. Sea level to 6500 ft.

D. Temperature Variation: Allow for thermal movements from the following differential temperatures:

1. Ambient Temperature Differential: 120 deg F.
2. Material Surface Temperature Differential: 180 deg F.

E. Ground Water:

1. Assume ground-water level is at grade level unless a lower water table is noted on Drawings.
2. Assume ground-water level is 36 inch below ground surface unless a higher water table is indicated on Drawings.

F. Corrosive Environmental Conditions:

1. This facility uses corrosive salts. All equipment shall be suitable for installation in corrosive environments..

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Nonmetallic underground conduit with conductors, Type NUCC.
3. Metal-clad cable, Type MC.
4. Fire-alarm wire and cable.
5. Connectors and splices.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpha Wire Company.
2. American Bare Conductor.
3. Belden Inc.
4. Cerro Wire LLC.
5. Encore Wire Corporation.
6. General Cable Technologies Corporation.
7. Okonite Company (The).
8. Service Wire Co.
9. Southwire Company.
10. WESCO.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Conductor Insulation:

1. Type RHH and Type RHW-2: Comply with UL 44.
2. Type THHN and Type THWN-2: Comply with UL 83.
3. Type THW and Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
4. Type XHHW-2: Comply with UL 44.

2.2 NONMETALLIC UNDERGROUND CONDUIT WITH CONDUCTORS, TYPE NUCC

A. Description: A factory assembly of conductors or cables inside a nonmetallic, smooth wall raceway with a circular cross section.

B. Applicable Standards:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

a. Reference Standards: UL 1990.

2.3 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpha Wire Company.
2. American Bare Conductor.
3. Atkore International (AFC Cable Systems).
4. Belden Inc.
5. Encore Wire Corporation.
6. General Cable Technologies Corporation.
7. Okonite Company (The).
8. Service Wire Co.
9. Southwire Company.
10. WESCO.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:

1. Single circuit.
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

E. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

F. Ground Conductor: Insulated.

G. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

H. Armor: Steel, interlocked.

2.4 FIRE-ALARM WIRE AND CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Allied Wire & Cable Inc.
2. CommScope, Inc.
3. Comtran Corporation.
4. Genesis Cable Products; Honeywell International, Inc.
5. Prysmian Group North America.
6. Radix Wire.
7. Rockbestos-Suprenant Cable Corp.
8. Superior Essex Inc.
9. West Penn Wire.

B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

2.5 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. 3M Electrical Products.
2. ABB (Electrification Products Division).
3. Atkore International (AFC Cable Systems).
4. Emerson Electric Co. (Automation Solutions - Appleton - O-Z/Gedney).
5. Gardner Bender.
6. Hubbell Incorporated (Hubbell Power Systems).
7. Ideal Industries, Inc.
8. ILSCO.
9. NSi Industries LLC.
10. Service Wire Co.
11. TE Connectivity Ltd.

C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: One hole with barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
2. Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Conductors must be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
2. Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

E. Feeders Installed below Raised Flooring: Type THHN/THWN-2, single conductors in raceway.

F. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

I. Branch Circuits Installed below Raised Flooring: .

J. Branch Circuits in Cable Tray: Type XHHW-2, single conductors larger than No. 1/0 AWG.

K. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION, GENERAL

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

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. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

G. Complete cable tray systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

3.4 INSTALLATION OF FIRE-ALARM WIRE AND CABLE

A. Comply with NFPA 72.

B. Wiring Method: Install wiring in metal pathway according to Section 270528.29 "Hangers and Supports for Communications Systems."

1. Install plenum cable in environmental airspaces, including plenum ceilings.
2. Fire-alarm circuits and equipment control wiring associated with fire-alarm system must be installed in a dedicated pathway system.

    a. Cables and pathways used for fire-alarm circuits, and equipment control wiring associated with fire-alarm system, may not contain any other wire or cable.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

F. Risers: Install at least two vertical cable risers to serve the fire-alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent receipt or transmission of signals from other floors or zones.

G. Wiring to Remote Alarm Transmitting Device: 1 inch conduit between the fire-alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.5 CONNECTIONS

A. 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-486B.

B. Make splices, terminations, 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, termination, and tap for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch of slack.

D. Comply with requirements in Section 284621.13 "Conventional Fire-Alarm Systems" for connecting, terminating, and identifying wires and cables.

3.6 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.9 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Perform each of the following visual and electrical tests:

    a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
    b. Test bolted connections for high resistance using one of the following:

        1) A low-resistance ohmmeter.
        2) Calibrated torque wrench.
        3) Thermographic survey.

c. Inspect compression-applied connectors for correct cable match and indentation.
d. Inspect for correct identification.
e. Inspect cable jacket and condition.
f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
g. Continuity test on each conductor and cable.
h. Uniform resistance of parallel conductors.

3. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

   a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
   b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

4. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Grounding and bonding conductors.
2. Grounding and bonding clamps.
3. Grounding and bonding bushings.
4. Grounding and bonding hubs.
5. Grounding and bonding connectors.
6. Intersystem bonding bridge grounding connector.
7. Grounding and bonding busbars.
8. Grounding (earthing) electrodes.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product indicated.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment Grounding Conductor:

1. General Characteristics: 600 V, THHN/THWN-2, copper wire or cable, green color, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Isolated Equipment Grounding Conductor:

1. General Characteristics: 600 V, THHN/THWN-2, copper wire or cable, green color with one or more yellow stripes, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. ASTM - Bare Copper Grounding and Bonding Conductor:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. ERICO; brand of nVent Electrical plc.
   b. Harger Lightning & Grounding; business of Harger, Inc.

2. Referenced Standards: Complying with one or more of the following:

   a. Soft or Annealed Copper Wire: ASTM B3
   b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
   c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.
   d. 19-Wire Combination Unilay-Stranded Copper Conductor: ASTM B787/B787M.

2.2 GROUNDING AND BONDING CLAMPS

A. Description: Clamps suitable for attachment of grounding and bonding conductors to grounding electrodes, pipes, tubing, and rebar. Grounding and bonding clamps specified in this article are also suitable for use with communications applications; see Section 270526 "Grounding and Bonding for Communications Systems," for selection and installation guidelines.

B. Performance Criteria:

1. Regulatory Requirements:

   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

   a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
   b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

C. UL KDER and KDSH - Hex-Fitting-Type Pipe and Rod Grounding and Bonding Clamp :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. ABB, Electrification Business.
   b. America Fujikura Ltd. (AFL); Fujikura Ltd.
   c. Arlington Industries, Inc.
   d. Cooper B-line; brand of Eaton, Electrical Sector.
   e. Crouse-Hinds; brand of Eaton, Electrical Sector.
   f. ERICO; brand of nVent Electrical plc.
   g. Galvan Industries, Inc.; Electrical Products Division, LLC.

h. Greaves Corp.; Essex Products Group, Inc.
i. Harger Lightning & Grounding; business of Harger, Inc.
j. ILSCO.
k. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
l. Panduit Corp.
m. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. General Characteristics:

a. Two pieces with stainless steel bolts.
b. Clamp Material: Tinned brass.
c. Listed for outdoor use.

D. UL KDER and KDSH - U-Bolt-Type Pipe and Rod Grounding and Bonding Clamp :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. America Fujikura Ltd. (AFL); Fujikura Ltd.
c. Arlington Industries, Inc.
d. Cooper B-line; brand of Eaton, Electrical Sector.
e. Crouse-Hinds; brand of Eaton, Electrical Sector.
f. ERICO; brand of nVent Electrical plc.
g. Galvan Industries, Inc.; Electrical Products Division, LLC.
h. Greaves Corp.; Essex Products Group, Inc.
i. Harger Lightning & Grounding; business of Harger, Inc.
j. ILSCO.
k. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
l. Panduit Corp.
m. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. General Characteristics:

a. Clamp Material: Tinned brass.
b. Listed for outdoor use.

E. UL KDER and KDSH - Strap-Type Pipe and Rod Grounding and Bonding Clamp :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
b. Crouse-Hinds; brand of Eaton, Electrical Sector.
c. ERICO; brand of nVent Electrical plc.
d. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
e. Panduit Corp.

2. General Characteristics:

    a. Clamp Material: Tinned copper.
    b. Listed for outdoor use.

F. UL KDER - Beam Grounding and Bonding Clamp :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Anderson; brand of Hubbell Utility Solutions; Hubbell Incorporated.
    c. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    d. Panduit Corp.
    e. Penn-Union Corp.; subsidiary of Nesco, Inc.

2. General Characteristics: Mechanical-type, terminal, ground wire access from four directions; with dual, tin-plated or silicon bronze bolts.

G. UL KDER - Exothermically Welded Connection :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. ALLTEC LLC.
    c. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    d. Continental Industries; brand of Hubbell Utility Solutions; Hubbell Incorporated.
    e. Crouse-Hinds; brand of Eaton, Electrical Sector.
    f. ERICO; brand of nVent Electrical plc.
    g. Harger Lightning & Grounding; business of Harger, Inc.

2. General Characteristics: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING AND BONDING BUSHINGS

A. Description: Bonding bushings connect conduit fittings, tubing fittings, threaded metal conduit, and unthreaded metal conduit to metal boxes and equipment enclosures, and have one or more bonding screws intended to provide electrical continuity between bushing and enclosure. Grounding bushings have provision for connection of bonding or grounding conductor and may or may not also have bonding screws.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

C. UL KDER - Bonding Bushing :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Arlington Industries, Inc.
c. Crouse-Hinds; brand of Eaton, Electrical Sector.
d. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
f. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. General Characteristics: Threaded bushing with insulated throat.

D. UL KDER - Grounding Bushing :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Arlington Industries, Inc.
c. Crouse-Hinds; brand of Eaton, Electrical Sector.
d. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
f. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. General Characteristics: Threaded bushing with insulated throat and mechanical-type wire terminal.

2.4 GROUNDING AND BONDING HUBS

A. Description: Hubs with certified grounding or bonding locknut.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

C. UL KDER - Grounding and Bonding Hub :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Arlington Industries, Inc.
c. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
d. Crouse-Hinds; brand of Eaton, Electrical Sector.
e. Greaves Corp.; Essex Products Group, Inc.
f. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
g. Penn-Union Corp.; subsidiary of Nesco, Inc.

2. General Characteristics: Insulated, gasketed, watertight hub with mechanical-type wire terminal.

2.5 GROUNDING AND BONDING CONNECTORS

A. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

B. UL KDER - Pressure-Type Grounding and Bonding Busbar Cable Connector :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. General Characteristics: Copper or copper alloy, for compression bonding of one or more conductor directly to copper busbar. Listed for direct burial.

C. UL KDER - Lay-In Lug Mechanical-Type Grounding and Bonding Busbar Terminal :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. ABB, Electrification Business.
   b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
   c. Chatsworth Products, Inc.
   d. Greaves Corp.; Essex Products Group, Inc.
   e. ILSCO.

2. General Characteristics: Mechanical-type, copper rated for direct burial terminal with set screw.

D. UL KDER - Crimped Lug Pressure-Type Grounding and Bonding Busbar Terminal :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. ABB, Electrification Business.
   b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
   c. Harger Lightning & Grounding; business of Harger, Inc.
   d. ILSCO.

2. General Characteristics: Cast silicon bronze, solderless compression-type wire terminals; with long barrel and two holes spaced on 5/8 or 1 inch centers for two-bolt connection to busbar.

E. UL KDER - Split-Bolt Service-Post Pressure-Type Grounding and Bonding Busbar Terminal :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Panduit Corp.

2. General Characteristics: Bolts that surround cable and bond to cable under compression when nut is tightened after assembly is screwed into busbar opening.

F. UL KDER - Crimped Pressure-Type Grounding and Bonding Cable Connector :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. ABB, Electrification Business.

b. allG Fabrication; business of Advanced Lightning Technology, Ltd.
c. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
d. ILSCO.

2. General Characteristics: Crimp-and-compress connectors that bond to conductor when connector is compressed around conductor.

a. Tinned copper, C and H shaped.

G. UL KDER - Split-Bolt Pressure-Type Grounding and Bonding Cable Connector :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. allG Fabrication; business of Advanced Lightning Technology, Ltd.
c. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
d. ERICO; brand of nVent Electrical plc.
e. Greaves Corp.; Essex Products Group, Inc.

2. General Characteristics: Bolts that surround cable and bond to cable under compression when nut is tightened.

H. UL KDER - Signal Reference Grid Grounding and Bonding Connector :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
c. Continental Industries; brand of Hubbell Utility Solutions; Hubbell Incorporated.
d. Cooper B-line; brand of Eaton, Electrical Sector.
e. ERICO; brand of nVent Electrical plc.
f. Harger Lightning & Grounding; business of Harger, Inc.

2. General Characteristics: Combination of compression wire connectors, access floor grounding clamps, bronze U-bolt grounding clamps, and copper split-bolt connectors, designed for the purpose.

2.6 INTERSYSTEM BONDING BRIDGE GROUNDING CONNECTORS

A. Description: Devices that provide means for connecting communications systems grounding and bonding conductors at service equipment or at disconnecting means for buildings or structures.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

C. UL KDSH - One-Piece Intersystem Bonding Bridge Grounding Connector:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Galvan Industries, Inc.; Electrical Products Division, LLC.
b. Madison Electric Products; business of Southwire Company, LLC.

2. General Characteristics: Zinc-alloy one-piece construction; six terminating points; gangable.

D. UL KDSH - Two-Piece Intersystem Bonding Bridge Grounding Connector:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
b. Crouse-Hinds; brand of Eaton, Electrical Sector.
c. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. General Characteristics: Copper body and polycarbonate cover; four terminating points.

2.7 GROUNDING AND BONDING BUSBARS

A. Description: Miscellaneous grounding and bonding device that serves as common connection for multiple grounding and bonding conductors.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

C. UL KDER - Equipment Room Grounding and Bonding Busbar :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. allG Fabrication; business of Advanced Lightning Technology, Ltd.
   b. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
   c. Chatsworth Products, Inc.
   d. Continental Industries; brand of Hubbell Utility Solutions; Hubbell Incorporated.
   e. Cooper B-line; brand of Eaton, Electrical Sector.
   f. ERICO; brand of nVent Electrical plc.
   g. Harger Lightning & Grounding; business of Harger, Inc.
   h. Hoffman; brand of nVent Electrical plc.
   i. ILSCO.
   j. Panduit Corp.

2. General Characteristics:

   a. Bus: Rectangular bar of annealed copper.
   b. Mounting Stand-Off Insulators: Lexan or PVC.

      1) Comply with UL 891 for use in 600 V switchboards, impulse tested at 5000 V.

3. Options:

   a. Predrilled Hole Pattern: [9/32 inch holes spaced 1-1/8 inch apart] [Suitable for installing specified grounding and bonding connectors].

2.8 GROUNDING (EARTHING) ELECTRODES

A. Description: Grounding electrodes include rod electrodes, ring electrodes, metal underground water pipes, metal building frames, concrete-encased electrodes, and pipe and plate electrodes.

B. Performance Criteria:

1. Regulatory Requirements:

   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

   a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

C. UL KDER - Rod Electrode :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. allG Fabrication; business of Advanced Lightning Technology, Ltd.
    c. Continental Industries; brand of Hubbell Utility Solutions; Hubbell Incorporated.
    d. ERICO; brand of nVent Electrical plc.
    e. Galvan Industries, Inc.; Electrical Products Division, LLC.
    f. Harger Lightning & Grounding; business of Harger, Inc.

2. General Characteristics: Copper-clad steel, sectional type; 3/4 inch by 10 ft.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine facility's grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of electrical system.

B. Inspect test results of grounding system measured at point of electrical service equipment connection.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with connection of electrical service equipment only after unsatisfactory conditions have been corrected.

3.2 SELECTION OF BUSBARS

A. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus horizontally, on insulated spacers 2 inch minimum from wall, 6 inch above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

3.3 SELECTION OF GROUNDING AND BONDING CONDUCTORS

A. Conductors: Install solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.

B. Custom-Length Insulated Equipment Bonding Jumpers: 6 AWG, 19-strand, Type THHN.

C. Bonding Cable: 28 kcmil, 14 strands of 17 AWG conductor, 1/4 inch in diameter.

D. Bonding Conductor: 4 AWG or 6 AWG, stranded conductor.

E. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch wide and 1/16 inch thick.

F. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch wide and 1/16 inch thick.

G. Underground Grounding Conductors: Install bare tinned-copper conductor, 2/0 AWG minimum.

1. Bury at least 30 inch below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inch above duct bank when indicated as part of duct-bank installation.

3.4 SELECTION OF CONNECTORS

A. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.5 SELECTION OF SIGNAL REFERENCE GRIDS

A. Access Floor Signal Reference Grid:

1. Install 6 AWG bonding conductors in a grid pattern under floor.

    a. Install grid bonding conductors on 4 ft centers, so as to permit bonding of one structural pedestal for each access floor tile. Connect grid conductors together where they cross each other.

B. Substation Signal Reference Grid:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with IEEE C2.

    a. Install 6 AWG bonding conductors below grade in a grid pattern on 2 ft centers. Bond grid conductors with exothermic welds where they cross each other.
    b. Grid must fill entire area inside equipment yard fence, and extend minimum 6.5 ft outside fence, so someone walking or running outside yard may not touch fence or open gate without first stepping inside grid.
    c. Bond each metal fence post and gate post to at least two grid conductors.
    d. Bond equipment housekeeping pads and sidewalks inside grid to at least two grid conductors.

e. Bond underground metal pipe and conduit passing under grid to nearest grid conductor at both ends.

3.6 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
2. Consult Architect for resolution of conflicting requirements.

C. Special Techniques:

1. Conductors:

a. 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.

2. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
b. Make connections with clean, bare metal at points of contact.
c. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
f. 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 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 disconnect-type connection is required, use bolted clamp.

g. 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 bolted clamp connector or bolt lug-type connector to pipe flange by using one of lug bolts of flange. Where 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 bolted connector.
3) Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

h. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.
i. Grounding for Steel Building Structure: Install driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 ft apart.

3. Electrodes:

a. Ground Rods: Drive rods until tops are 2 inch 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.
2) Use exothermic welds for below-grade connections.

b. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least same distance from other grounding electrodes, and connect to service grounding electrode conductor.
c. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and must be at least 12 inch deep, with cover.

1) Install at least one test well for each service unless otherwise indicated. Install at ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

d. Ring Electrode: Install grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around perimeter of building.

1) Install tinned-copper conductor not less than 2/0 AWG for ring electrode and for taps to building steel.
2) Bury ring electrode not less than from building's foundation.

e. Concrete-Encased Electrode (Ufer Ground):

1) Fabricate in accordance with NFPA 70; use minimum of of bare copper conductor not smaller than 4 AWG.

a) Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

2) Fabricate in accordance with NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 ft long. If reinforcing is in multiple pieces, connect together by usual steel tie wires or exothermic welding to create required length.

4. Grounding Separately Derived Systems:

a. Generator: Install grounding electrode(s) at transformer location. Electrode must be connected to equipment grounding conductor and to frame of transformer.

5. Grounding Underground Distribution System Components:

a. Duct-Bank Grounding Conductor: Bury 12 inch above duct bank when indicated as part of duct-bank installation.
b. Comply with IEEE C2 grounding requirements.
c. Grounding Manholes and Handholes: Install driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inch will extend above finished floor. If necessary, install ground rod before manhole is placed and provide 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inch above to 6 inch below concrete. Seal floor opening with waterproof, nonshrink grout.
d. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields in accordance with manufacturer's published instructions with splicing and termination kits.
e. Pad-Mounted Transformers and Switches: Install two ground rods and ring electrode around pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than 2 AWG for ring electrode and for taps to equipment grounding terminals. Bury ring electrode not less than 6 inch from foundation.

6. Equipment Grounding:

a. Install insulated equipment grounding conductors with feeders and branch circuits.
b. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

    1) Feeders and branch circuits.
    2) Lighting circuits.
    3) Receptacle circuits.
    4) Single-phase motor and appliance branch circuits.
    5) Three-phase motor and appliance branch circuits.
    6) Flexible raceway runs.
    7) Metal-clad cable runs.
    8) Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

c. 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.
d. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
e. Isolated Grounding Receptacle Circuits: Install insulated equipment grounding conductor connected to receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of applicable derived system or service unless otherwise indicated.
f. Isolated Equipment Enclosure Circuits: For designated equipment supplied by branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of applicable derived system or service unless otherwise indicated.
g. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.
h. Metallic Fences: Comply with requirements of IEEE C2.

    1) Grounding Conductor: Bare, tinned copper, not less than 8 AWG.
    2) Gates: Must be bonded to grounding conductor with flexible bonding jumper.

3.7 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by Tenant.

B. Tests and Inspections:

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 calibrated torque wrench in accordance with manufacturer's published instructions.
3. Test completed grounding system at each location where maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method in accordance with IEEE Std 81.
    c. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to record of tests and observations. Include number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Nonconforming Work:

1. Grounding system will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective components and retest.

D. Collect, assemble, and submit test and inspection reports.

1. Report measured ground resistances that exceed the following values:

    a. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 Ω.
    b. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 Ω.
    c. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 Ω.
    d. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 Ω.
    e. Manhole Grounds: 10 Ω.

3.8 PROTECTION

A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.components.
6. Fabricated metal equipment support assemblies.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch diameter holes at a maximum of 8 inch on center in at least one surface.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB (Electrification Products Division).
    b. Atkore International (Allied Tube & Conduit).
    c. Atkore International (Unistrut).
    d. Eaton (B-line).
    e. Flex-Strut Inc.
    f. Gripple Inc.
    g. GS Metals Corp.
    h. G-Strut.
    i. Haydon Corporation.
    j. Metal Ties Innovation.
    k. MIRO Industries.
    l. nVent (CADDY).
    m. Wesanco, Inc.

2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
3. Material for Channel, Fittings, and Accessories: Galvanized steel Stainless steel, Type 304 Stainless steel, Type 316.
4. Channel Width: Selected for applicable load criteria.
5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices: Steel Stainless steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Hilti, Inc.
2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
3) MKT Fastening, LLC.
4) Simpson Strong-Tie Co., Inc.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Eaton (B-line).
2) Empire Tool and Manufacturing Co., Inc.
3) Hilti, Inc.
4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
6. Toggle Bolts: All steel springhead type.
7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 SELECTION

A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA NEIS 101
2. NECA NEIS 102.
3. NECA NEIS 105.

4. NECA NEIS 111.

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."

D. Provide seismic controls with hangers and supports in accordance with requirements specified in "Section 260548.16 "Seismic Controls for Electrical Systems."

E. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERMC as required by NFPA 70. Minimum rod size must be 1/4 inch in diameter.

F. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

G. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF SUPPORTS

A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT may be supported by openings through structure members, in accordance with NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inch thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inch thick.
6. To Steel: Spring-tension clamps.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M. Submit welding certificates.

END OF SECTION

SECTION 260533.13 - CONDUITS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type EMT-A and Type EMT-SS duct raceways and elbows.
2. Type EMT-S duct raceways and elbows.
3. Type ERMC-A and Type ERMC-SS duct raceways, elbows, couplings, and nipples.
4. Type FMC-S and Type FMC-A duct raceways.
5. Type IMC duct raceways.
6. Type LFMC duct raceways.
7. Type PVC duct raceways and fittings.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

C. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
3. Section 260519 "Low-Voltage for Electrical Power Conductors and Cables" for nonmetallic underground conduit with conductors (Type NUCC).

1.2 DEFINITIONS

A. Conduit: A structure containing one or more duct raceways.

B. Duct Raceway: A single enclosed raceway for conductors or cable.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Type EMT-A and Type EMT-SS duct raceways and elbows.
2. Type EMT-S duct raceways and elbows.
3. Type ERMC-A and Type ERMC-SS duct raceways, elbows, couplings, and nipples.
4. Type FMC-S and Type FMC-A duct raceways.
5. Type IMC duct raceways.

6. Type LFMC duct raceways.
7. Type PVC duct raceways and fittings.

PART 2 - PRODUCTS

2.1 TYPE EMT-A AND TYPE EMT-SS DUCT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN FJMX; including UL 797A.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL FJMX - Aluminum Electrical Metal Tubing (EMT-A) and Elbows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Conduit; Norsk Hydro ASA, Hydro Extrusion USA LLC.
b. Patriot Aluminum Products, LLC.

2. Material: Aluminum.
3. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

D. UL FJMX - Stainless Steel Electrical Metal Tubing (EMT-SS) and Elbows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Calconduit; Atkore International.

2. Material: Stainless steel.
3. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.2 TYPE EMT-S DUCT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN FJMX; including UL 797.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL FJMX - Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Allied Tube & Conduit; Atkore International.
    b. Calconduit; Atkore International.
    c. Emerson Electric Co.
    d. Picoma; Zekelman Industries.
    e. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
    f. Topaz Lighting & Electric.
    g. Western Tube; Zekelman Industries.
    h. Wheatland Tube; Zekelman Industries.

2. Material: Steel.
3. Options:

    a. Exterior Coating: Zinc Alternate corrosion-resistant coating.
    b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.3 TYPE ERMC-A AND TYPE ERMC-SS DUCT RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DYWV; including UL 6A.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DYWV - Aluminum Electrical Rigid Metal Conduit (ERMC-A), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Allied Tube & Conduit; Atkore International.
    c. American Conduit; Norsk Hydro ASA, Hydro Extrusion USA LLC.
    d. Calconduit; Atkore International.
    e. Crouse-Hinds; brand of Eaton, Electrical Sector.
    f. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    g. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    h. Patriot Aluminum Products, LLC.
    i. Penn Aluminum Conduit & EMT.
    j. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
    k. Topaz Lighting & Electric.
    l. Western Tube; Zekelman Industries.
    m. Wheatland Tube; Zekelman Industries.

2. Material: Aluminum.
3. Options:

    a. Protective Coating: Provide protective coating for use in severely corrosive environment.
    b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

D. UL DYWV - Stainless Steel Electrical Rigid Metal Conduit (ERMC-SS), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Allied Tube & Conduit; Atkore International.
    c. Calconduit; Atkore International.
    d. Crouse-Hinds; brand of Eaton, Electrical Sector.
    e. Patriot Aluminum Products, LLC.

2. Material: Stainless steel.
3. Options:

    a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.4 TYPE FMC-S AND TYPE FMC-A DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DXUZ; including UL 1.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DXUZ - Aluminum Flexible Metal Conduit (FMC-A):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Anaconda Sealtite; Anamet Electrical, Inc.
c. Electri-Flex Company.
d. Topaz Lighting & Electric.

2.5 TYPE IMC DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DYBY; including UL 1242.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DYBY - Steel Intermediate Metal Conduit (IMC):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Allied Tube & Conduit; Atkore International.
c. Calconduit; Atkore International.
d. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
e. Topaz Lighting & Electric.
f. Western Tube; Zekelman Industries.
g. Wheatland Tube; Zekelman Industries.

2. Options:

a. Exterior Coating: Zinc Alternative corrosion-resistant coating.
b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.6 TYPE LFMC DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DXHR; including UL 360.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DXHR - Stainless Steel Liquidtight Flexible Metal Conduit (LFMC-SS):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Electri-Flex Company.

2. Material: Stainless steel.
3. Options:

    a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.7 TYPE PVC DUCT RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DZYR; including UL 651.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DZYR - Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Calconduit; Atkore International.
c. JM Eagle; J-M Manufacturing Co., Inc.
d. NAPCO; Westlake Chemical Corp.
e. Opti-Com Manufacturing Network, Inc (OMNI).
f. Topaz Lighting & Electric.

2. Dimensional Specifications: Schedule 40.

D. UL DZYR - Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Calconduit; Atkore International.
c. JM Eagle; J-M Manufacturing Co., Inc.
d. Opti-Com Manufacturing Network, Inc (OMNI).
e. Topaz Lighting & Electric.

2. Dimensional Specifications: Schedule 80.
3. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

E. UL DZYR - Type A Rigid PVC Concrete-Encased Conduit (PVC-A) and Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Southern Pipe, Inc.

2. Dimensional Specifications: Type A.
3. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

F. UL DZYR - Type EB Rigid PVC Concrete-Encased Underground Conduit (PVC-EB) and Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. JM Eagle; J-M Manufacturing Co., Inc.
b. Southern Pipe, Inc.

2. Dimensional Specifications: Type EB.

PART 3 - EXECUTION

3.1 SELECTION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: ERMC.
2. Exposed and Subject to Physical Damage: ERMC.
    a. Locations less than 2.5 m (8 ft) above finished floor.
3. Exposed and Not Subject to Physical Damage: ERMC PVC-80.
4. Concealed Aboveground: EMT.
5. Direct Buried: PVC-80 PVC-40.
6. Concrete Encased Not in Trench: PVC-80 PVC-40 PVC-A.
7. Concrete Encased in Trench: PVC-80 PVC-40 PVC-A PVC-EB.
8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC .

C. Indoors:

1. Exposed and Subject to Severe Physical Damage: ERMC. Locations include the following:
    a. Loading docks.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
2. Exposed and Subject to Physical Damage: IMC. Locations include the following:
    a. Locations less than 2.5 m (8 ft) above finished floor.
    b. Stub-ups to above suspended ceilings.
3. Exposed and Not Subject to Physical Damage: Corrosion-resistant EMT.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Damp or Wet Locations: Corrosion-resistant EMT.
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

3.2 INSTALLATION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Type EMT-A: Article 358 of NFPA 70 and NECA NEIS 102.
2. Type EMT-SS: Article 358 of NFPA 70 and NECA NEIS 101.
3. Type EMT-S: Article 358 of NFPA 70 and NECA NEIS 101.
4. Type ERMC-A: Article 344 of NFPA 70 and NECA NEIS 102.
5. Type ERMC-SS: Article 344 of NFPA 70 and NECA NEIS 101.
6. Type FMC-A: Article 348 of NFPA 70 and NECA NEIS 102.
7. Type IMC: Article 342 of NFPA 70 and NECA NEIS 101.
8. Type LFMC: Article 350 of NFPA 70 and NECA NEIS 101.
9. Type PVC: Article 356 of NFPA 70 and NECA NEIS 111.
10. Expansion Fittings: NEMA FB 2.40.
11. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. General Requirements for Installation of Duct Raceways:

   a. Complete duct raceway installation before starting conductor installation.
   b. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft above finished floor.
   c. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch of changes in direction.
   d. Make bends in duct raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
   e. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
   f. Support conduit within 12 inch of enclosures to which attached.
   g. Install duct sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed duct raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install duct sealing fittings in accordance with NFPA 70.
   h. Install devices to seal duct raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of duct raceways at the following points:

      1) Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
      2) Where an underground service duct raceway enters a building or structure.
      3) Conduit extending from interior to exterior of building.
      4) Conduit extending into pressurized duct raceway and equipment.
      5) Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.

6) Where otherwise required by NFPA 70.

i. Do not install duct raceways or electrical items on "explosion-relief" walls or rotating equipment.
j. Do not install conduits within 2 inch of the bottom side of a metal deck roof.
k. Keep duct raceways at least 6 inch away from parallel runs of flues and steam or hot-water pipes. Install horizontal duct raceway runs above water and steam piping.
l. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
m. Install pull wires in empty duct raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb tensile strength. Leave at least 12 inch of slack at both ends of pull wire. Cap underground duct raceways designated as spare above grade alongside duct raceways in use.
n. Install duct raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.

1) Termination fittings with shoulders do not require two locknuts.

o. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts..

2. Types EMT-A, ERMC-A, and FMC-A: Do not install aluminum duct raceways or fittings in contact with concrete or earth.
3. Types ERMC and IMC:

a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of duct raceway and fittings before making up joints. Follow compound manufacturer's published instructions.

4. Types FMC, LFMC, and LFNC:

a. Provide a maximum of 72 inch of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

5. Types PVC, HDPE, and EPEC:

a. Do not install Type PVC, Type HDPE, or Type EPEC conduit where ambient temperature exceeds . Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
b. Comply with manufacturer's published instructions for solvent welding and fittings.

6. Stub-ups to Above Recessed Ceilings:

a. Provide EMT, IMC, or ERMC for duct raceways.
b. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

7. Duct Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

   a. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
   b. EMT: Provide setscrew, steel fittings. Comply with NEMA FB 2.10.
   c. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

8. Expansion-Joint Fittings:

   a. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F and that have straight-run length that exceeds 25 ft. Install in runs of aboveground ERMC and EMT conduit that are located where environmental temperature change may exceed 100 deg F and that have straight-run length that exceeds 100 ft.
   b. Install type and quantity of fittings that accommodate temperature change listed for the following locations:

      1) Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
      2) Attics: 135 deg F temperature change.

   c. 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 for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
   d. Install expansion fittings at locations where conduits cross building or structure expansion joints.
   e. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's published instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

9. Duct Raceways Penetrating Rooms or Walls with Acoustical Requirements: Seal duct raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.
10. Identification: Provide labels for conduit assemblies, duct raceways, and associated electrical equipment.

    a. Provide warning signs.

D. Interfaces with Other Work:

1. Coordinate with Section 078413 "Penetration Firestopping" for installation of firestopping at penetrations of fire-rated floor and wall assemblies.

2. Coordinate with Section 260529 "Hangers and Supports for Electrical Systems" for installation of conduit hangers and supports.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260533.16 - BOXES AND COVERS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.
3. Cover plates for device boxes.
4. Hoods for outlet boxes.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

C. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.
3. Cover plates for device boxes.
4. Hoods for outlet boxes.

PART 2 - PRODUCTS

2.1 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN QCIT; including UL 514A.

B. UL QCIT - Metallic Outlet Boxes and Covers:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Arlington Industries, Inc.
    c. Crouse-Hinds; brand of Eaton, Electrical Sector.
    d. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    e. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    f. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    g. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    h. MonoSystems, Inc.
    i. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
    j. Pass & Seymour; Legrand North America, LLC.
    k. Patriot Aluminum Products, LLC.
    l. Plasti-Bond; Robroy Industries.
    m. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    n. Spring City Electrical Manufacturing Company.
    o. Topaz Lighting & Electric.
    p. Wiremold; Legrand North America, LLC.

3. Options:

    a. Material: Sheet aluminum.
    b. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb.
    c. Paddle Fan Outlet Boxes and Covers: Nonadjustable, designed for attachment of paddle fan weighing up to 70 lb.

C. UL QCIT - Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Crouse-Hinds; brand of Eaton, Electrical Sector.
    c. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    d. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
    f. Pass & Seymour; Legrand North America, LLC.

g. Patriot Aluminum Products, LLC.
h. Plasti-Bond; Robroy Industries.
i. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
j. Topaz Lighting & Electric.

D. UL QCIT - Metallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Arlington Industries, Inc.
    c. Crouse-Hinds; brand of Eaton, Electrical Sector.
    d. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    e. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    f. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    g. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    h. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
    i. Patriot Aluminum Products, LLC.
    j. Plasti-Bond; Robroy Industries.
    k. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    l. Topaz Lighting & Electric.

3. Options:

    a. Material: Sheet aluminum.

E. UL QCIT - Metallic Extension Rings:

1. Description: Ring intended to extend sides of outlet box or device box to increase box depth, volume, or both.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Cooper B-line; brand of Eaton, Electrical Sector.
    c. Crouse-Hinds; brand of Eaton, Electrical Sector.
    d. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    e. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    f. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
    g. Pass & Seymour; Legrand North America, LLC.
    h. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    i. Topaz Lighting & Electric.

2.2 JUNCTION BOXES AND PULL BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. Listing Criteria: UL CCN BGUZ; including UL 50 and UL 50E.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL BGUZ - Indoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Adalet.
    b. Cooper B-line; brand of Eaton, Electrical Sector.
    c. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    d. FSR Inc.
    e. Hoffman; brand of nVent Electrical plc.
    f. Hubbell Industrial Controls; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    g. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    h. Milbank Manufacturing Co.
    i. N J Sullivan Company.
    j. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
    k. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    l. Spring City Electrical Manufacturing Company.
    m. Square D; Schneider Electric USA.

3. Options:

    a. Degree of Protection: Type 1.

D. UL BGUZ - Outdoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Adalet.
    b. Cooper B-line; brand of Eaton, Electrical Sector.
    c. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
    d. FSR Inc.
    e. Hoffman; brand of nVent Electrical plc.
    f. Hubbell Industrial Controls; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    g. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    h. Milbank Manufacturing Co.
    i. N J Sullivan Company.
    j. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
    k. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
    l. Spring City Electrical Manufacturing Company.
    m. Square D; Schneider Electric USA.

3. Options:

    a. Degree of Protection: Type 4X.

2.3 COVER PLATES FOR DEVICES BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. Listing Criteria: UL CCN QCIT or UL CCN QCMZ; including UL 514D.
3. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL QCIT or QCMZ - Metallic Cover Plates for Device Boxes:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business.
    b. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
    c. Crouse-Hinds; brand of Eaton, Electrical Sector.
    d. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.

e. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
f. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
g. Intermatic, Inc.
h. Leviton Manufacturing Co., Inc.
i. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
j. Panduit Corp.
k. Pass & Seymour; Legrand North America, LLC.
l. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
m. Topaz Lighting & Electric.
n. Wiremold; Legrand North America, LLC.

2. Options:

a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
b. Wallplate Material: Galvanized steel Cast aluminum.

2.4 HOODS FOR OUTLET BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. Listing Criteria:

a. UL CCN QCIT or UL CCN QCMZ; including UL 514D.
b. Receptacle, Hood, Cover Plate, Gaskets, and Seals: UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.

3. Mounts to box using fasteners different from wiring device.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL QCIT or QCMZ - Extra-Duty, While-in-Use Hoods for Outlet Boxes:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business.
b. Allied Tube & Conduit; Atkore International.
c. Arlington Industries, Inc.

d. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
e. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
f. Intermatic, Inc.
g. Leviton Manufacturing Co., Inc.
h. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. Additional Characteristics: Marked "Extra-Duty" in accordance with UL 514D.
3. Options:

a. Provides clear, weatherproof, "while-in-use" cover.
b. Manufacturer may combine nonmetallic device box with hood as extra-duty rated assembly.

PART 3 - EXECUTION

3.1 SELECTION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

a. Type 3R unless otherwise indicated.
b. Locations Exposed to Hosedown: Type 4.
c. Locations Subject to Potential Flooding: Type 6P.
d. Locations Aboveground Where Mechanism Must Operate When Ice Covered: Type 3S.
e. Locations in-Ground or Exposed to Corrosive Agents: Type 4X.
f. Locations in-Ground or Exposed to Corrosive Agents Where Mechanism Must Operate When Ice Covered: Type 3SX.

2. Indoors:

a. Type 1 unless otherwise indicated.
b. Damp or Dusty Locations: Type 4.
c. Surface Mounted in Kitchens and Other Locations Exposed to Oil or Coolants: Type 12.
d. Locations Exposed to Airborne Dust, Lint, Fibers, or Flyings: Type 4.
e. Locations Exposed to Hosedown: Type 4.
f. Locations Exposed to Brief Submersion: Type 6.
g. Locations Exposed to Prolonged Submersion: Type 6P.
h. Locations Exposed to Corrosive Agents: Type 4X.
i. Locations Exposed to Spraying Oil or Coolants: Type 13.

C. Exposed Boxes Installed Less Than 2.5 m (8 ft) Above Floor:

1. Boxes with knockouts or unprotected openings are prohibited.

2. Provide exposed cover. Flat covers with angled mounting slots or knockouts are prohibited.

3.2 INSTALLATION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Outlet, Device, Pull, and Junction Boxes: Article 314 of NFPA 70.
2. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
2. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
3. 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. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.
4. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
5. Locate boxes so that cover or plate will not span different building finishes.
6. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.
7. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.
8. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
9. Set metal floor boxes level and flush with finished floor surface.
10. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
11. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.
12. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.
13. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:

    a. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
    b. Provide gaskets for wallplates and covers.

14. Identification: Provide labels for boxes and associated electrical equipment.

    a. Identify field-installed conductors, interconnecting wiring, and components.
    b. Provide warning signs.
    c. Label each box with engraved metal or laminated-plastic nameplate.

3.3 PROTECTION

A. After installation, protect boxes from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 260548 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Elastomeric isolation pads.
2. Restraints - rigid type.
3. Restraints - cable type.
4. Restraint accessories.
5. Post-Installed concrete anchors.
6. Concrete inserts.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
3. Section 260529 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

1.2 DEFINITIONS

A. OSHPD: Office of Statewide Health Planning and Development (for the State of California owned and regulated medical facilities).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated load capacity for each seismic- and wind-load-restraint device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic- and wind-load-restraint component used.
3. Annotate types and sizes of seismic restraints and accessories, complete with listing markings or report numbers and load rating in tension and compression as evaluated by an agency acceptable to authorities having jurisdiction.
4. Annotate to indicate application of each product submitted and compliance with requirements.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage qualified structural professional engineer to design seismic and wind-load control system in accordance with criteria specified in Section 260010 "Supplemental Requirements for Electrical" and Section 260011 "Facility Performance Requirements for Electrical."

B. Seismic- and Wind-Load-Restraint Device Load Ratings: Devices to be tested and rated in accordance with applicable code requirements and authorities having jurisdiction. Devices to be listed by a nationally recognized third party that requires periodic follow-up inspections and has a listing directory available to the public. Provide third-party listing by one or more of the following: an agency acceptable to authorities having jurisdiction.

C. Consequential Damage: Provide additional seismic and wind-load restraints for suspended components or anchorage of floor-, roof-, or wall-mounted components so that failure of a non-essential or essential component will not cause failure of any other essential building component.

D. Fire/Smoke Resistance: Seismic- and wind-load-restraint devices that are not constructed of ferrous metals must have a maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested by an NRTL in accordance with ASTM E84 or UL 723, and be so labeled.

E. Component Supports:

1. Load ratings, features, and applications of reinforcement components must be based on testing standards of a nationally recognized testing agency.

2.2 ELASTOMERIC ISOLATION PADS

A. Elastomeric Isolation Pads: .

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ace Mountings Co., Inc.
b. California Dynamics Corporation.
c. Isolation Technology, Inc.
d. Kinetics Noise Control, Inc.
e. Korfund.
f. Mason Industries, Inc.
g. Novia; A Division of C&P.
h. nVent (CADDY).
i. Vibration Eliminator Co., Inc.
j. Vibration Isolation.
k. Vibration Management Corp.

l. Vibration Mountings & Controls, Inc.

2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
3. Size: Factory or field cut to match requirements of supported equipment.
4. Pad Material: Oil and water resistant with elastomeric properties. Neoprene rubber, silicone rubber, or other elastomeric material.
5. Surface Pattern: Smooth, ribbed, or waffle pattern.
6. Infused nonwoven cotton or synthetic fibers.
7. Load-bearing metal plates adhered to pads.
8. Sandwich-Core Material: Resilient and elastomeric.

    a. Surface Pattern: Smooth, ribbed, or waffle pattern.
    b. Infused nonwoven cotton or synthetic fibers.

2.3 RESTRAINTS - RIGID TYPE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Atkore International (Unistrut).
2. California Dynamics Corporation.
3. Eaton (B-line).
4. Hilti, Inc.
5. Isolation Technology, Inc.
6. nVent (CADDY).
7. TOLCO.
8. Vibration Mountings & Controls, Inc.

B. Description: Shop- or field-fabricated bracing assembly made of ANSI/AISI S110-07-S1 slotted steel channels, ANSI/ASTM A53/A53M steel pipe, or other rigid steel brace member. Includes accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.4 RESTRAINTS - CABLE TYPE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton (B-line).
2. Loos & Co.
3. nVent (CADDY).
4. Vibration Mountings & Controls, Inc.

B. Seismic- and Wind-Load-Restraint Cables: ASTM A1023/A1023M galvanized or ASTM A603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for seismic-restraining cable service; with fittings attached by means of poured socket, swaged socket, or mechanical (Flemish eye) loop.

C. Restraint cable assembly and cable fittings must comply with ASCE/SEI 19. Cable fittings and complete cable assembly must maintain the minimum cable breaking force. U-shaped cable clips and wedge-type end fittings do not comply and are unacceptable.

2.5 RESTRAINT ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Atkore International (Unistrut).
2. Eaton (B-line).
3. Hilti, Inc.
4. Loos & Co.
5. Mason Industries, Inc.
6. nVent (CADDY).
7. TOLCO.

B. Hanger-Rod Stiffener: Reinforcing steel angle clamped to hanger rod. Non-metallic stiffeners are unacceptable.

C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings.

D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.6 POST-INSTALLED CONCRETE ANCHORS

A. Mechanical Anchor Bolts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Atkore International (Unistrut).
b. Eaton (B-line).
c. Hilti, Inc.
d. Mason Industries, Inc.
e. Powers Fasteners.
f. Simpson Strong-Tie Co., Inc.

2. Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength for anchor and as tested according to ASTM E488/E488M.

B. Provide post-installed concrete anchors that have been prequalified for use in seismic and wind-load applications.

1. Prequalify post-installed anchors in concrete in accordance with ACI 355.2 or other approved qualification testing procedures.
2. Prequalify post-installed anchors in masonry in accordance with approved qualification procedures.

C. Expansion-type anchor bolts are not permitted for equipment in excess of 10 hp that is not vibration isolated.

1. Undercut expansion anchors are permitted.

2.7 CONCRETE INSERTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Atkore International (Unistrut).
2. Eaton (B-line).
3. Hilti, Inc.
4. Mason Industries, Inc.
5. Powers Fasteners.
6. Simpson Strong-Tie Co., Inc.

B. Provide preset concrete inserts that are seismically prequalified in accordance with ICC-ES AC446 testing.

C. Comply with MSS SP-58.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive seismic and wind-load control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger-Rod Stiffeners: Install where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods caused by seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry static, wind-load, and seismic loads within specified loading limits.

3.3 INSTALLATION OF SEISMIC-RESTRAINT AND WIND-LOAD CONTROL DEVICES

A. Provide seismic restraint and wind-load control devices for systems and equipment where indicated in Equipment Schedules or Seismic and Wind-Load Controls Schedule, where indicated on Drawings, where the Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.

1. Install equipment and devices to withstand the effects of earthquake motions and high wind events.

B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

C. Installation of seismic and wind-load restraints must not cause any stresses, misalignment, or change of position of equipment or conduits.

D. Equipment Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
2. Install seismic-restraint and wind-load-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.

E. Raceway, Cable, Wireway, Cable Tray, and Busway Support and Hanger Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
2. Install seismic-restraint and wind-load-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
3. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
4. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

F. Install cables so they do not bend across edges of adjacent equipment or building structure.

G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

I. Post-Installed Concrete Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Mechanical-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors must be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive-Type Anchor Bolts: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

A. Field tests must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.

3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test no fewer than four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.

C. Nonconforming Work:

1. Seismic controls will be considered defective if they do not pass tests and inspections.
2. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

END OF SECTION

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Labels.
2. Bands and tubes.
3. Signs.
4. Cable ties.
5. Miscellaneous identification products.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1 and IEEE C2.

B. Comply with 29 CFR 1910.144 for color identification of hazards; 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs and tags; and the following:

1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.
2. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft above finished floor.

C. Signs, labels, and tags required for personnel safety must comply with the following standards:

1. Safety Colors: NEMA Z535.1.
2. Facility Safety Signs: NEMA Z535.2.
3. Safety Symbols: NEMA Z535.3.
4. Product Safety Signs and Labels: NEMA Z535.4.
5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

D. Comply with NFPA 70E requirements for arc-flash warning labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, must comply with UL 969.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 1000 V or Less:

1. Black letters on orange field.
2. Legend: Indicate voltage.

B. Color-Coding for Phase- Identification, 1000 V or Less: Use colors listed below for ungrounded feederandbranch-circuit conductors.

1. Color must be factory applied or field applied for sizes larger than 8 AWG if authorities having jurisdiction permit.
2. Colors for 208Y/120 V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.

3. Colors for 240 V Circuits:

a. Phase A: Black.
b. Phase B: Red.

4. Color for Neutral: White.
5. Color for Equipment Grounds: Green.

C. Warning Label Colors:

1. Identify system voltage with black letters on orange background.

D. Warning labels and signs must include, but are not limited to, the following legends:

1. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 3 FEET MINIMUM."

E. Equipment Identification Labels:

1. Black letters on white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Brady Corporation.
b. Champion America.
c. emedco.
d. Grafoplast Wire Markers.
e. HellermannTyton.
f. LEM Products Inc.
g. Marking Services, Inc.
h. Panduit Corp.
i. Seton Identification Products; a Brady Corporation company.

B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Brady Corporation.
b. HellermannTyton.
c. Marking Services, Inc.
d. Panduit Corp.
e. Seton Identification Products; a Brady Corporation company.

C. Self-Adhesive Wraparound Labels: Preprinted, 3 mil thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. A'n D Cable Products.
b. Brady Corporation.
c. Brother International Corporation.
d. emedco.
e. Grafoplast Wire Markers.
f. Ideal Industries, Inc.
g. LEM Products Inc.
h. Marking Services, Inc.
i. Panduit Corp.
j. Seton Identification Products; a Brady Corporation company.

2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over legend. Labels sized such that clear shield overlaps entire printed legend.

D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3 mil thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. A'n D Cable Products.
b. Brady Corporation.
c. Brother International Corporation.
d. emedco.
e. Grafoplast Wire Markers.
f. HellermannTyton.
g. Ideal Industries, Inc.
h. LEM Products Inc.
i. Marking Services, Inc.
j. Panduit Corp.
k. Seton Identification Products; a Brady Corporation company.

2. Minimum Nominal Size:

a. 1-1/2 by 6 inch for raceway and conductors.
b. 3-1/2 by 5 inch for equipment.
c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

A. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 deg F. Comply with UL 224.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Brady Corporation.
b. Panduit Corp.

2.5 SIGNS

A. Baked-Enamel Signs:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlton Industries, LP.
b. Champion America.
c. emedco.
d. Marking Services, Inc.

2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
3. 1/4 inch grommets in corners for mounting.
4. Nominal Size: 7 by 10 inch.

B. Laminated Acrylic or Melamine Plastic Signs:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.
d. Marking Services, Inc.

2. Engraved legend.

2.6 CABLE TIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. HellermannTyton.
2. Ideal Industries, Inc.
3. Marking Services, Inc.
4. Panduit Corp.

B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F in accordance with ASTM D638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain 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. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of item before installing identification products.

D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

G. System Identification for Raceways and Cables under 1000 V: Identification must completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.

H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

I. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.

J. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.

K. Snap-Around Labels: Secure tight to surface at location with high visibility and accessibility.

L. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.

M. Self-Adhesive Labels:

1. Install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.

2. Unless otherwise indicated, provide 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 inch high.

N. Snap-Around Color-Coding Bands: Secure tight to surface at location with high visibility and accessibility.

O. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.

P. Baked-Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
2. Unless otherwise indicated, provide single line of text with 1/2 inch high letters on minimum 1-1/2 inch high sign; where two lines of text are required, use signs minimum 2 inch high.

Q. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
2. Unless otherwise indicated, provide single line of text with 1/2 inch high letters on 1-1/2 inch high sign; where two lines of text are required, use labels 2 inch high.

END OF SECTION

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electronic time switches.
2. Indoor occupancy and vacancy sensors.
3. Switchbox-mounted occupancy sensors.
4. Outdoor motion sensors.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
3. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

1.3 WARRANTY

A. Special Extended Warranty: Manufacturer and Installer warrant that installed lighting control devices perform in accordance with specified requirements and agree to repair or replace, including labor, materials, and equipment, devices that fail to perform as specified within extended warranty period.

1. Failures include, but are not limited to, the following:

a. Faulty operation of lighting control devices.

2. Extended Warranty Period: Four year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ELECTRONIC TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Industries, Inc.
2. Intermatic, Inc.
3. Invensys Controls.
4. Leviton Manufacturing Co., Inc.
5. NSi Industries LLC.
6. TE Connectivity Ltd.

B. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Astronomic Time: All channels.
3. Automatic daylight savings time changeover.
4. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

2.2 INDOOR OCCUPANCY AND VACANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bryant Electric.
2. Cooper Industries, Inc.
3. Douglas Lighting Controls.
4. Hubbell Control Solutions; Hubbell Incorporated, Lighting.
5. Intermatic, Inc.
6. Leviton Manufacturing Co., Inc.
7. Lithonia Lighting; Acuity Brands Lighting, Inc.
8. Lutron Electronics Co., Inc.
9. NSi Industries LLC.
10. RAB Lighting.
11. Schneider Electric USA (Square D).
12. Sensor Switch, Inc.
13. Signify North America Corporation (formerly Philips Lighting).
14. WattStopper; Legrand North America, LLC.

B. General Requirements for Sensors:

1. Dual technology.

2. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. Operation:

    a. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
4. Mounting:

    a. Sensor: Suitable for mounting in any position in a standard device box or outlet box.
    b. Relay: Externally mounted through a 1/2 inch knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

5. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
6. Bypass Switch: Override the "on" function in case of sensor failure.
7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.

C. Dual-Technology Type: Wall mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch, and detect a person of average size and weight moving not less than 12 inch in either a horizontal or a vertical manner at an approximate speed of 12 inch/s.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bryant Electric.
2. Cooper Industries, Inc.
3. Douglas Lighting Controls.
4. Hubbell Control Solutions; Hubbell Incorporated, Lighting.
5. Intermatic, Inc.
6. Leviton Manufacturing Co., Inc.
7. Lithonia Lighting; Acuity Brands Lighting, Inc.
8. Lutron Electronics Co., Inc.
9. NSi Industries LLC.
10. RAB Lighting.
11. Schneider Electric USA (Square D).
12. Sensor Switch, Inc.
13. Signify North America Corporation (formerly Philips Lighting).

14. WattStopper; Legrand North America, LLC.

B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchboxusing hardwired connection.

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application, and must comply with California Title 24.
2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.

2.4 OUTDOOR MOTION SENSORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bryant Electric.
2. Cooper Industries, Inc.
3. Hubbell Control Solutions; Hubbell Incorporated, Lighting.
4. Leviton Manufacturing Co., Inc.
5. Lithonia Lighting; Acuity Brands Lighting, Inc.
6. NSi Industries LLC.
7. RAB Lighting.
8. Sensor Switch, Inc.
9. WattStopper; Legrand North America, LLC.

B. Description: Solid-state outdoor motion sensors.

1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application, and must comply with California Title 24.
2. [PIR] [Dual-technology (PIR and ultrasonic)] type, weatherproof. Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch. Comply with UL 773A.
3. Voltage: Match the circuit voltage type.
4. Detector Coverage:

    a. Long Range: 180-degree field of view and 110 ft. detection range.

5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and help eliminate false "off" switching.
7. Operating Ambient Conditions: Suitable for operation in ambient temperatures ranging from minus 40 to plus 130 deg F, rated as "raintight" in accordance with UL 773A.

PART 3 - EXECUTION

3.1 INSTALLATION OF SENSORS

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's instructions.

3.2 INSTALLATION OF CONTACTORS

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 INSTALLATION OF WIRING

A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 3/4 inch.

B. Wiring within Enclosures: Separate power-limited and nonpower-limited conductors in accordance with conductor manufacturer's instructions.

C. Size conductors in accordance with lighting control device manufacturer's instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, device, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

A. Identify components and power and control wiring in accordance with Section 260553 "Identification for Electrical Systems.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Field tests must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Nonconforming Work:

1. Lighting control devices will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Prepare test and inspection reports.

E. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 MAINTENANCE

A. Software and Firmware Service Agreement:

1. Technical Support: Beginning at Substantial Completion, verify that software and firmware service agreement includes software support for two years.
2. Upgrade Service: At Substantial Completion, update software and firmware to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Verify upgrading software includes operating system and new or revised licenses for using software.

    a. Upgrade Notice: No fewer than 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3. Upgrade Reports: Prepare written report after each update, documenting upgrades installed.

END OF SECTION

SECTION 262213 - LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution, dry-type transformers with nominal primary and secondary rating of 600 V and less, with capacities up to 1500 kVA.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB, Electrification Products Division.
2. Acme Electric Corporation.
3. Controlled Power Company; an Emerson company.
4. Dongan Electric Manufacturing Company.
5. Eaton.
6. Federal Pacific.
7. Hammond Power Solutions Inc.
8. Jefferson Electric, Inc.
9. Lincoln Electric Products Co., Inc.
10. Mag-Tran; a division of Quality Transformer & Electronics.
11. Marcus Transformer LTD.
12. MGM Transformer Company.
13. Micron Industries Corporation.
14. Mirus International Inc.

15. Powersmiths International Corp.
16. Prolec GE; A Xignux and General Electric Company Joint Venture.
17. Rex Power Magnetics.
18. Siemens Industry, Inc., Energy Management Division.
19. Sola/Hevi-Duty; Emerson Electric Co.
20. Square D; Schneider Electric USA.
21. TEMCo Transformers.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60 Hz service.

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

C. Transformers Rated 15 kVA and Larger:

1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
2. Marked as compliant with DOE 2016 efficiency levels by qualified electrical testing laboratory recognized by authorities having jurisdiction.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NFPA 70, and list and label as complying with UL 1561.

B. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.

1. One leg per phase.

C. Coils: Continuous windings without splices except for taps.

1. Coil Material: Aluminum.
2. Internal Coil Connections: Brazed or pressure type.
3. Terminal Connections: Bolted.

D. Enclosure: Ventilated.

1. Core and coil must be encapsulated within resin compound using vacuum-pressure impregnation process to seal out moisture and air.
2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
3. Wiring Compartment: Sized for conduit entry and wiring installation.
4. Environmental Protection:

a. Indoor: UL 50E, Type 4X, Stainless Steel.

E. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

F. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with maximum of 150 deg C rise above 40 deg C ambient temperature.

G. Grounding: Provide ground-bar kit or ground bar installed on inside of transformer enclosure.

2.4 IDENTIFICATION

A. Nameplates:

1. Engraved, laminated-acrylic or melamine plastic signs for distribution transformers, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for transformers.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's published instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance must be 5 Ω at location of transformer.

E. Environment: Enclosures must be rated for environment in which they are located. Covers for UL 50E, Type 4X enclosures may not cause accessibility problems.

3.2 INSTALLATION

A. Construct concrete bases and anchor floor-mounted transformers in accordance with manufacturer's published instructions, seismic requirements applicable to Project, and requirements in Section 260529 "Hangers and Supports for Electrical Systems."

1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

B. Secure transformer to concrete base in accordance with manufacturer's published instructions.

C. Secure covers to enclosure and tighten bolts to manufacturer-recommended torques to reduce noise generation.

D. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

A. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Tighten electrical connectors and terminals in accordance with manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

D. Provide flexible connections at conduit and conductor terminations and supports to eliminate sound and vibration transmission to building structure.

3.4 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Small (Up to 167 kVA Single-Phase or 500 kVA Three-Phase) Dry-Type Transformer Field Tests:

    a. Visual and Mechanical Inspection.

        1) Inspect physical and mechanical condition.
        2) Inspect anchorage, alignment, and grounding.
        3) Verify that resilient mounts are free and that shipping brackets have been removed.
        4) Verify that unit is clean.
        5) Perform specific inspections and mechanical tests recommended by manufacturer.
        6) Verify that as-left tap connections are as specified.
        7) Verify presence of surge arresters and that their ratings are as specified.

    b. Electrical Tests:

        1) Measure resistance at windings, taps, and bolted connections.
        2) Perform insulation-resistance tests winding-to-winding and windings-to-ground. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index: value of index may not be less than 1.0.
        3) Perform turns-ratio tests at tap positions. Test results may not deviate by more than one-half percent from either adjacent coils or calculated ratio. If test fails, replace transformer.
        4) Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.

C. Test Labeling: On completion of satisfactory testing of units, attach dated and signed "Satisfactory Test" label to tested components.

D. Nonconforming Work:

1. Transformer will be considered defective if it does not pass tests and inspections.
2. Remove and replace units that do not pass tests or inspections and retest as specified above.

E. Assemble and submit test and inspection reports.

3.5 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power panelboards.
2. Disconnecting and overcurrent protective devices.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 DEFINITIONS

A. GFEP: Ground-fault equipment protection.

B. VPR: Voltage protection rating.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Power panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.
4. Electronic-grade panelboards.
5. Disconnecting and overcurrent protective devices.
6. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
7. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

1.4 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed panelboards perform in accordance with specified requirements and agrees to repair or replace components or products that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty: Manufacturer warrants that panelboards perform in accordance with specified requirements and agrees to provide repair or replacement of components or products that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Four years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

A. Fabricate and test panelboards in accordance with IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing agency recognized by authorities having jurisdiction, and marked for intended location and application.

C. Comply with NFPA 70.

D. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

a. Other Wet or Damp Indoor Locations: UL 50E, Type 4x.

2. Height: 7 ft maximum.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims must cover live parts and may have no exposed hardware.

E. Incoming Mains:

1. Location: Convertible between top and bottom.

F. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

G. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Main and Neutral Lugs: Mechanical type, with lug on neutral bar for each pole in panelboard.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with lug on bar for each pole in panelboard.

4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

H. Future Devices: Panelboards or load centers must have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

I. Panelboard Short-Circuit Current Rating:

1. Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by qualified electrical testing laboratory recognized by authorities having jurisdiction. Include label or manual with size and type of allowable upstream and branch devices listed and labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for series-connected short-circuit rating.

2.2 POWER PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB, Electrification Business.
2. Eaton.
3. ESL Power Systems, Inc.
4. Mersen USA.
5. Siemens Industry, Inc., Energy Management Division.
6. Square D; Schneider Electric USA.

B. Listing Criteria: NEMA PB 1, distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inch high, provide two latches, keyed alike.

D. Mains: Circuit breaker.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in circuit breakers.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB, Electrification Business.
2. Eaton.
3. Siemens Industry, Inc., Energy Management Division.

4. Square D; Schneider Electric USA.

B. MCCB: Comply with UL 489, with series-connected rating to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

   a. Inverse time-current element for low-level overloads.
   b. Instantaneous magnetic trip element for short circuits.
   c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6 mA trip).
3. Subfeed Circuit Breakers: Vertically mounted.
4. MCCB Features and Accessories:

   a. Standard frame sizes, trip ratings, and number of poles.
   b. Breaker handle indicates tripped status.
   c. UL listed for reverse connection without restrictive line or load ratings.
   d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
   e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
   f. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Panelboards: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NECA 407.
2. Consult Architect for resolution of conflicting requirements.

C. Special Techniques:

1. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
2. Mount top of trim 7.5 ft above finished floor unless otherwise indicated.
3. Mount panelboard cabinet plumb and rigid without distortion of box.
4. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
5. Install overcurrent protective devices and controllers not already factory installed.

   a. Set field-adjustable, circuit-breaker trip ranges.

6. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
7. Install filler plates in unused spaces.
8. Stub four 1 inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in future. Stub four 1 inch empty conduits into raised floor space or below slab not on grade.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."

B. Panelboard Nameplates: Label each panelboard with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each branch circuit device in power panelboards with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

E. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles must be located on interior of panelboard door.

F. Breaker Labels: Faceplate must list current rating, UL and IEC certification standards, and AIC rating.

G. Circuit Directory:

1. Provide computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.

    a. Circuit directory must identify specific purpose with detail sufficient to distinguish it from other circuits.

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Field tests and inspections must be witnessed by authorities having jurisdiction.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers. Do not perform optional tests. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Nonconforming Work:

1. Panelboards will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Collect, assemble, and submit test and inspection reports, including certified report that identifies panelboards included and that describes scanning results, with comparisons of two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

F. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

END OF SECTION

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General-use switches, dimmer switches, and fan-speed controller switches.
2. General-grade single straight-blade receptacles.
3. General-grade duplex straight-blade receptacles.
4. Connectors, cords, and plugs.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
3. Section 260923 "Lighting Control Devices" for occupancy sensors, timers, control-voltage switches, and control-voltage dimmers.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Toggle switches.
2. Rocker switches.
3. Dimmer switches.
4. Fan-speed controllers.
5. Single straight-blade receptacles
6. Duplex straight-blade receptacles.
7. Cord connectors.

PART 2 - PRODUCTS

2.1 GENERAL-USE SWITCHES, DIMMER SWITCHES, AND FAN-SPEED CONTROLLER SWITCHES

A. Toggle Switch :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.

b. Leviton Manufacturing Co., Inc.
c. Pass & Seymour; Legrand North America, LLC.
d. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.

2. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

a. Reference Standards: UL CCN WMUZ and UL 20.

4. Options:

a. Device Color: As indicated on architectural Drawings.
b. Configuration:

1) General-duty, 120-277 V, 20 A, single pole.
2) Extra-heavy-duty, 120-277 V, 20 A, single pole .
3) Extra-heavy-duty, 120-277 V, 30 A, single pole .

5. Accessories:

a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

B. Type I Dimmer Switch :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
b. GE Lighting; General Electric Company.
c. Leviton Manufacturing Co., Inc.
d. Lutron Electronics Co., Inc.
e. Pass & Seymour; Legrand North America, LLC.
f. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.

2. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

a. Reference Standards: UL CCN EOYX and UL 1472 Type I dimmer.

4. Options:

    a. Device Color: As indicated on architectural Drawings.
    b. Switch Style: Rocker.
    c. Dimming Control Style: Slide.

5. Accessories:

    a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
    b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

C. Air-Gap Fan-Speed Controller Switch :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
    b. Leviton Manufacturing Co., Inc.
    c. Pass & Seymour; Legrand North America, LLC.
    d. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.

2. Regulatory Requirements:

    a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

    a. Reference Standards: UL CCN GQHG and UL 1917.

4. Options:

    a. Device Color: As indicated on architectural Drawings.

5. Accessories:

    a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
    b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.2 GENERAL-GRADE SINGLE STRAIGHT-BLADE RECEPTACLES

A. Single Straight-Blade Receptacle :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
    b. Leviton Manufacturing Co., Inc.
    c. Pass & Seymour; Legrand North America, LLC.
    d. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.

2. Regulatory Requirements:

    a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

    a. Reference Standards: UL CCN RTRT and UL 498.

4. Options:

    a. Device Color: As indicated on architectural Drawings.

5. Accessories:

    a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
    b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.3 GENERAL-GRADE DUPLEX STRAIGHT-BLADE RECEPTACLES

A. Duplex Straight-Blade Receptacle :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
    b. Leviton Manufacturing Co., Inc.
    c. Pass & Seymour; Legrand North America, LLC.
    d. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.

2. Regulatory Requirements:

    a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

a. Reference Standards: UL CCN RTRT and UL 498.

4. Options:

a. Device Color: As indicated on architectural Drawings.

5. Accessories:

a. Cover Plate: 0.060 inch thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.4 CONNECTORS, CORDS, AND PLUGS

A. Outdoor-Use, Watertight, Sealed Cord Connector :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ericson Manufacturing Company.

2. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

a. Reference Standards: UL CCN AXUT and UL 498.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receptacles:

1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

B. Cord Reels:

1. Examine roughing-in for cord reel mounting and power connections to verify actual locations of mounts and power connections before cord reel installation.
2. Examine walls, floors, and ceilings for suitable conditions where cord reel will be installed.

3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SELECTION OF CONTROLLED AND UNCONTROLLED RECEPTACLES

A. Private and Open Office Spaces:

1. Uncontrolled Receptacles at Workstations: Coordinate final locations of receptacles with furniture plan such that at least one uncontrolled receptacle is selected for installation not greater than 6 ft from each workstation.
2. Controlled Receptacles at Workstations: Coordinate final locations of receptacles with furniture plan such that at least one controlled receptacle is selected for installation not greater than 6 ft from each workstation.
3. Contact Architect for resolution of discrepancies between these requirements and Drawings.

3.3 SELECTION OF GFCI RECEPTACLES

A. Healthcare Facilities: Unless protection of downstream branch-circuit wiring, cord sets, and power-supply cords is required by NFPA 70 or NFPA 99, provide non-feed-through GFCI receptacles.

3.4 INSTALLATION OF SWITCHES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

    a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black -filled lettering, and provide durable wire markers or tags inside device box or outlet box.
    b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.5 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.

    a. Hospital-Grade Receptacle Orientation: Orient receptacle with ground pin or neutral pin at top.

4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

    a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black -filled lettering, and provide durable wire markers or tags inside device box or outlet box.
    b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.6 INSTALLATION OF LOCKING RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

    a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black -filled lettering, and provide durable wire markers or tags inside device box or outlet box.

b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.7 INSTALLATION OF PIN-AND-SLEEVE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in UL 1686.
4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black -filled lettering, and provide durable wire markers or tags inside device box or outlet box.
b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.8 INSTALLATION OF CORD REELS AND FITTINGS

A. Comply with manufacturer's instructions.

3.9 INSTALLATION OF CONNECTORS, CORDS, AND PLUGS

A. Comply with manufacturer's instructions.

3.10 FIELD QUALITY CONTROL OF SWITCHES

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Perform tests and inspections in accordance with manufacturers' instructions.

C. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.

2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

E. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.11 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage.
4. Measure percent voltage drop.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
6. Healthcare Facilities: Test straight-blade receptacles in patient care spaces with receptacle pin tension test instrument in accordance with NFPA 99. Retention force of ground pin must be not less than 115 g (4 oz).
7. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.

C. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

E. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.12 FIELD QUALITY CONTROL OF CONNECTORS, CORDS, AND PLUGS

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Perform tests and inspections indicated in manufacturer's instructions.

C. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Assemble and submit test and inspection reports.

E. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.13 SYSTEM STARTUP FOR SWITCHES

A. Perform startup service.

1. Complete installation and startup checks for momentary switches, dimmer switches, and fan-speed controller switches in accordance with manufacturer's instructions.

3.14 ADJUSTING

A. Occupancy Adjustments for Controlled Receptacles: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

B. Cord Reels and Fittings: Adjust spring mechanisms and moving parts of cord reels and fittings to function smoothly, and lubricate as recommended in writing by manufacturer.

3.15 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.
2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

B. Cord Reels and Fittings:

1. After installation, protect cord reels and fittings from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

C. Connectors, Cords, and Plugs:

1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonfusible switches.
2. Molded-case circuit breakers (MCCBs).
3. Enclosures.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 DEFINITIONS

A. GFEP: Ground-fault circuit-interrupter for equipment protection.

1.3 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed enclosed switches and circuit breakers perform in accordance with specified requirements and agrees to repair or replace components or products that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty: Manufacturer warrants that enclosed switches and circuit breakers perform in accordance with specified requirements and agrees to provide repair or replacement of components or products that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Three years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2.2 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB, Electrification Business.
2. Eaton.
3. Siemens Industry, Inc., Energy Management Division.
4. Square D; Schneider Electric USA.

B. Type HD, Heavy Duty, Three Pole, Single Throw, 240 V(ac), 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB, Electrification Business.
2. Eaton.
3. NOARK Electric North America.
4. Siemens Industry, Inc., Energy Management Division.
5. Square D; Schneider Electric USA.

B. Circuit breakers must be constructed using glass-reinforced insulating material. Current carrying components must be completely isolated from handle and accessory mounting area.

C. Maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings must be clearly marked on face of circuit breaker. Circuit breakers must be series rated. Circuit breaker/circuit breaker combinations for series connected interrupting ratings must be listed by UL as recognized component combinations. Series rated combination used must be marked on end-use equipment along with statement "Caution - Series Rated System. _____ Amps Available. Identical Replacement Component Required."

D. MCCBs must be equipped with device for locking in isolated position.

E. Lugs must be suitable for 60 deg C rated wire on 125 A circuit breakers and below 75 deg C rated wire.

F. Standard: Comply with UL 489 with required interrupting capacity for available fault currents.

G. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, UL 50E, and UL 50, to comply with environmental conditions at installed location.

B. Enclosures designated as UL 50E Type 4, 4X stainless steel, 12, or 12K must have dual cover interlock mechanism to prevent unintentional opening of enclosure cover when circuit breaker is ON and to prevent turning circuit breaker ON when enclosure cover is open.

PART 3 - EXECUTION

3.1 SELECTION OF ENCLOSURES

A. Indoor, Dry and Clean Locations: UL 50E, Type 4X.

B. Outdoor Locations: UL 50E, Type 3R.

C. Other Wet or Damp, Indoor Locations: UL 50E, Type 4X.

D. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: UL 50E, Type 12.

3.2 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Special Techniques:

1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
2. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
3. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
4. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
5. Install fuses in fusible devices.

3.3 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:

a. Inspect physical and mechanical condition.
b. Inspect anchorage, alignment, grounding, and clearances.
c. Verify that unit is clean.
d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
e. Verify that fuse sizes and types match the Specifications and Drawings.
f. Verify that each fuse has adequate mechanical support and contact integrity.
g. Inspect bolted electrical connections for high resistance using one of the following methods:

1) Use low-resistance ohmmeter.

a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

a) Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS Table 100.12.

h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on Drawings.
i. Verify correct phase barrier installation.
j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

a. Perform resistance measurements through bolted connections with low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of lowest value.
b. Measure contact resistance across each switchblade fuseholder. Drop values may not exceed high level of manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of lowest value.
c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, use Table 100.1 from NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
e. Perform ground fault test in accordance with NETA ATS Section 7.14 "Ground Fault Protection Systems, Low-Voltage."

C. Tests and Inspections for Molded-Case Circuit Breakers:

1. Visual and Mechanical Inspection:

a. Verify that equipment nameplate data are as described in the Specifications and shown on Drawings.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, grounding, and clearances.
d. Verify that unit is clean.
e. Operate circuit breaker to ensure smooth operation.
f. Inspect bolted electrical connections for high resistance using one of the following methods:

1) Use low-resistance ohmmeter.

a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

a) Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS Table 100.12.

g. Inspect operating mechanism, contacts, and chutes in unsealed units.
h. Perform adjustments for final protective device settings in accordance with coordination study.

2. Electrical Tests:

a. Perform resistance measurements through bolted connections with low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of lowest value.
b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, use Table 100.1 from NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
c. Perform contact/pole resistance test. Drop values may not exceed high level of manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of lowest value.
d. Perform insulation resistance tests on control wiring with respect to ground. Applied potential must be 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable. Test duration must be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values may be no less than 2 MΩ.
e. Determine the following by primary current injection:

1) Long-time pickup and delay. Pickup values must be as specified. Trip characteristics may not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
2) Short-time pickup and delay. Short-time pickup values must be as specified. Trip characteristics may not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
3) Ground-fault pickup and time delay. Ground-fault pickup values must be as specified. Trip characteristics may not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
4) Instantaneous pickup. Instantaneous pickup values must be as specified and within manufacturer's published tolerances.

f. Test functionality of trip unit by means of primary current injection. Pickup values and trip characteristics must be as specified and within manufacturer's published tolerances.
g. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of shunt trip and close coils must be as indicated by manufacturer.
h. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset trip logs and indicators. Investigate units that do not function as designed.
i. Verify operation of charging mechanism. Investigate units that do not function as designed.

3. Test and adjust controls, remote monitoring, and safeties.

D. Nonconforming Work:

1. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Collect, assemble, and submit test and inspection reports.

1. Test procedures used.
2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
3. List deficiencies detected, remedial action taken, and observations after remedial action.

F. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following types of LED luminaires:

1. Lowbay.
2. Surface mount, linear.
3. Suspended, linear.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
2. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

1.3 QUALITY ASSURANCE

A. Provide luminaires from a single manufacturer for each luminaire type.

1.4 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

C. Ambient Temperature: 5 to 104 deg F.

1. Relative Humidity: Zero to 95 percent.

D. Altitude: Sea level to 6500 ft..

2.2 LUMINAIRE REQUIREMENTS

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. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.
b. Lamp diameter, shape, size, wattage, and coating.
c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

D. California Title 24 compliant.

2.3 LOWBAY .

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Lithonia Lighting; Acuity Brands Lighting, Inc.

B. Nominal Operating Voltage: 120 V ac.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

D. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp and corrosive locations.

2.4 SURFACE MOUNT, LINEAR .

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Lithonia Lighting; Acuity Brands Lighting, Inc.

B. Nominal Operating Voltage: 120 V ac.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

D. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp and corrosive locations.

2.5 SUSPENDED, LINEAR .

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Lithonia Lighting; Acuity Brands Lighting, Inc.

B. Nominal Operating Voltage: 120 V ac.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

D. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp and corrosive locations.

2.6 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.

3. Form and support to prevent warping and sagging.

B. Steel:

1. ASTM A36/A36M for carbon structural steel.
2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:

1. 1. Manufacturer's standard grade.
2. 2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.7 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.8 LUMINAIRE SUPPORT

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.2 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.4 STARTUP SERVICE

A. Comply with requirements for startup specified in Section 260943.16 "Addressable-Luminaire Lighting Controls."

B. Comply with requirements for startup specified in Section 260943.23 "Relay-Based Lighting Controls."

END OF SECTION

SECTION 265213 - EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exit signs.
2. Materials.
3. Luminaire support components.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of emergency lighting unit, exit sign, and emergency lighting support.

a. Include data on features, accessories, and finishes.
b. Include physical description of unit and dimensions.
c. Battery and charger for light units.
d. Include life, output of luminaire (lumens, CCT, and CRI), and energy-efficiency data.
e. Include photometric data and adjustment factors based on laboratory tests by, or under supervision of, qualified luminaire photometric testing laboratory, for each luminaire type.

1.3 WARRANTY

A. Special Installer Extended Warranty for Emergency and Exit Lighting: Installer warrants that fabricated and installed emergency luminaires and exit signs, including batteries, perform in accordance with specified requirements and agrees to repair or replace components and assemblies that fail to perform as specified within extended warranty period.

1. Extended Warranty Period: Two year(s) from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty for Batteries for Emergency and Exit Lighting: Manufacturer warrants that batteries for emergency luminaires and exit signs perform in accordance with specified requirements and agrees to provide repair or replacement of batteries that fail to perform as specified within extended warranty period.

1. Extended Warranty Period: Five year(s) from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

A. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70 and UL 924, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Comply with NFPA 101.

C. Lamp Base: Comply with ANSI C81.61.

D. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.

1. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
2. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.

    a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

3. Battery: Sealed, maintenance-free, nickel-cadmium type.
4. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
5. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.2 EXIT SIGNS

A. General Characteristics: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Sign :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Amerlux.
    b. Eaton (Lighting).
    c. Evenlite, Inc.
    d. Hubbell Incorporated, Lighting.
    e. Lithonia Lighting; Acuity Brands Lighting, Inc.
    f. Ruud Lighting Direct.
    g. Signify North America Corporation (formerly Philips Lighting).

2. Options:

    a. Operating at nominal voltage of 120 V(ac).

    b. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.

2.3 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components must be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access:

1. Smooth operating, free of light leakage under operating conditions.
2. Designed to permit relamping without use of tools.
3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Conduit: EMT, minimum metric designator 21 (trade size 3/4).

2.4 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

B. Install lamps in each luminaire.

C. Supports:

1. Sized and rated for luminaire and emergency power unit weight.
2. Able to maintain luminaire position when testing emergency power unit.
3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
4. Luminaire-mounting devices must be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.

D. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.

E. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inch, brace to limit swinging.
2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
3. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

3.2 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

C. Nonconforming Work:

1. Luminaire will be considered defective if it does not pass operation tests and inspections.
2. Remove and replace defective units and retest.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjustments: Within 12 months of date of Substantial Completion, provide on-site visit to do the following:

1. Inspect luminaires. Replace lamps, emergency power units , batteries, exit signs, and luminaires that are defective.

a. Parts and supplies must be manufacturer's authorized replacement parts and supplies.

2. Conduct short-duration tests on all emergency lighting.

3.5 PROTECTION

A. Remove and replace luminaires and exit signs that are damaged or caused to be unfit for use by construction activities.

END OF SECTION

SECTION 265619 - LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
2. Luminaire supports.
3. Luminaire-mounted photoelectric relays.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

1.4 FIELD CONDITIONS

A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.5 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 2 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

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. UL Compliance: Comply with UL 1598 and listed for wet location.

C. CRI of 80. CCT of 3000 K.

D. L70 lamp life of 50,000 hours.

E. Lamps dimmable from 100 percent to 0 percent of maximum light output.

F. Nominal Operating Voltage: 120 V ac.

G. Lamp Rating: Lamp marked for outdoor use.

H. Source Limitations:

1. Obtain luminaires from single source from a single manufacturer.
2. For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.3 LUMINAIRE TYPES

A. Area and Site:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Lithonia Lighting; Acuity Brands Lighting, Inc.

2. Luminaire Shape: Square.
3. Mounting: Building .

2.4 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

C. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

D. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

E. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
2. Provide filter/breather for enclosed luminaires.

2.5 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

2.6 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Install lamps in each luminaire.

D. Fasten luminaire to structural support.

E. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Support luminaires without causing deflection of finished surface.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

F. Wiring Method: Install cables in raceways. Conceal raceways and cables.

G. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.

H. Coordinate layout and installation of luminaires with other construction.

I. Adjust luminaires that require field adjustment or aiming.

J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.2 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):

a. IES LM-5.
b. IES LM-50.
c. IES LM-52.
d. IES LM-64.
e. IES LM-72.

2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

D. Luminaire will be considered defective if it does not pass tests and inspections.

E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires.

END OF SECTION

SECTION 270010 - SUPPLEMENTAL REQUIREMENTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Supplemental requirements generally applicable to the Work specified in Division 27.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for abbreviations and acronyms for electrical terms and units of measure, abbreviations and acronyms for electrical raceway types, abbreviations and acronyms for electrical cable types, and additional coordination drawing submittal requirements.
2. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 REFERENCES

A. Abbreviations and Acronyms for Communications:

1. LAN: Local area network.
2. PoE: Power over Ethernet.
3. POTS: Plain old telephone service. See "public switched telephone network."
4. TCP/IP: Transmission control protocol/Internet protocol.
5. WAN: Wide area network.

B. Definitions for Communications:

1. Calling Party Control (CPC): A momentary break in phone line loop current, which is used to signal voicemail and other automated telephone company services that distant party has hung up.
2. Private Branch Exchange (PBX): Analog telephone switch that routes calls internal to a business or organization so a direct external line for each phone is unnecessary.
3. Public Switched Telephone Network (PSTN): Analog telephone technology that uses twisted-pair cables from a telephone-provider central office for the transmission medium. PSTN refers to the telephone network; POTS refers to the individual subscriber line.
4. Remote Office Phone System (ROPS): VoIP system that allows phones for a business or organization located anywhere in the world with internet connectivity to behave similar to phones connected to a PBX.

5. Ringer Equivalence Number (REN): The loading effect of a single traditional telephone ringing circuit. TIA-968 defines REN 1 as an impedance of 7000 Ω at 20 Hz (Type A ringer) or 8000 Ω from 15 Hz to 68 Hz (Type B ringer). The sum of the RENs for all devices on a subscriber line circuit may not exceed the maximum permitted REN for the subscriber line.
6. Voice over Internet Protocol (VoIP): Digital telephone packet technology that uses the internet for its transmission medium.

1.3 COORDINATION

A. Interruption of Existing Telephone Service: Do not interrupt telephone service to facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify Owner no fewer than seven days in advance of proposed interruption of telephone service.
2. Do not proceed with interruption of telephone service without Owner's written permission.

B. Interruption of Existing Internet Service: Do not interrupt internet service to facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify Owner no fewer than seven days in advance of proposed interruption of internet service.
2. Do not proceed with interruption of internet service without Owner's written permission.

1.4 QUALIFICATIONS

A. Qualified Regional Manufacturer: Manufacturer, possessing qualifications specified in Section 014000 "Quality Requirements," that maintains a service center capable of providing training, parts, and emergency on-site repairs to Project site with response time less than eight hours.

B. Structural Professional Engineer: Professional engineer possessing active qualifications specified in Section 014000 "Quality Requirements," with expertise in structural engineering, including seismic- and wind-load modeling and analysis.

C. Communications Design Professional: Design professional possessing active qualifications specified in Section 014000 "Quality Requirements" and the following:

1. Expertise in design of communications infrastructure and distribution equipment.
2. BICSI Registered Communications Distribution Designer (RCDD) certification.

D. Welder: Installer possessing active qualifications specified in Section 014000 "Quality Requirements," with training and certification in accordance with AWS D1.1/D1.1M.

E. Communications Cable Installer: Entity possessing active qualifications specified in Section 014000 "Quality Requirements" and the following:

1. Training and manufacturer certification to install, splice, and terminate communications cabling.
2. Installation Supervisor: BICSI Technician (TECH) certification.

3. Copper Installers: 30 percent of employees possess BICSI Copper Installer 2 (INSTC) certification. Remaining employees possess BICSI Installer 1 certification.
4. Fiber Installers: 30 percent of employees possess BICSI Optical Fiber Installer 2 (INSTF) certification. Remaining employees possess BICSI Installer 1 certification.

F. Structural Testing and Inspecting Agency: Entity possessing active qualifications specified in Section 014000 "Quality Requirements" with documented training and experience with testing structural concrete, seismic controls, and wind-load controls.

1.5 FIELD CONDITIONS

A. Modeling, analysis, product selection, installation, and quality control for Work specified in Division 27 must comply with requirements specified in Section 260011 "Facility Performance Requirements for Electrical."

PART 2 - EXECUTION

2.1 INSTALLATION OF COMMUNICATIONS WORK

A. Unless more stringent requirements are specified in the Contract Documents or manufacturers' instructions, comply with NFPA 70, NECA NEIS 1, and BICSI N1 for installation of Work specified in Division 27. Consult Architect for resolution of conflicting requirements.

2.2 FIELD QUALITY CONTROL

A. Administrant for Communications Tests and Inspections:

1. Owner will engage qualified communications testing and inspecting agency to administer and perform tests and inspections.
2. Engage qualified communications testing and inspecting agency to administer and perform tests and inspections.
3. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
4. Administer and perform tests and inspections.

B. Administrant for Structural Tests and Inspections:

1. Owner will engage qualified structural testing and inspecting agency to administer and perform tests and inspections.
2. Engage qualified structural testing and inspecting agency to administer and perform tests and inspections.
3. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
4. Administer and perform tests and inspections.

END OF SECTION

SECTION 270526 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Selection and installation of communications busbars.
2. Selection and installation of communications bonding conductors.

B. Related Requirements:

1. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
2. Section 270010 "Supplemental Requirements for Communications" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 DEFINITIONS

A. BBC: Backbone bonding conductor, for connecting multiple TBBs serving the same floor.

B. PBB: Primary bonding busbar, located in main distribution frame room, ideally near electrical service entrance.

C. RBB: Rack bonding busbar, located in equipment cabinets and racks.

D. SBB: Secondary bonding busbar, located in intermediate distribution frame rooms.

E. TBB: Telecommunications bonding backbone, for connecting SBBs to PBB.

F. TBC: Telecommunications bonding conductor, for connecting PBB to intersystem bonding termination device or busbar at electrical service entrance.

G. TEBC: Telecommunications equipment bonding conductor, for connecting RBBs to SBBs or PBB.

H. UBC: Unit bonding conductor, for connecting individual communications equipment to RBBs or SBBs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine facility's grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of electrical system.

B. Inspect test results of grounding system measured at point of TBC connection.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with connection of TBC only after unsatisfactory conditions have been corrected.

3.2 SELECTION OF COMMUNICATIONS BUSBARS

A. Unless otherwise indicated in this Section or on Drawings, provide products specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. PBB:

1. Dimensions: 1/4 inch thick by 4 inch high.
2. Stand-Off Distance: 4 inch.

C. SBB:

1. Dimensions: 1/4 inch thick by 4 inch high.
2. Stand-Off Distance: 4 inch.

3.3 SELECTION OF COMMUNICATIONS BONDING CONDUCTORS

A. Unless otherwise indicated in this Section or on Drawings, provide products specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Communications Busbar Connections:

1. TBC: Not smaller than 3/0 AWG and no smaller than largest TBB.
2. TBB: Not smaller than 2 kcmil per linear ft of conductor length, but not larger than 750 kcmil, unless otherwise indicated on Drawings.
3. BBC: Not smaller than largest TBB to which it is connected unless otherwise indicated on Drawings.
4. TEBC: Not smaller than 2 AWG unless otherwise indicated on Drawings. Provide bolted connectors.

5. UBC: Not smaller than 6 AWG unless otherwise indicated on Drawings. Provide bolted connectors.
6. Bonding Conductors to Structural Steel: Not smaller than 6 AWG unless otherwise indicated on Drawings. Provide bolted clamp connectors.

C. Cable Tray Connections:

1. Cable Tray Equipment Grounding Conductor: 6 AWG.

D. Underground Connections: Not smaller than 2 AWG. Provide welded connectors, except bolted connectors may be used in handholes or manholes and as otherwise indicated on Drawings.

3.4 INSTALLATION OF BONDING FOR COMMUNICATIONS

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Bonding of Communications: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with BICSI N3.
2. Consult Architect for resolution of conflicting requirements.

C. Special Techniques:

1. Busbars:

a. Indicate locations of grounding busbars on Drawings. Install busbars horizontally, on insulated spacers 12 inch above finished floor unless otherwise indicated.
b. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

2. Conductors:

a. Stacking of conductors under a single bolt is not permitted when connecting to busbars.
b. Assemble wire connector to conductor, complying with manufacturer's published instructions and as follows:

1) Use crimping tool and die specific to connector.
2) Pretwist conductor.
3) Apply antioxidant compound to bolted and compression connections.

c. Install in straightest and shortest route between origination and termination point, and no longer than required. Bend radius must not be smaller than 10 times diameter of conductor. No single bend may exceed 90 degrees.
d. Install without splices.
e. Support conductors at not more than 36 inch intervals.

f. Outside telecommunications rooms, install conductors in metric designator 21 (trade size 3/4) PVC-80 conduit until conduit enters telecommunications room. Install bonding conductors in EMT-A or EMT-SS when routed through plenum. Do not install bonding conductors in EMT-S unless otherwise indicated on Drawings.

1) If bonding conductor must be installed in EMT-S or other ferrous metallic raceway, bond conductor to raceway using grounding bushing that complies with Section 270528 "Pathways for Communications Systems," and bond both ends of raceway to SBB.

3. Provide TBC and terminate ends to PBB and intersystem bonding busbar at electrical service entrance in accordance with Section 250.94, "Bonding for Communication Systems," of NFPA 70.
4. Busbar Interconnections: Bond SBBs to PBB with TBBs. If more than one TBB is installed, bond TBBs together BBCs where required by TIA-607.
5. Structural Steel: Where structural steel of steel frame building is readily accessible within room or space, bond each SBB and PBB to vertical steel of building frame.
6. Communications Enclosures: Bond metallic enclosures of telecommunications equipment with UBCs to nearest SBB or PBB.
7. Shielded Cable: Bond shield of shielded cable to SBB in communications rooms and spaces. Comply with TIA-568.1 and TIA-568.2 when grounding shielded balanced twisted-pair cables.
8. Primary Protector: Bond to PBB with insulated bonding conductor.
9. Electrical Power Panelboards: Where electrical panelboards for communications equipment are located in same room or space, bond each ground bar of panelboard to SBB.
10. Cable Trays: Provide continuous electrical path by installing bonding clips and jumpers. Bond each end to nearest SBB.
11. Ladder Racks: Provide continuous electrical path by installing bonding clips and jumpers. Bond each end to nearest SBB.
12. Access Floors: Bond metal parts of access floors to SBB.

3.5 IDENTIFICATION

A. Comply with Section 270553 "Identification for Communications Systems."

B. Labels must be preprinted or computer-printed type.

1. Label PBB(s) with "ts-PBB," where "ts" is telecommunications space identifier for location of PBB.
2. Label SBB(s) with "ts-SBB," where "ts" is telecommunications space identifier for location of SBB.
3. Label TBC, TBBs, and BBCs at attachment points with legend: "WARNING! COMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

3.6 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with calibrated torque wrench according to manufacturer's published instructions.
2. Test bonding connections of system using AC earth ground-resistance tester, taking two-point bonding measurements in each telecommunications equipment room containing PBB or SBB, using process recommended by BICSI N1. Conduct tests with facility in operation.

    a. Measure resistance between PBB and electrical service intersystem termination point. Maximum acceptable value is 100 mΩ.

        1) If measured resistance from electrical service equipment to ground exceeds 5 Ω, notify Architect and include recommendations to reduce resistance to ground.

    b. Measure resistance between SBBs and PBB. Maximum acceptable value is 100 mΩ.

3. Test for ground loop currents using digital clamp-on ammeter, with full scale not more than 10 A, displaying current in increments of 0.01 A at accuracy of plus or minus 2.0 percent.

    a. With grounding infrastructure completed and communications system electronics operating, measure current in bonding conductors connected to PBB and to SBBs. Maximum acceptable AC current level is 1 A.

C. Nonconforming Work:

1. Communications bonding will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Collect, assemble, and submit test and inspection reports.

END OF SECTION

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

A. Related Requirements:

Always retain two subparagraphs below.

1.2 Section 260533.13 "Conduits for Electrical Systems" for requirements governing Pathways for Communication Systems.

PART 2 - EXECUTION

2.1 PATHWAY APPLICATION

A. Minimum Pathway Size: 3/4-inch trade size for copper and aluminum cables, and 1 inch for optical-fiber cables.

B. Pathway Fittings: Compatible with pathways and suitable for use and location.

C. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

D. Install surface pathways only where indicated on Drawings.

E. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

2.2 INSTALLATION

A. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA/BICSI 568.
3. TIA-569-D.
4. NECA 101
5. NECA 102.
6. NECA 105.
7. NECA 111.

B. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

C. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

D. Comply with requirements in Section 270529 "Hangers and Supports for Communications Systems" for hangers and supports.

E. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling" for sleeves and sleeve seals for communications.

F. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

G. Complete pathway installation before starting conductor installation.

H. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches of changes in direction. Utilize long radius ells for all optical-fiber cables.

I. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

J. Support conduit within 12 inches of enclosures to which attached.

K. Pathways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
2. Arrange pathways to cross building expansion joints at right angles with expansion fittings. Comply with requirements for expansion joints specified in this article.
3. Arrange pathways to keep a minimum of 2 inches of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
5. Change from nonmetallic conduit and fittings to RNC, Type EPC-40-PVC, and fittings before rising above floor.

L. Stub-ups to Above Recessed Ceilings:

1. Use EMT, IMC, or RMC for pathways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.

N. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.

P. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

Q. Install pull wires in empty pathways. 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 wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.

R. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, 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 pathway-sealing fittings according to NFPA 70.

S. Install devices to seal pathway interiors at accessible locations. Locate seals, so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service pathway enters a building or structure.
3. Where otherwise required by NFPA 70.

T. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.

2.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Install backfill.
2. After installing conduit, backfill and compact.
3. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete around conduit for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

4. Underground Warning Tape: Comply with requirements in Section 270553 "Identification for Communications Systems."

2.4 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

2.5 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

2.6 PROTECTION

A. Protect coatings, finishes, and cabinets from damage or deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 270529 - HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:

1. Section 270548 "Seismic Controls for Communications Systems" for products and installation requirements necessary for compliance with seismic criteria.
2. Section 260529 "Hangers and Supports for Electrical Systems" for Hangers and Supports for Communications Systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.

B. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
2. Component Importance Factor: 1.0.

END OF SECTION

SECTION 270548 - SEISMIC CONTROLS FOR COMMUNICATIONS SYSTEMS

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. Related Requirements:

1. Section 270529 "Hangers and Supports for Communications Systems" for commonly used communications system supports and installation requirements.
2. Section 260548 "Vibration and Seismic Controls for Electrical Systems" for requirements governing Seismic Controls for Communication Systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic[**and wind-load**] control system.

1. Seismic[**and Wind-Load**] Performance: Equipment shall withstand the effects of earthquake motions[**and high wind events**] determined in accordance with [**ASCE/SEI 7-05**] [**ASCE/SEI 7-10**] [**ASCE/SEI 7-16**] <**Insert requirement**>.

B. Seismic Design Calculations:

1. Perform calculations to obtain force information necessary to properly select seismic restraint devices, fasteners, and anchorage. Perform calculations using methods acceptable to applicable code authorities and as presented in [**ASCE/SEI 7-05**] [**ASCE/SEI 7-10 including supplement No. 1**] [**ASCE/SEI 7-16**] <**Insert ASCE/SEI 7 edition or other seismic calculation method required by authorities having jurisdiction**>. Where "ASCE/SEI 7" is used throughout this Section, it is to be understood that the edition referred to in this subparagraph is the edition intended as reference throughout the Section Text.

a. Data indicated below to be determined by Delegated Design Contractor must be obtained by Contractor and must be included in individual component submittal packages.
b. Coordinate seismic design calculations with wind-load calculations for equipment mounted outdoors.
c. Building Occupancy Category: [**I**] [**II**] [**III**] [**IV**].

d. Building Risk Category: [**I**] [**II**] [**III**] [**IV**].
e. Building Site Classification: [**A**] [**B**] [**C**] [**D**] [**E**] [**F**].

2. Calculation Factors, ASCE/SEI 7-16, Ch. 13 - Seismic Design Requirements for Nonstructural Components: All section, paragraph, equation, and table numbers refer to ASCE/SEI 7-16 unless otherwise noted.

   a. Horizontal Seismic Design Force F_p: Value is to be calculated by Delegated Design Contractor using Equation 13.3-1. Factors below must be obtained for this calculation.

      1) S_{DS} = Spectral Acceleration: <**Insert value**>. Value applies to all components on Project.
      2) a_p = Component Amplification Factor: See Drawing Schedule for each component.
      3) I_p = Component Importance Factor: See Drawing Schedule for each component.
      4) W_p = Component Operating Weight: For each component. Obtain by Delegated Design Contractor from each component submittal.
      5) R_p = Component Response Modification Factor: See Drawing Schedule for each component.
      6) z = Height in Structure of Point of Attachment of Component with Respect to Base: Determine from Project Drawings for each component by Delegated Design Contractor. For items at or below the base, "z" shall be taken as zero.
      7) h = Average Roof Height of Structure with Respect to Base: Determine from Project Drawings by Delegated Design Contractor.

   b. Vertical Seismic Design Force: Calculated by Delegated Design Contractor using method explained in ASCE/SEI 7-16, Paragraph 13.3.1.2.
   c. Seismic Relative Displacement D_{pl}: Calculated by Delegated Design Contractor using methods explained in ASCE/SEI 7-16, Paragraph 13.3.2. Factors below must be obtained for this calculation:

      1) D_p = Relative Seismic Displacement that Each Component Must Be Designed to Accommodate: Calculated by Delegated Design Contractor in accordance with ASCE/SEI 7-16, Paragraph 13.3.2.
      2) I_e = Structure Importance Factor: <**Insert value**>. Value applies to all components on Project.
      3) $\delta?_{xA}$ = Deflection at Building Level x of Structure A: See Drawing Schedule for each component.
      4) $\delta?_{yA}$ = Deflection at Building Level y of Structure A: See Drawing Schedule for each component.
      5) $\delta?_{yB}$ = Deflection at Building Level y of Structure B: See Drawing Schedule for each component.
      6) h_x = Height of Level x to Which Upper Connection Point Is Attached: Determine for each component by Delegated Design Contractor from Project Drawings and manufacturer's data.
      7) h_y = Height of Level y to Which Upper Connection Point Is Attached: Determine for each component by Delegated Design Contractor from Project Drawings and manufacturer's data.
      8) $\Delta?_{aA}$ = Allowable Story Drift for Structure A: See Drawing Schedules for each component.

9) $\Delta?_{aB}$ = Allowable Story Drift for Structure B: See Drawing Schedules for each component.
10) h_{sx} = Story Height Used in the Definition of the Allowable Drift A_a: See Drawings Schedules for each component.

d. Component Fundamental Period T_p: Calculated by Delegated Design Contractor using methods explained in ASCE/SEI 7-16, Paragraph 13.3.3. Factors below must be obtained for this calculation:

1) W_p = Component Operating Weight: Determined by Contractor from Project Drawings and manufacturer's data.
2) g = Gravitational Acceleration: [32.17 fps2] <**Insert value**>.
3) K_p = Combined Stiffness of the Component, Supports, and Attachments: Determined by delegated design seismic engineer. <**Insert value**>.

3. Calculation Factors, ASCE/SEI 7-10, Ch. 13 - Seismic Design Requirements for Nonstructural Components: All section, paragraph, equation, and table numbers refer to ASCE/SEI 7-10 unless otherwise noted.

a. Horizontal Seismic Design Force F_p: Calculated by Delegated Design Contractor by ASCE/SEI 7-10, Equation 13.3-1. Factors below must be obtained for this calculation:

1) S_{DS} = Spectral Acceleration: <**Insert value**>. Value applies to all components on Project.
2) a_p = Component Amplification Factor: See Drawing Schedule for each component.
3) I_p = Component Importance Factor: See Drawing Schedule for each component.
4) W_p = Component Operating Weight: For each component. Obtain by Delegated Design Contractor from equipment submittal.
5) R_p = Component Response Modification Factor: See Drawing Schedule for each component.
6) z = Height in Structure of Point of Attachment of Component with Respect to Base: Determined from Project Drawings for each component by Contractor. For items at or below the base, "z" shall be taken as zero.
7) h = Average Roof Height of Structure with Respect to Base: Determine from Project Drawings by Delegated Design Contractor.

b. Vertical Seismic Design Force: Calculate by Delegated Design Contractor using method explained in ASCE/SEI 7-10, Paragraph 13.3.1.
c. Seismic Relative Displacement D_{pl}: Calculate by Delegated Design Contractor using methods explained in ASCE/SEI 7-10, Paragraph 13.3.2. Factors below must be obtained for this calculation:

1) D_p = Relative Seismic Displacement that Each Component Must Be Designed to Accommodate: Calculate by Delegated Design Contractor in accordance with ASCE/SEI 7-10, Paragraph 13.3.2.
2) I_e = Structure Importance Factor: <**Insert value**>. Value applies to all components on Project.
3) $\delta?_{xA}$ = Deflection at Building Level x of Structure A: See Drawing Schedule for each component.

4) $\delta?_{yA}$ = Deflection at Building Level y of Structure A: See Drawing Schedule for each component.
5) $\delta?_{yB}$ = Deflection at Building Level y of Structure B: See Drawing Schedule for each component.
6) h_x = Height of Level x to Which Upper Connection Point Is Attached: Determine for each component by Delegated Design Contractor from Project Drawings and manufacturer's data.
7) h_y = Height of Level y to Which Upper Connection Point Is Attached: Determine for each component by Delegated Design Contractor from Project Drawings and manufacturer's data.
8) $\Delta?_{aA}$ = Allowable Story Drift for Structure A: See Drawing Schedule for each component.
9) $\Delta?_{aB}$ = Allowable Story Drift for Structure B: See Drawing Schedule for each component.
10) h_{sx} = Story Height Used in the Definition of the Allowable Drift A_a: See Schedule for each component.

4. Calculation Factors, ASCE/SEI 7-05, Ch. 13 - Seismic Design Requirements for Nonstructural Components: All section, paragraph, equation, and table numbers refer to ASCE/SEI 7-05 unless otherwise noted.

   a. Horizontal Seismic Design Force F_p: Calculated by Delegated Design Contractor by ASCE/SEI 7-05, Equation 13.3-1. Factors below must be obtained for this calculation:

      1) S_{DS} = Spectral Acceleration: <**Insert value**>. Value applies to all components on Project.
      2) a_p = Component Amplification Factor: See Drawing Schedule for each component.
      3) I_p = Component Importance Factor: See Drawing Schedule for each component.
      4) W_p = Component Operating Weight: Obtain by Delegated Design Contractor for each component from component submittal.
      5) R_p = Component Response Modification Factor: See Drawing Schedule for each component.
      6) z = Height in Structure of Point of Attachment of Component with Respect to Base: Determine by Delegated Design Contractor for each component from Project Drawings. For items at or below the base, "z" shall be taken as zero.
      7) h = Average Roof Height of Structure with Respect to Base: Determine by Delegated Design Contractor from Project Drawings.

   b. Vertical Seismic Design Force: Calculated by Delegated Design Contractor using method explained in ASCE/SEI 7-05, Paragraph 13.3.1.
   c. Seismic Relative Displacement D_p: Calculated by Delegated Design Contractor using methods explained in ASCE/SEI 7-05, Paragraph 13.3.2. Factors below must be obtained for this calculation:

      1) $\delta?_{xA}$ = Deflection at Building Level x of Structure A: See Drawing Schedule for each component.
      2) $\delta?_{yA}$ = Deflection at Building Level y of Structure A: See Drawing Schedule for each component.
      3) $\delta?_{yB}$ = Deflection at Building Level y of Structure B: See Drawing Schedule for each component.

4) h_x = Height of Level x to Which Upper Connection Point Is Attached: Determine for each component by Delegated Design Contractor from Project Drawings and manufacturer's data.
5) h_y = Height of Level y to Which Upper Connection Point Is Attached: Determine for each component by Delegated Design Contractor from Project Drawings and manufacturer's data.
6) $\Delta?_{aA}$ = Allowable Story Drift for Structure A: See Drawing Schedule for each component.
7) $\Delta?_{aB}$ = Allowable Story Drift for Structure B: See Drawing Schedule for each component.
8) h_{sx} = Story Height Used in the Definition of Allowable Drift A_a: See Drawing Schedule for each component.

C. Wind-Load Design Calculations:

1. Perform calculations to obtain force information necessary to properly select wind-load-restraint devices, fasteners, and anchorage. Perform calculations using methods acceptable to applicable code authorities and as presented in [**ASCE/SEI 7-05**] [**ASCE/SEI 7-10**] [**ASCE/SEI 7-16**] <**Insert ASCE/SEI 7 edition or other wind-load calculation method required by authorities having jurisdiction**>. Where "ASCE/SEI 7" is used throughout this Section, it is to be understood that the edition referred to in this subparagraph is intended as referenced throughout the Section Text unless otherwise noted.

    a. Data indicated below that are specific to individual pieces of equipment must be obtained by Contractor and must be included in individual component submittal packages.
    b. Coordinate design wind-load calculations with seismic load calculations for equipment requiring both seismic and wind-load reinforcement. Comply with requirements in other Sections in addition to those in this Section.

2. Design wind pressure "p" for external sidewall-mounted equipment is to be calculated by Delegated Design Contractor using methods in ASCE/SEI 7-16, Ch. 30. Perform calculations according to one of the following, as appropriate:

    a. PART 1: Low-Rise Buildings.
    b. PART 2: Low-Rise Buildings (Simplified).
    c. PART 3: Buildings with "h" less than 60 ft..
    d. PART 4: Buildings with "h" greater than 60 ft. and less than 160 ft..
    e. PART 5: Open Buildings.

3. Design wind pressure "p" for rooftop equipment is to be calculated by Delegated Design Contractor using methods in ASCE/SEI 7-16, Ch. 30, PART 6: Building Appurtenances and Rooftop Structures and Equipment.

    a. Risk Category: [**I**] [**II**] [**III**] [**IV**] [**V**].
    b. h = Mean Roof Height: <**Insert value**>.
    c. V = Basic Wind Speed: <**Insert value**>.
    d. K_d = Wind Directionality Factor: <**Insert factor**>.
    e. Exposure Category: [**B**] [**C**] [**D**].
    f. K_{zt} = Topographic Factor: <**Insert factor**>.
    g. K_e = Ground Elevation Factor: <**Insert factor**>.
    h. K_z = Velocity Pressure Exposure Coefficient (Evaluated at Height z): <**Insert coefficient**>.

i. K_h = Velocity Pressure Exposure Coefficient (Evaluated at Height h): <**Insert coefficient**>.
j. q_z = Velocity Pressure: Value calculated by delegated wind-load design Contractor using methods detailed in ASCE/SEI 7-16 Section 26.10.1 or other source approved by authorities having jurisdiction.
k. q_h = Velocity Pressure: Value calculated by delegated wind-load design Contractor using methods detailed in ASCE/SEI 7-16 Section 26.10.1 or other source approved by authorities having jurisdiction.

1) G = Gust-Effect Factor: [**0.85**] <**Insert factor**>.
2) Enclosure Classification: <**Insert classification**>.
3) GC_{pi} = Internal Pressure Coefficient: <**Insert coefficient**>.

4. Design wind pressure "p" for external sidewall-mounted equipment is to be calculated by Delegated Design Contractor using methods in ASCE/SEI 7-10, Ch. 30. Perform calculations in accordance with one of the following, as appropriate:

a. PART 1: Low-Rise Buildings.
b. PART 2: Low-Rise Buildings (Simplified).
c. PART 3: Buildings with "h" greater than 60 ft..
d. PART 4: Buildings with "h" less than 160 ft..
e. PART 5: Open Buildings, as appropriate.

5. Design wind pressure "p" for rooftop equipment is to be calculated by Delegated Design Contractor using methods in ASCE/SEI 7-10, Ch. 30, PART 6: Building Appurtenances and Rooftop Structures and Equipment.

a. Risk Category: [**I**] [**II**] [**III**] [**IV**] [**V**].
b. h = Mean Roof Height: <**Insert value**>.
c. V = Basic Wind Speed: <**Insert value**>.
d. K_d = Wind Directionality Factor: <**Insert factor**>.
e. Exposure Category: [**B**] [**C**] [**D**].
f. K_{zt} = Topographic Factor: <**Insert factor**>.
g. K_z = Velocity Pressure Exposure Coefficient (Evaluated at Height z): <**Insert coefficient**>.
h. K_h = Velocity Pressure Exposure Coefficient (Evaluated at Height h): <**Insert coefficient**>.
i. q_z = Velocity Pressure at Height z: Value calculated by delegated wind-load design Contractor using methods detailed in ASCE/SEI 7-10 Section 26.10.1 or other source approved by authorities having jurisdiction.
j. q_h = Velocity Pressure at Height h: Value calculated by delegated wind-load design Contractor using methods detailed in ASCE/SEI 7-10 Section 26.10.1 or other source approved by authorities having jurisdiction.
k. G = Gust-Effect Factor: [**0.85**] <**Insert factor**>.
l. Enclosure Classification: <**Insert classification**>.
m. GC_{pi} = Internal Pressure Coefficient: <**Insert coefficient**>.

6. Design wind-load "F" for rooftop equipment and external sidewall-mounted equipment is to be calculated by Delegated Design Contractor using methods in ASCE/SEI 7-05, Ch. 6.

a. I = Importance Factor: <**Insert factor**>.
b. h = Mean Roof Height: <**Insert value**>.

c. V = Basic Wind Speed: <**Insert value**>.
d. K_d = Wind Directionality Factor: <**Insert factor**>.
e. Exposure Category: [**B**] [**C**] [**D**].
f. K_{zt} = Topographic Factor: <**Insert factor**>.
g. K_z = Velocity Pressure Exposure Coefficient (Evaluated at Height z): <**Insert coefficient**>.
h. K_h = Velocity Pressure Exposure Coefficient (Evaluated at Height h): <**Insert coefficient**>.
i. q_z = Velocity Pressure at Height z: Value calculated by delegated wind-load design Contractor using methods detailed in ASCE/SEI 7-05 Section 6.5.10 or other source approved by authorities having jurisdiction.
j. q_h = Velocity Pressure at Roof Height h: Value calculated by delegated wind-load design Contractor using methods detailed in ASCE/SEI 7-05 Section 6.5.10 or other source approved by authorities having jurisdiction.
k. G = Gust-Effect Factor: [**0.85**] <**Insert factor**>.

1) GC_{pi} = Internal Pressure Coefficient: <**Insert coefficient**>.

l. GC_p = External Pressure Coefficient: <**Insert coefficient**>.
m. C_f = Force Coefficient: Value determined by delegated wind-load design contractor from ASCE/SEI 7-05, Figures 6-21 through 6-23 or other source approved by authorities having jurisdiction.
n. A_f = Projected Area Normal to the Wind: Except where C_f is specified for the actual surface area. Value determined by delegated wind-load design Contractor from equipment submittal or manufacturer.

D. Consequential Damage: Provide additional seismic [**and wind-load**]restraints for suspended communications components or anchorage of floor-, roof-, or wall-mounted communications components as indicated in [**ASCE/SEI 7-05**] [**ASCE/SEI 7-10**] [**ASCE/SEI 7-16**] so that failure of a non-essential or essential communications component will not cause failure of any other essential architectural, mechanical, or communications building component.

E. Fire/Smoke Resistance: Seismic[**- and wind-load**]-restraint devices that are not constructed of ferrous metals must have a maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested by an NRTL in accordance with ASTM E84 or UL 723, and be so labeled.

F. Component Supports:

1. Load ratings, features, and applications of all reinforcement components must be based on testing standards of a nationally recognized testing agency.
2. All component support attachments must comply with force and displacement resistance requirements of [**ASCE/SEI 7-05 Section 13.6**] [**ASCE/SEI 7-10 Section 13.6**] [**ASCE/SEI 7-16 Section 13.6**].

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive seismic [**and wind-load**]control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by [**an evaluation service member of ICC-ES**] [**OSHPD**] [**an agency acceptable to authorities having jurisdiction**].

B. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry static[**, wind-load,**] and seismic loads within specified loading limits.

3.3 INSTALLATION OF SEISMIC RESTRAINT[**AND WIND-LOAD CONTROL**] DEVICES

A. Provide seismic restraint [**and wind-load control**]devices for systems and equipment where indicated in Equipment Schedules or Communications Seismic and Wind-Load Controls Schedule, where indicated on Drawings, where the Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.

1. Install all equipment and devices to withstand the effects of earthquake motions[**and high wind events**] determined in accordance with [**ASCE/SEI 7-05**] [**ASCE/SEI 7-10**] [**ASCE/SEI 7-16**] <**Insert requirement**>.

B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

C. Installation of seismic[**and wind-load**] restraints must not cause any stresses, misalignment, or change of position of equipment or conduits.

D. Equipment Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.

2. Install seismic-restraint[**and wind-load-restraint**] devices using methods approved by [**an evaluation service member of ICC-ES**] [**OSHPD**] [**an agency acceptable to authorities having jurisdiction**] that provides required submittals for component.

E. Raceway, Cable, Wireway, Cable Tray, and Busway Support and Hanger Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
2. Install seismic-restraint[**and wind-load-restraint**] devices using methods approved by [**an evaluation service member of ICC-ES**] [**OSHPD**] [**an agency acceptable to authorities having jurisdiction**] that provides required submittals for component.
3. Comply with requirements in NFPA 70 and [**ASCE/SEI 7-05**] [**ASCE/SEI 7-10**] [**ASCE/SEI 7-16**] <**Insert requirement**>.

F. Equipment and Hanger Restraints:

1. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
2. Install seismic-restraint devices using methods approved by [**an evaluation service member of ICC-ES**] [**OSHPD**] [**an agency acceptable to authorities having jurisdiction**] providing required submittals for component.

G. Install cables so they do not bend across edges of adjacent equipment or building structure.

H. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

I. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

END OF SECTION

SECTION 270553 - IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

A. Related Requirements:

Always retain two subparagraphs below.

1.2 Section 260553 "Identification for Electrical Systems" for requirements governing Identification for Communication Systems.

END OF SECTION

SECTION 271313 - COMMUNICATIONS COPPER BACKBONE CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Products Installed, but Not Furnished, under This Section:

1. See Section 270553 "Identification for Communications Systems" for communications equipment labels.
2. See Section 271513 "Communications Copper Horizontal Cabling" for Type CM, CMG, and CMX cabling.

B. Related Requirements:

1. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
2. Section 270010 "Supplemental Requirements for Communications" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 SEQUENCING

A. Wet-work in spaces must be completely dry, and HVAC system must be operating and maintaining ambient temperature and humidity conditions within manufacturer's recommended limits, before delivering and installing cables and connecting materials.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Backbone communications cable.
2. Communications-, audio/video-, data-, and other signaling-circuit accessories.

1.4 WARRANTY FOR COMMUNICATIONS COPPER BACKBONE CABLE ASSEMBLIES

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed communications copper backbone cable assemblies perform in accordance with specified requirements and agrees to repair or replace cable assemblies that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Four years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 BACKBONE COMMUNICATIONS CABLES

A. Description: This category covers multiple conductor jacketed communications cable for telephone and other communications circuits for use in risers and plenums as described in Article 800 of NFPA 70.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Certified Cable: UL CCN DUZX; including UL 444.
b. Verified Cable: UL CCN DVBI; including TIA-568.2.
c. Type CMP: NFPA 262.
d. Type CMR: UL 1666.
e. Limited Smoke: Marked "-LS" in accordance with UL 1685.
f. Halogen-Free: Marked "-HF" in accordance with UL Subject 2885.
g. Low Smoke and Halogen-Free: Marked "-LSHF" in accordance with IEC 61034-2.
h. Cable Heating Test: Marked "-LP" with current rating and temperature rating.

C. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

PART 3 - EXECUTION

3.1 PREPARATION

A. Shop Drawings: Prepare and submit the following:

1. Cable Labeling Schedules: Submit electronic files.
2. Cabling Administration Diagrams: Submit diagrams and supporting electronic files.

a. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

3. Wiring Diagrams:

    a. Telecommunications rooms plans and elevations.
    b. Telecommunications pathways.
    c. Telecommunications system access points.
    d. Telecommunications grounding system.
    e. Cross-connects.
    f. Patch panels.
    g. Patch cords.

4. Cross-Connect and Patch Panel Details: Include mounting assemblies, elevations, and physical relationship between installed components.
5. Twisted-Pair Cable Testing Plan: Include list of cables to be tested, identification of tests to be performed, pass/fail criteria, and copy of testing procedures (may be separate volume). Indicate Installer's required tests for warranty compliance.

3.2 INSTALLATION OF COMMUNICATIONS COPPER BACKBONE CABLING

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation:

1. Communications Cable Assemblies: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with BICSI N1.
2. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

    a. Provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure.
    b. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters may not be used as part of backbone cabling.

2. Drawings indicate general arrangement of pathways and fittings.
3. Wiring Methods:

    a. Raceway and Tray: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters. Conceal raceway and cables, except in unfinished spaces.

        1) Install plenum cable in environmental air spaces, including plenum ceilings.
        2) Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."

b. Open-Cable: Route conductors and cables in accessible ceilings, walls, and floors where possible.
c. Within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install cables parallel with or at right angles to sides and back of enclosure.

4. General Requirements for Cabling:

a. Install 110-style IDC termination hardware unless otherwise indicated.
b. Do not untwist twisted-pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
c. Terminate all conductors; no cable may contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
d. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inch and not more than 6 inch from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
e. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
f. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Use lacing bars and distribution spools.
g. 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.
h. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps may not be used for heating.
i. In the communications equipment room, install 10 ft long service loop on each end of cable.
j. Pulling Cable: Monitor cable pull tensions.

5. Open-Cable Installation:

a. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
b. Suspend twisted-pair cabling, not in a wireway or pathway, a minimum of 8 inch above ceilings by cable supports not more than 5 ft apart.
c. Cable may not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

6. Installation of Cable Routed Exposed under Raised Floors:

a. Install plenum-rated cable only.
b. Install cabling after the flooring system has been installed in raised floor areas.
c. Coil cable 6 ft long not less than 12 inch in diameter below each feed point.

7. Group connecting hardware for cables into separate logical fields.
8. Separation from EMI Sources:

a. Comply with BICSI N1 for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
b. Separate open communications cables or cables in nonmetallic raceways from unshielded power conductors and electrical equipment as follows:

    1) Power Rating Less Than 2 kVA: Minimum 5 inch.
    2) Power Rating between 2 and 5 kVA: Minimum 12 inch.
    3) Power Rating More Than 5 kVA: Minimum 24 inch.

c. Separate communications cables in grounded metallic raceways from unshielded power lines or electrical equipment as follows:

    1) Power Rating Less Than 2 kVA: Minimum 2-1/2 inch.
    2) Power Rating between 2 and 5 kVA: Minimum 6 inch.
    3) Power Rating More Than 5 kVA: Minimum 12 inch.

d. Separate communications cables in grounded metallic raceways from power lines and electrical equipment located in grounded metallic conduits or enclosures as follows:

    1) Power Rating Less Than 2 kVA: No minimum distance.
    2) Power Rating between 2 and 5 kVA: Minimum 3 inch.
    3) Power Rating More Than 5 kVA: Minimum 6 inch.

e. Separate communications cables from electrical motors and transformers rated 5 kVA or 5 HP and larger minimum 48 inch.
f. Separate communications cables from fluorescent luminaires minimum 5 inch.

9. Identify system components, wiring, and cabling in accordance with TIA-606.

    a. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

10. Cable and Wire Identification:

    a. Label each cable within 4 inch of each termination and tap, where it is accessible in cabinet or junction or outlet box, and elsewhere as indicated.
    b. Each wire connected to building-mounted devices is not required to be numbered at device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
    c. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 ft.
    d. Label each terminal strip, and screw terminal in each cabinet, rack, or panel.

        1) Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group, extended from panel or cabinet to building-mounted device, with name and number of particular device.
        2) Label each unit and field within distribution racks and frames.

e. 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 different color for jacks and plugs of each service.

11. Cable Schedule: Install 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 electronic copy of final comprehensive schedules for Project.
12. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

D. Interfaces with Other Work:

1. Coordinate with Section 078413 "Penetration Firestopping" for sealing fire-rated penetrations.
2. Coordinate with Section 260533.16 "Boxes and Covers for Electrical Systems" for installation of outlet boxes and cover plates.
3. Coordinate with Section 270526 "Grounding and Bonding for Communications Systems" for grounding communications cabling and connectors.
4. Coordinate with Section 270528 "Pathways for Communications Systems" for installation of provisions for routing and terminating cable assemblies.
5. Coordinate with Section 270529 "Hangers and Supports for Communications Systems" for installation of cable supports.
6. Coordinate with Section 270536 "Cable Trays for Communications Systems" for installation of cable trays.

3.3 FIELD QUALITY CONTROL OF COMMUNICATIONS COPPER BACKBONE CABLING

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Perform manufacturer's recommended tests and inspections.
2. Visually inspect jacket materials for certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568.1.
3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
4. Test 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 must meet or exceed applicable requirements in TIA-568.2. 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.

C. Nonconforming Work:

1. Cable assemblies will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective cable assemblies and retest.

D. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.4 PROTECTION

A. After installation, protect cable assemblies and accessories from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 271333 - COMMUNICATIONS COAXIAL BACKBONE CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Communications coaxial cable.
2. Coaxial cable hardware.

1.2 COAXIAL BACKBONE CABLING DESCRIPTION

A. Coaxial cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Nominal OD.
2. Minimum bending radius.
3. Maximum pulling tension.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard, and the requirements of TIA-568-C.4.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

A. Communications Cable: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. Communications, Plenum Rated: Type CMP complying with UL 1685 or Type CMP in listed plenum communications raceway.
2. Communications, Plenum Rated: Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."
3. Communications, Riser Rated: Type CMR complying with UL 1666.
4. Communications, Riser Rated: Type CMP complying with UL 1685, or Type CMR complying with UL 1666 in listed plenum or riser communications raceway.
5. Communications, Riser Rated: Type CMP or Type CMR in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

B. CATV Cable: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. CATV Plenum Rated: Type CATVP installed in riser raceways or cable routing assemblies, complying with NFPA 262.
2. CATV Riser Rated: Type CATVR complying with UL 1666; or CATVP complying with NFPA 262.
3. CATV Cable: Type CATV, or CATVP or CATVR in fireproof riser shafts with firestops at each penetration.

2.3 COMMUNICATIONS COAXIAL CABLE

A. Description: Coaxial cable with a 75-ohm characteristic impedance designed for broadband data transmission.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpha Wire.
2. Belden CDT Networking Division/NORDX.
3. Coleman Cable, Inc.
4. CommScope, Inc.
5. Draka USA.

2.4 COAXIAL CABLE HARDWARE

A. Description: Hardware designed to connect, splice, and terminate coaxial cable with a 75-ohm characteristic impedance.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:

1. Aim Electronics.
2. Leviton Manufacturing Co., Inc.
3. Siemon Co. (The).

D. Coaxial-Cable Connectors: Type BNC, 75 ohms.

2.5 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.

B. Comply with TIA-607-B.

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 cables in raceways and cable trays except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect 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. Comply with requirements specified in Section 271100 "Communications Equipment Room Fittings."

B. Comply with requirements in Section 270528 "Pathways for Communications Systems" for installation of conduits and wireways.

C. Comply with Section 270528.29 "Hangers and Supports for Communications Systems."

D. Drawings indicate general arrangement of pathways and fittings.

E. Comply with NFPA 70 for pull-box sizing and length of conduit and number of bends between pull points.

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 COAXIAL BACKBONE CABLES

A. Comply with NECA 1, TIA 568-C.4, and NECA/BICSI 568.

B. General Requirements for Cabling:

1. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
2. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and patch panels.
3. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
5. 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.
6. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
7. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
8. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend coaxial cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum rated cable only.

2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 6 feet long not less than 12 inches in diameter below each feed point.

E. Outdoor Coaxial Cable Installation:

1. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
2. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:

1. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
   b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 12 inches.
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

2. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
   b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 6 inches.
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

3. 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:

   a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 3 inches.
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

4. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
5. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.5 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. 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 TIA-607-B and NECA/BICSI-607.

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 FIELD QUALITY CONTROL

A. Perform the following tests and inspections.

B. Tests and Inspections:

1. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
2. Test coaxial 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.

C. Data for each measurement shall be documented. 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.

D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION

SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 COPPER HORIZONTAL CABLING DESCRIPTION

A. Horizontal cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1," in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.

1. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.
2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
3. Bridged taps and splices shall not be installed in the horizontal cabling.

B. A work area is approximately 100 sq. ft., and includes the components that extend from the equipment outlets to the station equipment.

C. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment or in the horizontal cross-connect.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

PART 3 - EXECUTION

3.1 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES

A. Comply with NECA 1 and NECA/BICSI 568

B. Routing: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters. Conceal raceway and cables, except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

D. General Requirements for Cabling:

1. Comply with TIA-568-C.1.
2. Comply with BICSI's "Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Do not untwist twisted pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
6. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
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 Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use 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. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
11. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
12. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.

E. Group connecting hardware for cables into separate logical fields.

F. Separation from EMI Sources:

1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.

3.2 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with "Firestopping Systems" Article in BISCI's "Telecommunications Distribution Methods Manual."

3.3 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.

B. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."

C. Comply with TIA-607-B and NECA/BICSI-607.

D. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.

E. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

3.4 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."

B. Equipment grounding conductors.

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. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
4. 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, extended from a panel or cabinet to a building-mounted device, with the name and number of a particular device.
    b. Label each unit and field within distribution racks and frames.

5. 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.

D. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.5 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test twisted pair 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.

C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.

D. Nonconforming Work:

1. End-to-end cabling will be considered defective if it does not pass tests and inspections.
2. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

E. Collect, assemble, and submit test and inspection reports.

F. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

END OF SECTION

SECTION 271533 - COMMUNICATIONS COAXIAL HORIZONTAL CABLING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard, and the requirements of TIA-568-C.4.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

A. Communications Cable: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. Communications, Plenum Rated: Type CMP complying with UL 1685 or Type CMP in listed cable routing assembly.
2. Communications, Plenum Rated: Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed per NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

B. CATV Cable: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. CATV Plenum Rated: Type CATVP installed in riser raceways or cable routing assemblies, complying with NFPA 262.
2. CATV Cable: Type CATV, or CATVP or CATVR in fireproof riser shafts with firestops at each penetration.

2.3 COMMUNICATIONS COAXIAL CABLE

A. Description: Coaxial cable with a 75-ohm characteristic impedance designed for broadband data transmission.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer name, product name or designation> or comparable product by one of the following:

1. Alpha Wire.
2. Belden CDT Networking Division/NORDX.
3. Coleman Cable, Inc.
4. CommScope, Inc.
5. Draka USA.

2.4 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.

B. Comply with TIA-607-B.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate horizontal cabling with the protectors and demarcation point provided by communications service provider.

3.2 INSTALLATION OF COAXIAL HORIZONTAL CABLES

A. Comply with NECA 1 and NECA/BICSI 568.

B. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

D. General Requirements for Cabling:

1. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
2. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and patch panels.
3. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
4. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
6. 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.
7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
8. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
9. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Pulling Cable" Section. Monitor cable pull tensions.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend coaxial cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 6 feet long not less than 12 inches in diameter below each feed point.

G. Outdoor Coaxial Cable Installation:

1. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
2. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches.

H. Group connecting hardware for cables into separate logical fields.

I. Separation from EMI Sources:

1. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
    b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 12 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

2. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
    b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 6 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

3. 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:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 3 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

4. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
5. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.3 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-C, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.4 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with TIA-607-B and NECA/BICSI-607.

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.

3.5 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Cable Schedule: Install in a 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. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, horizontal pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

D. 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. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
4. 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 with name and number of particular device as shown.
    b. Label each unit and field within distribution racks and frames.

5. 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 communications cabling, use a different color for jacks and plugs of each service.

E. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606-B, for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.6 FIELD QUALITY CONTROL

A. Perform the following tests and inspections.

B. Tests and Inspections:

1. Visually inspect coaxial jacket materials for NRTL certification markings.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test coaxial horizontal 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.

C. Data for each measurement shall be documented. 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.

D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION

SECTION 282000 - VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes a video surveillance system consisting of cameras, digital video recorder, data transmission wiring, and a control station with its associated equipment.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

1.3 PROJECT CONDITIONS

A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Control Station: Rated for continuous operation in ambient temperatures of 60 to 85 deg F and a relative humidity of 20 to 80 percent, noncondensing.
2. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph and snow cover up to 24 inches thick. Use NEMA 250, Type 3R enclosures.
3. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. Video-signal format shall comply with NTSC standard, composite interlaced video. Composite video-signal termination shall be 75 ohms.

B. Surge Protection: Protect components from voltage surges entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.

1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits."
2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits" as recommended by manufacturer for type of line being protected.

C. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Video surveillance system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

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. Comply with NECA 1.

D. Comply with NFPA 70.

E. Electronic data exchange between video surveillance system with an access-control system shall comply with SIA TVAC.

2.3 STANDARD CAMERAS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AXCESS International Inc.
2. Bosch Security Systems, Inc.
3. CBC (AMERICA) Corp.
4. COP-USA.
5. Crest Electronics, Inc.
6. Elbex Ltd.
7. ELMO.
8. EverFocus Electronics Corporation.

9. GE Security, Inc.
10. GENWAC.
11. Hitachi, Ltd.
12. Honeywell Security Products- Americas.
13. Hunt Electronics USA, Inc.
14. Ikegami Electronics (USA) Inc.
15. JVC Americas Corp.
16. Merit Li-Lin (USA) Corp.
17. Panasonic Corporation of North America.
18. Pelco.
19. Pixera Corporation.
20. Safety Vision.
21. Samsung Opto-Electronics.
22. SANYO North America Corporation.
23. Telpix Electronics, Inc.
24. Toshiba Corporation.
25. Trinus Systems Inc.
26. Tyco International Limited.

2.4 DIGITAL VIDEO RECORDERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AXCESS International Inc.
2. Bosch Security Systems, Inc.
3. CBC (AMERICA) Corp.
4. COP-USA.
5. Crest Electronics, Inc.
6. Dedicated Microcomputers Limited.
7. Elbex Ltd.
8. EverFocus Electronics Corporation.
9. GE Security, Inc.
10. Hitachi, Ltd.
11. Honeywell Security Products- Americas.
12. Ikegami Electronics (USA) Inc.
13. JVC Americas Corp.
14. Panasonic Corporation of North America.
15. Pelco.
16. Samsung Opto-Electronics.
17. SANYO North America Corporation.
18. Tyco International Limited.
19. VELTEK.
20. Vicon Industries, Inc.

B. Description: Digital, time-lapse type, full-frame and motion recorder, with removable hard drive.

1. Recording Time: 400 hours minimum.
2. Resolution: 720 by 480 lines, minimum.

3. Programming shall be from trackball and push buttons on face of the recorder, settings shall be displayed on any video monitor connected to the recorder. Programming shall include the following:

    a. Motion analysis graph.
    b. Password protection.
    c. Alarm and timer controls.
    d. Continuous recording option.
    e. Time-lapse operating modes.
    f. Search video by time, event, or motion.

4. Programming: SmartMedia card for software updating, image archiving, and image transfer to a PC.
5. Storage: 80-GB, removable hard drive. Software shall permit hot-swapping drives.
6. Time and Date Generator: Records time (hr:min:sec) and date legend of each frame.
7. Audio Recording: 70 to 7000 Hz. Phono and microphone input; phono output.
8. Mounting: Standard 19-inch rack complying with CEA 310-E, or freestanding desktop.

PART 3 - EXECUTION

3.1 WIRING

A. Comply with requirements in Section 270528 "Pathways for Communications Systems."

B. Wiring Method: Install cables in raceways unless otherwise indicated.

1. Except raceways are not required in accessible indoor ceiling spaces and attics.
2. Except raceways are not required in hollow gypsum board partitions.
3. Conceal raceways and wiring except in unfinished spaces.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. 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-486B.

E. For communication wiring, comply with the following:

1. Section 271313 "Communications Copper Backbone Cabling."
2. Section 271323 "Communications Optical Fiber Backbone Cabling."
3. Section 271333 "Communications Coaxial Backbone Cabling."
4. Section 271513 "Communications Copper Horizontal Cabling."
5. Section 271523 "Communications Optical Fiber Horizontal Cabling."
6. Section 271533 "Communications Coaxial Horizontal Cabling."

F. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.2 VIDEO SURVEILLANCE SYSTEM INSTALLATION

A. Install cameras with 84-inch- minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.

B. Set pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.

C. Avoid ground loops by making ground connections only at the control station.

1. For 12- and 24-V dc cameras, connect the coaxial cable shields only at the monitor end.

D. Identify system components, wiring, cabling, and terminals according to Section 270553 "Identification for Communications Systems."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:

    a. Verify operation of auto-iris lenses.
    b. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
    c. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
    d. Set and name all preset positions; consult Owner's personnel.
    e. Set sensitivity of motion detection.
    f. Connect and verify responses to alarms.
    g. Verify operation of control-station equipment.

3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation.

C. Video surveillance system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION

SECTION 284621.13 - CONVENTIONAL FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Heat detectors.
5. Notification appliances.
6. Remote annunciator.

B. Related Requirements:

1. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for cables and conductors for fire-alarm systems.

1.2 ACTION SUBMITTALS

A. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect or Engineer.

B. Product Data: For each type of product, including furnished options and accessories.

C. Delegated Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

2. Installation shall be by personnel certified by NICET as fire-alarm Level III technician.

B. NFPA Certification:

1. Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with and operate as an extension of existing system in the other buildings on site. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded system dedicated to fire-alarm service only.

C. All components provided shall be listed for use with the selected system.

D. 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.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.
2. Smoke detectors.
3. Carbon monoxide detectors.
4. Automatic sprinkler system water flow.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
2. Transmit an alarm signal to the remote alarm receiving station.
3. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.

4. Close smoke dampers in air ducts of designated air-conditioning duct systems.
5. Activate emergency lighting control.
6. Record events in the system memory.

2.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.4 FIRE-ALARM CONTROL UNIT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bosch Security Systems, Inc.
2. Faraday.
3. Fike Corporation.
4. Fire-Lite Alarms; Honeywell International, Inc.
5. Gamewell-FCI; Honeywell International, Inc.
6. Keltron Corporation.
7. Mircom Technologies, Ltd.
8. Notifier; Honeywell International, Inc.
9. Siemens Industry, Inc.; Fire Safety Division.
10. Silent Knight; Honeywell International, Inc.
11. SimplexGrinnell LP.
12. United Technologies Corporation (UTC Climate, Controls & Security - Edwards).
13. United Technologies Corporation (UTC Climate, Controls & Security - Kidde).

B. General Requirements for Fire-Alarm Control Unit:

1. Modular, power-limited design with electronic modules, UL 864 listed.

a. Include a real-time clock for time annotation of events.
b. The FACP shall be listed for connection to a central-station signaling system service.

C. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

2.5 MANUAL FIRE-ALARM BOXES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AMSECO - A Potter Brand.

2. Bosch Security Systems, Inc.
3. Faraday.
4. Federal Signal Corporation.
5. Fike Corporation.
6. Fire-Lite Alarms; Honeywell International, Inc.
7. Gamewell-FCI; Honeywell International, Inc.
8. Keltron Corporation.
9. Mircom Technologies, Ltd.
10. Notifier; Honeywell International, Inc.
11. Siemens Industry, Inc.; Fire Safety Division.
12. Silent Knight; Honeywell International, Inc.
13. SimplexGrinnell LP.
14. System Sensor.
15. United Technologies Corporation (UTC Climate, Controls & Security - Edwards).
16. United Technologies Corporation (UTC Climate, Controls & Security - Kidde).
17. Wheelock, Life Safety and Mass Notification; Eaton, Electrical Sector.

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.

1. Single-action mechanism, breaking-glass or plastic-rod type.
2. Station Reset: Key- or wrench-operated switch.

2.6 SYSTEM SMOKE DETECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bosch Security Systems, Inc.
2. Faraday.
3. Fire-Lite Alarms; Honeywell International, Inc.
4. Gamewell-FCI; Honeywell International, Inc.
5. Gentex Corporation.
6. Harrington Signal, Inc.
7. Keltron Corporation.
8. Mircom Technologies, Ltd.
9. Notifier; Honeywell International, Inc.
10. Siemens Industry, Inc.; Fire Safety Division.
11. Silent Knight; Honeywell International, Inc.
12. SimplexGrinnell LP.
13. System Sensor.
14. United Technologies Corporation (UTC Climate, Controls & Security - Edwards).
15. United Technologies Corporation (UTC Climate, Controls & Security - Kidde).

B. General Requirements for System Smoke Detectors:

1. Operating at 24-V dc, nominal.
2. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
3. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
4. Provide multiple levels of detection sensitivity for each sensor, with alarm-verification feature.

2.7 CARBON MONOXIDE DETECTORS

A. Description: Listed for connection to fire-alarm system.

1. Mounting: Adapter plate for outlet box mounting.
2. Detector shall provide a means to test by introducing test carbon monoxide into the sensing cell.
3. Detector shall provide alarm contacts and trouble contacts.
4. Detector shall send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
5. Detector shall be listed to comply with UL 2075.
6. Detectors shall be located, mounted, and wired according to manufacturer's written instructions.
7. Test button simulates an alarm condition.

2.8 HEAT DETECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bosch Security Systems, Inc.
2. Faraday.
3. Fire-Lite Alarms; Honeywell International, Inc.
4. Gamewell-FCI; Honeywell International, Inc.
5. Gentex Corporation.
6. Harrington Signal, Inc.
7. Keltron Corporation.
8. Mircom Technologies, Ltd.
9. Notifier; Honeywell International, Inc.
10. Siemens Industry, Inc.; Fire Safety Division.
11. Silent Knight; Honeywell International, Inc.
12. SimplexGrinnell LP.
13. System Sensor.
14. United Technologies Corporation (UTC Climate, Controls & Security - Edwards).
15. United Technologies Corporation (UTC Climate, Controls & Security - Kidde).

B. General Requirements for Heat Detectors: Comply with UL 521.

2.9 NOTIFICATION APPLIANCES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Federal Signal Corporation.
2. Gentex Corporation.
3. Harrington Signal, Inc.
4. Keltron Corporation.
5. Mircom Technologies, Ltd.

6. Siemens Industry, Inc.; Fire Safety Division.
7. SimplexGrinnell LP.
8. System Sensor.
9. United Technologies Corporation (UTC Climate, Controls & Security - Edwards).
10. United Technologies Corporation (UTC Climate, Controls & Security - Kidde).
11. Wheelock, Life Safety and Mass Notification; Eaton, Electrical Sector.

B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464.

D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.

1. Mounting: Wall mounted unless otherwise indicated.
2. Flashing shall be in a temporal pattern, synchronized with other units.
3. Strobe Leads: Factory connected to screw terminals.
4. Mounting Faceplate: Factory finished, red.

2.10 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Surface cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

C. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Section 270548.16 "Seismic Controls for Communications Systems."

D. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway.
2. Mount manual fire-alarm box on a background of a contrasting color.
3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.

E. Smoke- or Heat-Detector Spacing:Comply with NFPA 72.

F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches long shall be supported at both ends.

G. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

H. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

I. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling. Install all devices at the same height unless otherwise indicated.

K. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.2 PATHWAYS

A. Pathways shall be installed in EMT.

B. Exposed EMT shall be painted red enamel.

3.3 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

B. Connect supervised interface devices to the following devices and systems. Install the interface device less than 36 inches from the device controlled.

1. Smoke dampers in air ducts of designated HVAC duct systems.
2. Supervisory connections at valve supervisory switches.
3. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
4. Supervisory connections at fire-pump engine control panel.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.6 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Visual Inspection: Conduct the visual inspection prior to testing.

    a. Inspection shall be based on completed record Drawings and system documentation that is required by NFPA 72 in Chapter 10 "Fundamentals," Section 10.18.21 "Completion Documents, Preparation."
    b. Comply with NFPA 72, Chapter 14, "Inspection, Testing, and Maintenance," Section 14.3 "Inspection" and the "Visual Inspection Frequencies" Table; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with NFPA 72, Chapter 14, "Inspection, Testing, and Maintenance," Section 14.4 "Testing" and the "Test Methods" Table.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
5. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with the visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION

GEOTECHNICAL INVESTIGATION

El Dorado County DOT Corporate Yard
1121 Shakori Drive
South Lake Tahoe, California

PREPARED FOR:

EL DORADO COUNTY FACILITIES
3000 FAIRLANE COURT, SUITE 1
PLACERVILLE, CALIFORNIA 95667

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON

GEOCON PROJECT NO. S1534-03-07B

DECEMBER 2020

Project No. S1534-05-07B
December 18, 2020

VIA ELECTRONIC MAIL

Russell Fackrell
Facilities Manager
El Dorado County
3000 Fairlane Court, Suite 1
Placerville, California 95667

Subject: GEOTECHNICAL INVESTIGATION
PROPOSED EQUIPMENT STORAGE BUILDING
EL DORADO COUNTY DOT YARD
1121 SHAKORI DRIVE
MEYERS, CALIFORNIA

Mr. Fackrell:

In accordance with your authorization of our proposal (Geocon Proposal No. LS-20-256, dated August 17, 2020), we performed a geotechnical investigation for the proposed new equipment storage building for the El Dorado County Department of Transportation yard located at 1121 Shakori Drive in Meyers, California.

The accompanying report presents our findings, conclusions, and recommendations regarding geotechnical aspects of redeveloping the site as presently proposed. In our opinion, no adverse geotechnical conditions were encountered that would preclude development at the site provided recommendations of this report are incorporated into the design and construction of the project.

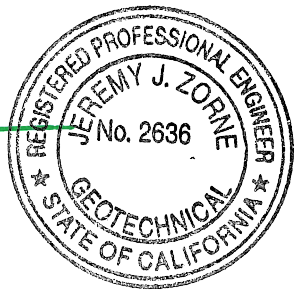
Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Sean M Dixon, PG
Senior Project Geologist

Jeremy J. Zorne, PE, GE
Senior Engineer



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GEOTECHNICAL INVESTIGATION

1.0 PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the proposed new El Dorado County Department of Transportation equipment storage building located at 1121 Shakori Drive in Meyers, California. The approximate site location is depicted on the Vicinity Map, Figure 1.

The purpose of our investigation was to evaluate subsurface soil and geologic conditions at the site and provide conclusions and recommendations relative to the geotechnical aspects of designing and constructing the project as presently proposed.

To prepare this report, we performed the following scope of services:

- Performed a limited geologic literature review to aid in evaluating the geologic conditions present at the site. A list of referenced material is included in Section 9.0 of this report.
- Performed a site reconnaissance to review project limits, determine exploration equipment access, and mark out exploratory excavation locations.
- Paid required fees and obtained a soil boring permit from the El Dorado County Environmental Health Department (EDCEHD).
- Notified subscribing utility companies via Underground Service Alert (USA) a minimum of two working-days (as required by law) prior to performing exploratory excavations at the site.
- Performed four exploratory borings (B1 through B4) with a truck-mounted drill rig to drilling refusal depths ranging from approximately 1 to 12½ feet.
- Obtained representative disturbed and relatively undisturbed soil samples from the exploratory borings.
- Logged the borings in accordance with the Unified Soil Classification System (USCS).
- Upon completion, backfilled the borings with neat cement grout in accordance with EDCEHD requirements.
- Performed laboratory tests to evaluate pertinent geotechnical parameters.
- Prepared this report to summarize our findings, conclusions, and recommendations regarding the geotechnical aspects of developing the site as presently proposed.

Details of our field exploration program including exploratory boring logs are presented in Appendix A. Approximate locations of our borings are shown on the Site Plan, Figure 2. Details of our laboratory testing program and test results are summarized in Appendix B.

2.0 SITE AND PROJECT DESCRIPTION

The overall approximately 2½-acre site located at 1121 Shakori Drive in Meyers, California, is currently developed with an office building, equipment maintenance/repair shop, fueling facility and an approximately 6,300 square-foot equipment storage building. The remainder of the site is paved with hot-mix asphalt (HMA) and Portland cement concrete (PCC) pavements. Although site-specific topographic information was not available for our review, site topography generally ranges between approximately 6,385 to 6,388 feet elevation (Google Earth Pro, June 7, 2018, WGS84 EGM96 Geoid). The existing equipment storage building is structurally deficient and functionally obsolete.

The project consists of demolishing the existing equipment storage building and constructing a new, slightly larger equipment storage building at the same location. We anticipate the structure will be of wood and steel frame construction supported on conventional shallow foundations with an interior concrete slab-on-grade. Other improvements will likely include underground utility infrastructure, concrete flatwork, paved parking/driveways. Grading plans are not yet available; however, due to the relatively flat site topography, we anticipate relatively minor grading with cuts and fills on the order of 5 feet or less. The existing and proposed site configuration is shown on the Site Plan, Figure 2.

3.0 SOIL AND GEOLOGIC CONDITIONS

We identified geologic and soil conditions by observing and sampling exploratory borings and reviewing the referenced geologic literature (Section 9.0). Soil descriptions below include the USCS symbol where applicable.

3.1 Site and Regional Geology

The Site is located in the Lake Tahoe Basin within the Sierra Nevada geomorphic province. The geology of the Lake Tahoe Basin is characteristic of the Sierra Nevada, being underlain by Jurassic to Cretaceous granitic rocks that intruded Paleozoic and Mesozoic volcanic and sedimentary rocks. Volcanism and uplift of the Sierra Nevada predominantly occurred during the Tertiary. The origin of the Lake Tahoe basin is largely the result of Basin and Range style normal faulting. A series of north-south-trending, east-dipping normal faults have been mapped within Lake Tahoe, such as the North Tahoe Fault and the Incline Village Fault. Movement on these faults have resulted in the creation of the basin (filled by Lake Tahoe) situated between the main crest of the Sierra Nevada to the west and the Carson Range, a spur of the Sierra Nevada, to the east. Evidence of glacial activity within the Lake Tahoe Basin is largely present on the basin's southern and western sides, in the form of glacial till and moraines.

According to the Geologic Map of the Lake Tahoe Basin, California and Nevada (California Department of Conservation, 2005), the site is underlain by Pleistocene aged Tioga glacial till deposits (map symbol Qti) generally consisting of silt, sand, gravel, cobbles and boulders. The site is located near a mapped geologic contact with Cretaceous aged Echo Lake granodiorite (map symbol Kelg) that likely underlies the glacial till at the site at relatively shallow depths.

3.2 Existing Pavement

Borings B1, B2 and B4 were advanced in existing pavement areas and we encountered approximately 3 inches of HMA at the ground surface in each boring. Aggregate base (AB) was not encountered below the HMA.

3.3 Fill

Below the existing pavement section where encountered and below the ground surface in Boring B3, we encountered 8 to 8½ feet of fill in Borings B1 and B2. Borings B3 and B4 met drilling refusal in the fill at depths of 3½ and 1 foot, respectively. The fill encountered generally consists of variably dense silty coarse sand with gravel, cobbles and boulders (SM).

Because of the undocumented status of the fill and the presence of oversize cobbles and boulders within future excavations areas (foundations and utilities), remedial grading in the form of partial removal, screening to remove oversize material, and replacement as engineered fill will be required prior to constructing improvements. Specific recommendations are provided in this report.

3.4 Glacial Till

Below the fill in Borings B1 and B2 we encountered glacial till to approximate depths between 12 and 12½ feet. The glacial till encountered generally consists of loose to medium dense poorly sorted sand with gravel (SP).

3.5 Granitic Rock (Granodiorite)

Below the glacial till in Borings B1 and B2 we encountered granitic rock at depths between 12 and 12½ feet. Borings B1 and B2 met drilling refusal on strong granitic rock.

Soil conditions described in the previous paragraphs are generalized. The exploratory boring logs included in Appendix A detail soil type, color, moisture, consistency, and USCS classification of the soils encountered at specific locations and elevations.

4.0 GROUNDWATER

We reviewed information available for nearby former leaking underground storage tank (LUST) facilities on the California State Water Resources Control Board's (CSWRCB) GeoTracker website (http://geotracker.waterboards.ca.gov/). The average depth to groundwater at the Caltrans maintenance station (2243 Carnelian Drive) located adjacent and north of the site was reported between 25 and 35 feet in 1998 with southwesterly flow. Depth to groundwater at the site would be seasonally influenced by prevailing precipitation/snowfall/snowmelt conditions.

It should be noted that fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors. Depth to groundwater can also vary significantly due to localized pumping, irrigation practices, and seasonal fluctuations. Therefore, it is possible that groundwater may be higher or lower than the level observed during our investigation.

5.0 SEISMICITY AND GEOLOGIC HAZARDS

5.1 Regional Active Faults

The numerous faults in Northern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Division of Mines and Geology (CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (Hart, 1999). An active fault has experienced surface displacement within the last 11,000 years. A potentially active fault has experienced surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known movement within the past 11,000 years. Faults that have not moved in the last 1.6 million years are considered inactive.

Based on our review of geologic maps and reports, the site is not within a currently established Alquist Priolo (AP) Earthquake Fault Zone. No active or potentially active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the project is considered low.

The Northern California region is considered seismically active, and the site could be subjected to ground shaking in the event of an earthquake on one of the many active Northern California faults. Table 5.1 summarizes the distance of known active faults within 50 miles of the site, based on the *2013 Caltrans Fault Database* KML overlay file for Google Earth. Principal references used within the *2013 Caltrans Fault Database* are Jennings and Bryant Fault Activity Map of California (2010) and The Working Group on California Earthquake Predictions (WGCEP), Uniform California Earthquake Rupture Forecast Version 3.

TABLE 5.1
REGIONAL ACTIVE FAULTS

Fault Name	Approximate Distance From Site (miles)	Maximum Moment Magnitude (Mw)
West Tahoe	3.5	7.0
Carson Range	10.0	7.2
East Carson Valley	14.3	6.6
Carson City	18.6	6.5
North Tahoe	18.8	6.7
Incline Village	19.4	6.4
Antelope Valley	23.4	7.0
Little Valley	25.6	6.5
Slinkard Valley	26.3	6.8
Mount Rose	27.8	6.9
Polaris	30.5	6.7
Smith Valley	31.2	7.4
Dog Valley	38.1	6.7
Smith Valley (Southern)	40.3	7.4
West Walker River	40.5	6.4
Singatse Range	43.2	6.8
Mohawk Valley	48.4	6.6

5.2 Ground Shaking

We used the United States Geological Survey (USGS) *Unified Hazard Tool* (https://earthquake.usgs.gov/hazards/interactive/) to determine the deaggregated seismic source parameters including controlling magnitude and fault distance. The USGS estimated modal magnitude is 6.5 and the estimated Peak Ground Acceleration (PGA) for the Maximum Considered Earthquake (MCE) with a 2,475-year return period is 0.64g.

5.3 Liquefaction

Liquefaction is a phenomenon in which loose, saturated, cohesionless soil deposits located beneath the groundwater table lose strength when subjected to intense and prolonged ground shaking. The seismic excitation increases pore water pressure creating a buoyant effect of the loose soil. When liquefaction occurs, building foundations may sink or tilt and differential ground settlement may occur. Other effects include sand boils (ground loss) and lateral spreading if the liquefiable soil is located adjacent to a steep free face. The areas that have the greatest potential for liquefaction are those in which the water table is less than 50 feet below ground surface and the soils are predominately clean, poorly graded sand deposits of loose to medium-dense relative density.

The site is not located in a currently established State of California Seismic Hazard Zone for liquefaction. Based on the subsurface conditions encountered at the site, including granitic rock above the ground water table, liquefaction potential at the site is expected to be low during seismic events. Mitigation and specific design measures with respect to liquefaction is not necessary for the project.

5.4 Expansive Soil

The sandy soils encountered at the site are non-plastic with a corresponding very low expansion potential. Mitigation and specific design measures with respect to expansive soil is not necessary.

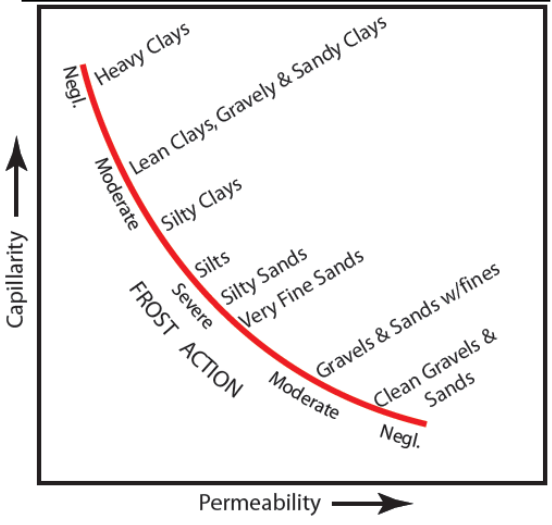
5.5 Soil Corrosion Screening

We performed a soil corrosion potential screening by conducting laboratory testing on a representative near-surface soil sample. The laboratory test results and published screening levels are presented in Appendix B.

5.6 Frost Action Susceptibility

Frost action is a phenomenon that occurs in soil in cold climates and is the result of freezing and thawing of water within the soil. Water expands roughly 9 to 10 percent by volume when frozen. When freezing temperatures penetrate soil, water from the unfrozen portion of the subgrade is drawn toward the frozen zone. Heaving (or volume expansion) from frost action is termed "frost heave." If the soil is susceptible to capillary action, the water migrates to previously formed ice crystals and freezes. Most near-surface soils in cold climates undergo some frost action, the magnitude of which is dependent upon the locally prevailing climate and soil type. Soil types most prone to severe frost action are silts, silty sands, and very fine sands as shown in Figure 5.6.

Figure 5.6 – Frost Action Susceptibility



We performed laboratory tests to evaluate general frost action susceptibility of near-surface soil at the site. Based on our results, shallow soils at the site fall within the range of "negligible" to "moderate" frost action susceptibility.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

6.1.1 No soil or geologic conditions were encountered during our investigation that would preclude development of the site as planned, provided the recommendations contained in this report are incorporated into the design and construction of the project.

6.1.2 Existing undocumented fill up to 8½ feet thick is present within the majority of the site. The fill contains oversize rock (boulders) which would impact construction of foundations and underground utilities. Documentation regarding the placement history of the fill was not available as of the date of this report. Because of the oversize rock and unknown disposition, the fill in its existing condition is not suitable for direct support of additional fill or improvements as excessive post-construction settlement may occur. To eliminate the potential for excavation difficulties associated with oversize rock and future post-construction settlement, full removal, screening, and re-compaction of the undocumented fill would be required. However, in our opinion, suitable mitigation may be achieved by performing partial removal, screening, and re-compaction prior to placing additional fill or constructing improvements. Specific recommendations are provided in this report.

6.1.3 Conclusions and recommendations provided in this report are based on our review of referenced literature, analysis of data obtained from our exploratory field exploration program, laboratory testing program, and our understanding of the proposed development at this time.

6.1.4 We should review the project plans as they develop further, provide engineering consultation as needed during final design, and perform geotechnical observation and testing services during construction.

6.2 Code-Based Seismic Design Values

6.2.1 We understand that seismic design of the proposed structures will be performed in accordance with the provisions of the 2019 *California Building Code* (CBC), the seismic provisions of which are based on the American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI) publication: *ASCE/SEI 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE/SEI, 2017). We used the Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) web application *Seismic Design Maps* (https://seismicmaps.org/) to evaluate code-based seismic design parameters in accordance with ASCE 7-16.

6.2.2 For seismic design purposes, sites are classified as Site Class "A" through "F" as follows:

- Site Class A – Hard Rock;
- Site Class B – Rock;
- Site Class C – Very Dense Soil and Soft Rock;
- Site Class D – Stiff Soil;
- Site Class E – Soft Clay Soil; and
- Site Class F – Soils Requiring Site Response Analysis.

6.2.3 Based on the subsurface conditions at the site, the Site Classification is Site Class "C" per Table 20.3-1 of ASCE/SEI 7-16. For the purposes of evaluating code-based seismic parameters for design, we assumed a seismic Risk Category II (per the CBC) for the project. Results are summarized in Table 6.2.3.

TABLE 6.2.3
ASCE 7-16 SEISMIC DESIGN PARAMETERS
SITE CLASS "C" – VERY DENSE SOIL AND SOFT ROCK

Parameter	Value	ASCE 7-16 Reference
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.295g	Figure 22-1
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.451g	Figure 22-2
Site Coefficient, F_A	1.2	Table 11.4-1
Site Coefficient, F_V	1.5	Table 11.4-2
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.554g	Eq. 11.4-1
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.677g	Eq. 11.4-2
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.036g	Eq. 11.4-3
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.451g	Eq. 11.4-4

6.2.4 Table 6.2.4 presents additional seismic design parameters for projects with Seismic Design Categories of D through F in accordance with ASCE 7-16 for the mapped maximum considered geometric mean (MCE_G).

TABLE 6.2.4
ASCE 7-16 SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.563g	Figure 22-7
Site Coefficient, F_{PGA}	1.2	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.676g	Section 11.8.3 (Eq. 11.8-1)

Conformance to the criteria presented in Tables 6.2.3 and 6.2.4 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid structural damage, since such design may be economically prohibitive.

6.3 Soil and Excavation Characteristics

6.3.1 In our opinion, grading and excavations at the site may be accomplished with standard to moderate effort using heavy-duty grading/excavation equipment.

6.3.2 Based on the predominantly granular, near-surface soils, we anticipate temporary excavations, such as utility trenches, may experience significant sloughing/caving. It is the contractor's responsibility to provide sufficient and safe excavation support as well as protecting nearby utilities, structures, and other improvements which may be damaged by earth movements.

6.3.3 Temporary excavations must meet Cal-OSHA requirements as appropriate. Excavation sloping, benching, the use of trench shields, and the placement of trench spoils should conform to the latest applicable Cal-OSHA standards. The contractor should have a Cal-OSHA-approved "competent person" onsite during excavation to evaluate trench conditions and to make appropriate recommendations where necessary. It is the contractor's responsibility to provide sufficient and safe excavation support as well as protecting nearby utilities, structures, and other improvements which may be damaged by earth movements.

6.3.4 The excavation support recommendations provided by Cal-OSHA are generally geared towards protecting human life and not necessarily towards preventing damage to nearby structures or surface improvements. The contractor should be responsible for using the proper active shoring systems or sloping to prevent damage to any structure or improvements near underground excavations.

6.3.5 Permanent cut and fill slopes should be constructed no steeper than 2H:1V (horizontal to vertical). To mitigate potential erosion, slopes should be vegetated as soon as possible, and surface drainage should be directed away from the tops of slopes.

6.3.6 If grading commences in winter or spring, or in periods of precipitation, excavated and in-place soils will likely be wet. Earthwork contractors should be aware of the moisture-sensitivity of fine-grained soils that may result in subgrade instability and/or potential compaction difficulties. Earthwork operations in these conditions will likely be difficult with low productivity. Often, a period of at least one month of warm and dry weather is necessary to allow the site to dry sufficiently so that heavy grading equipment can operate effectively. If the construction schedule allows, we highly recommend performing earthwork construction during the seasonal dry months.

6.4 Materials for Fill

6.4.1 Excavated soils generated from cut operations at the site are suitable for use as fill in structural areas provided they do not contain deleterious matter, organic material, or rock/cementations larger than 6 inches in maximum dimension. Soils reused as engineered fill may require moisture conditioning to attain suitable moisture content for compaction.

6.4.2 Import fill material should be primarily granular with a "very low" expansion potential (Expansion Index less than 20), a Plasticity Index less than 15, be free of organic material and construction debris, and not contain rock/cementations larger than 6 inches in greatest dimension. Import soil should also contain a sufficient amount of fines (generally more than 10%) to provide "binder" and reduce potential caving when excavated.

6.4.3 Environmental characteristics and corrosion potential of import soil materials should also be considered. Proposed import materials should be sampled, tested, and approved by Geocon prior to its transportation to the site.

6.5 Grading

6.5.1 Earthwork operations should be observed and fills tested for recommended compaction and moisture content by a representative of our firm.

6.5.2 References to relative compaction and optimum moisture content in this report are based on the latest American Society for Testing and Materials (ASTM) D1557 Test Procedure. Structural building pad areas should extend a minimum of 5 feet horizontally beyond the outside dimensions of buildings and structures, including footings and overhangs carrying structural loads.

6.5.3 Prior to commencing grading, a pre-construction conference with representatives of the client, grading contractor, and Geocon should be held at the site. Site preparation, soil handling and/or the grading plans should be discussed at the pre-construction conference.

6.5.4 Site preparation should begin with complete removal of existing structures (including slabs, footings, and appurtenances), subsurface structures, underground utilities, debris, organic-rich topsoil, and existing pavements (HMA and PCC). Excavations or depressions resulting from site clearing operations, or other existing excavations or depressions, should be restored with engineered fill in accordance with the recommendations of this report.

6.5.5 Within areas to be developed, any existing trees and associated root systems should be removed. Roots larger than 1 inch in diameter should be completely removed. Smaller roots may be left in-place as conditions warrant and at the discretion of our field representative.

6.5.6 After demolition, the proposed building area should be over-excavated to a depth of 5 feet below the deepest new footings. Rock larger than 6 inches in maximum dimension should be screened out and removed from the existing fill prior to re-use.

6.5.7 After site preparation and over-excavation, exposed soil should be scarified 12 inches, uniformly moisture-conditioned at or above optimum moisture content and compacted to at least 90% relative compaction. Scarification and recompaction operations should be performed in the presence of a Geocon representative to evaluate performance of the subgrade under compaction equipment loading and to identify any loose or unstable soil conditions that could require additional excavation.

6.5.8 Engineered fill should be compacted in horizontal lifts not exceeding 8 inches (loose thickness) and brought to final subgrade elevations. Each lift should be moisture-conditioned at or above optimum and compacted to at least 90% relative compaction. The building pad, whether completeld at-grade, by excavation, or filling should be uniformly moisture-conditioned at or above optimum moisture content and compacted to at least 90% relative compaction.

6.5.9 The top 6 inches of final pavement subgrade, whether completed at-grade, by excavation, or by filling, should be uniformly moisture-conditioned at or above optimum moisture content and compacted to at least 95% relative compaction. Final pavement subgrade should be finished to a smooth, unyielding surface. We further recommend proof-rolling the subgrade with a loaded water truck (or similar equipment with high contact pressure) to verify the stability of the subgrade prior to placing AB).

6.5.10 Underground utility trenches within structural areas should be backfilled with properly compacted material. Pipe bedding, shading, and backfill should conform to the requirements of the appropriate utility authority. Material excavated from trenches should be adequate for use as general backfill above shading provided it does not contain deleterious matter,

vegetation or cementations larger than 6 inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding 8 inches. Lifts should be compacted to a minimum of 90% relative compaction at or above optimum moisture content. Compaction should be performed by mechanical means only; jetting of trench backfill should not be allowed.

6.6 Foundations

6.6.1 Provided the site is graded in accordance with the recommendations of this report, the proposed building may be supported on conventional shallow foundations bearing on engineered fill.

6.6.2 To reduce potential for seasonal moisture variations beneath the building, foundations should consist of continuous perimeter strip footings with isolated interior spread footings. Perimeter strip footings should be continuous around the entire perimeter of the structure without breaks or discontinuities. Strip footings should be at least 12 inches wide and spread footings should be at least 18 inches square. All footings should be embedded at least 24 inches below lowest adjacent pad grade.

6.6.3 Underground utilities running parallel to footings should not be constructed in the zone of influence of footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom of the footing.

6.6.4 Foundations proportioned as recommended above and bearing within engineered fill may be designed for an allowable soil bearing capacity of 3,000 pounds per square foot (psf) for combined dead plus live loads. This value may be increased by one-third to evaluate all loads, including wind or seismic forces.

6.6.5 Foundations designed in accordance with the recommendations above should experience total settlements of less than 1 inch and differential settlements of approximately ½ inch over a distance of approximately 40 feet along continuous wall footings or between adjacent columns. The majority of the settlement will be immediate and will occur as the loads are applied during construction.

6.6.6 Allowable passive pressure used to resist lateral movement of footings may be assumed to be equal to a fluid weighing 350 pounds per cubic foot (pcf). The allowable coefficient of friction to resist sliding of footings is 0.35 for concrete against soil. Combined passive resistance and friction may be utilized for footing design provided that the frictional resistance is reduced by 50%.

6.6.7 Continuous footings should be reinforced with at least four No. 4 reinforcement bars, two each placed near the top and bottom of the footing to allow footings to span isolated soil

irregularities. The reinforcement recommended above is for soil characteristics only and is not intended to replace reinforcement required for structural considerations. The project structural engineer should evaluate the need for additional reinforcement.

6.6.8 A Geocon representative should observe foundation excavations prior to placing reinforcing steel or concrete to observe that the exposed soil conditions are consistent with those anticipated. If unanticipated soil conditions are encountered, foundation modifications may be required.

6.7 Interior Slabs-on-Grade

6.7.1 A cconventionally-reinforced interior concrete slab-on-grade is suitable for the building pad prepared as recommended in this report. Slab thickness and reinforcement should be determined by the structural engineer based on anticipated loading. However, at a minimum, the slab should be at least 5 inches thick and reinforced with No. 4 reinforcing bars placed 24 inches on center, each way. Structural requirements may require additional reinforcement or thicker concrete slabs.

6.7.2 If the near-surface soil of the building pad becomes dry prior to constructing concrete slabs-on-grade, the building pad should be re-moistened by soaking or sprinkling such that the upper 12 inches of soil is at or above optimum moisture content at least 48 hours before concrete placement.

6.7.3 Slabs-on-grade subjected to equipment/vehicular loads should be directly underlain by at least 6 inches of Caltrans Class 2 AB compacted to at least 95% relative compaction. Interior building slabs-on-grade that may receive floor coverings should be underlain by open-graded crushed rock as discussed below.

6.7.4 Migration of moisture through concrete slabs or moisture otherwise released from slabs is not a geotechnical issue. However, for the convenience of the project team, we are providing the following general suggestions for consideration by the owner, architect, structural engineer, and contractor. The suggested procedures may reduce the potential for moisture-related floor covering failures on concrete slabs-on-grade, but moisture problems may still occur even if the procedures are followed. If more detailed recommendations are desired, we recommend consulting a specialist in this field.

6.7.5 Where floor coverings are planned, a minimum 10-mil-thick vapor barrier meeting ASTM E1745-97 Class C requirements may be placed directly below the slab, without a sand cushion. To reduce the potential for punctures, a higher quality vapor barrier (15 mil, Class A or B) may be used. The vapor barrier, if used, should extend to the edges of the slab and should be sealed at all seams and penetrations.

6.7.6 At least 4 inches of ½- or ¾-inch crushed rock, with no more than 5 percent passing the No. 200 sieve, may be placed below the vapor barrier to serve as a capillary break.

6.7.7 The concrete water/cement ratio should be as low as possible. The water/cement ratio should not exceed 0.45 for concrete placed directly on the vapor barrier. Midrange plasticizers could be used to facilitate concrete placement and workability.

6.7.8 Proper finishing, curing, and moisture vapor emission testing should be performed in accordance with the latest guidelines provided by the American Concrete Institute (ACI), Portland Cement Association (PCA), and ASTM.

6.8 Exterior Concrete Flatwork

6.8.1 Onsite exterior concrete flatwork, such as pedestrian sidewalks, should be supported on at least 6 inches of compacted aggregate material such as ¾-inch crushed rock. The use of crushed rock serves as a capillary break for soil moisture and helps reduce the potential for frost heave.

6.8.2 Concrete mix designs for exterior concrete should conform to American Concrete Institute (ACI) recommendations for concrete used in freeze-thaw environments. Concrete should have a minimum design strength of 4,000 psi and air entrainment, with an air content range of 4.5% to 7.0%. The water/cement ratio for exterior concrete should be 0.45 or less. The use of mid-range plasticizer is also recommended to facilitate the finishing process for exterior slabs while maintaining the desired water cement ratio.

6.8.3 Exterior concrete slabs should be structurally independent of building foundations except at doorways, where vertical offset could affect doorway operation. At these locations, the concrete should be doweled into the building foundations.

6.8.4 To reduce the potential for concrete cracking, exterior concrete flatwork could be reinforced with No. 3 reinforcing bars spaced 18 inches center to center, each way. Consideration should be given to providing adequate control joints.

6.9 Hot Mix Asphalt Pavement

6.9.1 We performed Resistance-Value (R-Value) testing on a representative bulk soil sample from proposed at-grade pavement areas. Our testing resulted in an R-Value of 75 (Appendix B). To account for subgrade soil variability, we recommend using an R-Value of 50 for design. Table 6.9.1 provides alternative pavement sections based on the design methods of Caltrans' *Highway Design Manual* using a design subgrade R-value of 50. We assumed typical Traffic Index (TI) values for each pavement area.

TABLE 6.9.1
FLEXIBLE PAVEMENT SECTIONS

	Parking Areas Traffic Index = 4.5	Driveways, Light Truck Traffic, Fire Truck Areas Traffic Index = 6.0
HMA, inches	2.5	3.5
AB, inches	4.0	4.0
Total Section, inches	6.0	6.0

6.9.2 The recommended pavement section is based on the following assumptions:

1. Pavement subgrade soil has an R-Value of at least 50.
2. Class 2 AB has a minimum R-Value of 78 and meets the requirements of Section 26 of Caltrans' *Standard Specifications*.
3. Class 2 AB and the top 6 inches of subgrade are compacted to 95% or higher relative compaction at or near optimum moisture content.

6.9.3 To reduce the potential for water from landscaped areas migrating under pavement into the AB, consideration should be given to using full-depth curbs in areas where pavement abuts landscaping. The full-depth curbs should extend at least 6 inches or more into the soil subgrade beneath the AB. Alternatively, modified drop-inlets that contain weep-holes may be used to encourage accumulated water to drain from beneath the pavement.

6.9.4 Asphalt pavement section recommendations for driveways and parking areas are based on the design procedures of Caltrans' *Highway Design Manual* (Design Manual), Chapter 600, updated December 20, 2004. It should be noted that most rational pavement design procedures are based on projected street or highway traffic conditions and, hence, may not be representative of vehicular loading that occurs in parking lots and driveways. Pavement proximity to landscape irrigation, reduced traffic speed and short turning radii increase the potential for pavement distress to occur in parking lots even though the volume of traffic is significantly less than that of an adjacent street. The Design Manual indicates that the resulting pavement sections for parking lots are "minimized to keep initial costs down but are reasonable because additional AC surfacing can be added later, if needed, and generally without incurring traffic hazards or traffic handling problems." It is generally not economically feasible to design and construct the entire parking lot and driveways for the unique loading conditions previously described. Periodic maintenance of the pavement in these areas, therefore, should be anticipated.

6.10 Rigid Concrete Pavement

6.10.1 Table 6.10.1 provides alternative rigid concrete pavement sections based on the design procedures outlined in ACI 330 (Chapter 2 – Pavement Design – *Guide for Design and Construction of Concrete Parking Lots*). The project civil engineer should determine the

appropriate traffic category for pavement design throughout the project. PCC pavement should be underlain by at least 4 inches of Class 2 AB meeting the requirements of Section 26 of Caltrans' *Standard Specifications* and compacted to at least 95% relative compaction. Subgrade soils should be prepared and compacted in accordance with the recommendations of this report.

TABLE 6.10.1
RIGID CONCRETE PAVEMENT SECTIONS

Traffic Category	A[1]	A-1[2]	B[3]	C[4]
PCC (inches)	4.0	4.5	5.0	6.0
AB (inches)	4.0			
Total Section Thickness (inches)	8.0	8.5	9.0	10.0

Notes: 1. Car parking areas and access lanes (autos, pickups, and panel trucks only).
2. Truck access lanes.
3. Parking area and interior lanes (truck type: single units – bobtailed trucks).
4. Entrance and exterior lanes, and truck parking areas (truck type: single units – bobtailed trucks).

6.10.2 PCC should have a minimum 28-day compressive strength of 3,500 pounds per square inch (psi). Adequate construction and crack control joints should be used to control cracking inherent in concrete construction. It would be advantageous to provide minimal reinforcement, such as No. 3 steel bars placed 18 inches on center in both horizontal directions to help control cracking.

6.10.3 In general, we recommend that concrete pavements be designed, constructed, and maintained in accordance with industry standards such as those provided by the ACI Committee and American Concrete Pavement Association.

6.11 Site Drainage and Moisture Protection

6.11.1 Adequate site drainage is critical to reduce the potential for differential soil movement, soil expansion, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to building foundations. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with the 2019 CBC or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices.

6.11.2 Underground utilities should be leak free. Utility lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

6.11.3 We recommend that roof drains be connected to water-tight subdrains that direct the water to the storm drain system. However, we understand that LID and Leadership in Engineering and Environmental Design (LEED) requests disconnecting the roof drains to help obtain

certification. The water from the roof drains should be directed away from buildings. Consideration should be given to draining roofs to lined planter boxes or placing liners below the proposed landscape areas to prevent infiltration of the water. Geocon can be contacted for additional recommendations.

6.11.4 We recommend implementing measures such as appropriately spaced area drains to reduce infiltrating storm water near buildings, flatwork, or pavements.

6.11.5 Experience has shown that even with these provisions, subsurface seepage may develop in areas where no such water conditions existed prior to site development.

7.0 FURTHER GEOTECHNICAL SERVICES

7.1 Plan and Specification Review

7.1.1 Geocon should review the foundation and grading plans prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

7.2 Testing and Observation Services

7.2.1 The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer of Record (GER) throughout the construction phase and provide testing and observation services. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. If we are not retained for these services, we cannot assume any responsibility for other's interpretation of our recommendations or the future performance of the project.

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, we should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials or environmental contamination was not part of our scope of services.

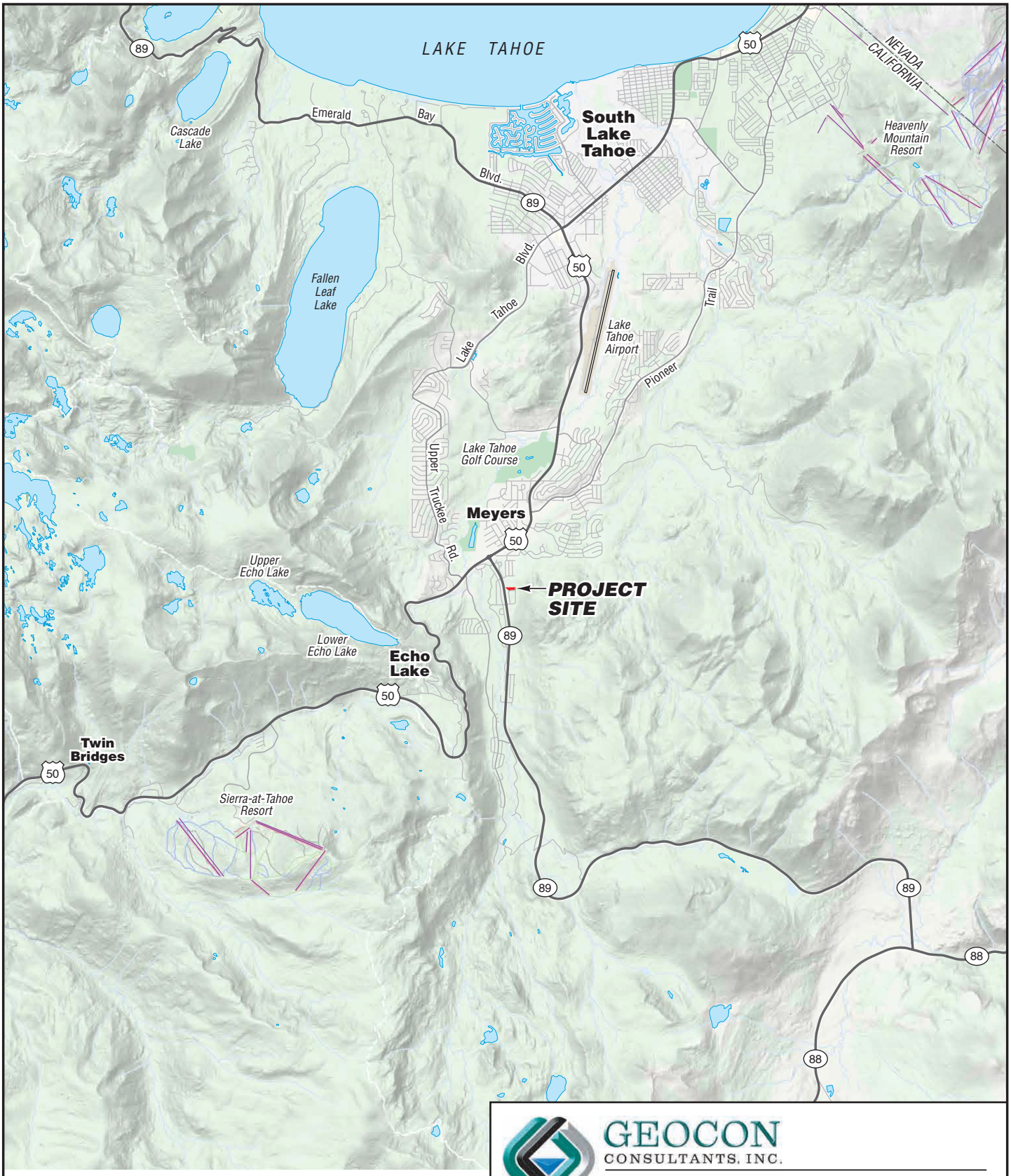
This report is issued with the understanding that it is the responsibility of the owner or their representative to ensure that the information and recommendations contained herein are brought to the attention of the design team for the project and incorporated into the plans and specifications and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The recommendations contained in this report are preliminary until verified during construction by representatives of our firm. Changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. Additionally, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated partially or wholly by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices used in the site area at this time. No warranty is provided, express or implied.

9.0 REFERENCES

1. American Concrete Institute, ACI 318-05, *Building Code Requirements for Structural Concrete and Commentary*, 2005.
2. American Concrete Institute (ACI), ACI 330R-01, *Guide for Design and Construction of Concrete Parking Lots,* October 1, 2001
3. American Society of Civil Engineers / Structural Engineering Institute, *ASCE/SEI 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, 2017.
4. California Building Standards Commission, *2019 California Building Code*, based on *2015 International Building Code*, International Code Council.
5. California Geological Survey, *Geologic Map of the Lake Tahoe Basin, California and Nevada*, 2005.
6. California State Water Resources Board. GeoTracker website. http://geotracker.swrcb.ca.gov/. Accessed November 2020.
7. Caltrans Fault Database, 2013, Google Earth Application (KML File): http://dap3.dot.ca.gov/ARS_Online/technical.php, accessed December 9, 2020.
8. Hart, Earl W., Bryant, William A. "Alquist-Priolo Earthquake Fault Zone Program." California Division of Mines and Geology, 1999.
9. Jennings, C.W. (compiler), *Fault Map of California*, California Division of Mines and Geology, 1982.
10. Portland Cement Association, *Concrete Floors on Ground*, 2001.
11. State of California Department of Transportation, *Highway Design Manual, Sixth Edition*, July 1, 2008.
12. Structural Engineers Association of California and Office of Statewide Health Planning and Development, *Seismic Design Maps* (https://seismicmaps.org/), accessed December 15, 2020.
13. United States Geological Survey (USGS), Unified Hazard Tool https://earthquake.usgs.gov/hazards/interactive/.
14. Unpublished reports, aerial photographs, and maps on file with Geocon.



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El Dorado County DOT Corporate Yard

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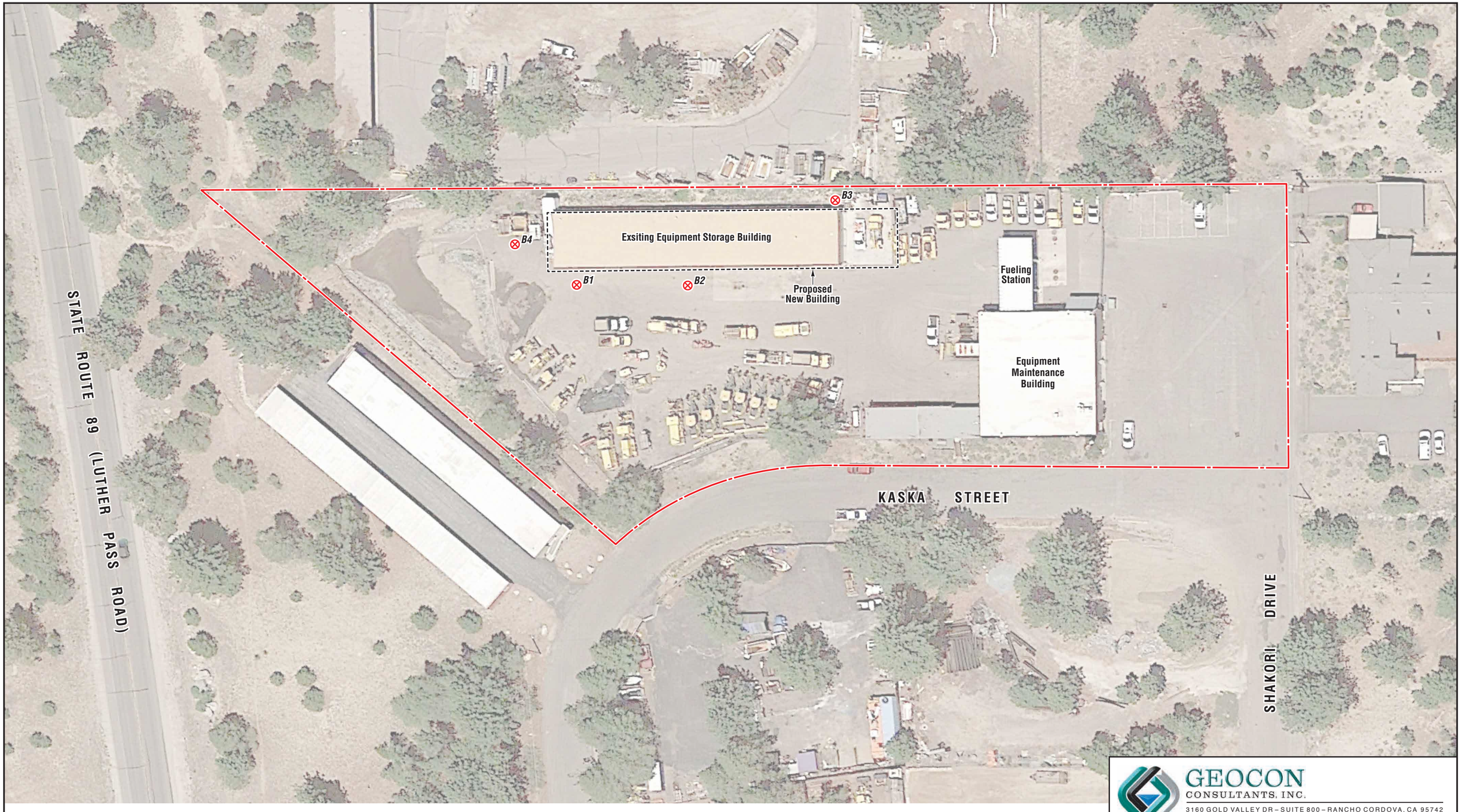
VICINITY MAP

S1534-03-07B	December 2020	Figure 1



LEGEND:

Approximate Site Boundary

B1 Approximate Boring Location

N

0 60

Scale in Feet

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SITE PLAN

S1534-03-07B	December 2020	Figure 2

APPENDIX A

APPENDIX A

FIELD EXPLORATION

We performed our geotechnical field exploration on October 16, 2020. Our field exploration program consisted of advancing and four exploratory borings (B1 through B4). The approximate locations of our boring are shown on the Site Plan, Figure 2.

Borings were performed using a truck-mounted CME 75 drill rig equipped with 6-inch outside diameter (OD) solid-flight augers. Soil sampling was performed using an automatic 140-pound hammer with a 30-inch drop. We obtained samples using a 3-inch OD split-spoon (California Modified) sampler. We recorded the number of blows required to drive the sampler the last 12 inches (or portion thereof) of the 18-inch sampling interval on the boring logs. Upon completion, the borings were backfilled with neat cement grout in accordance with El Dorado County Environmental Management Department permit requirements.

We visually examined, classified, and logged the subsurface conditions in the exploratory borings in general accordance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D2488-90). This system uses the Unified Soil Classification System (USCS) for soil designations. The logs depict soil and geologic conditions encountered and depths at which we obtained samples. The logs also include our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, drill rig penetration rates, excavation characteristics, and other factors. The transition between materials may be abrupt or gradual. Where applicable, we revised the field logs based on subsequent laboratory testing.

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS, MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS, MORE THAN HALF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS, MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS, MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS, LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS, LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
	HIGHLY ORGANIC SOILS		PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

BORING/TRENCH LOG LEGEND

- No Recovery
- Shelby Tube Sample
- Bulk Sample
- SPT Sample
- Modified California Sample
- Groundwater Level (At Completion)
- Groundwater Level (Seepage)

PENETRATION RESISTANCE

SAND AND GRAVEL			SILT AND CLAY			
RELATIVE DENSITY	BLOWS PER FOOT (SPT)*	BLOWS PER FOOT (MOD-CAL)*	CONSISTENCY	BLOWS PER FOOT (SPT)*	BLOWS PER FOOT (MOD-CAL)*	COMPRESSIVE STRENGTH (tsf)
VERY LOOSE	0 - 4	0 - 6	VERY SOFT	0 - 2	0 - 3	0 - 0.25
LOOSE	5 - 10	7 - 16	SOFT	3 - 4	4 - 6	0.25 - 0.50
MEDIUM DENSE	11 - 30	17 - 48	MEDIUM STIFF	5 - 8	7 - 13	0.50 - 1.0
DENSE	31 - 50	49 - 79	STIFF	9 - 15	14 - 24	1.0 - 2.0
VERY DENSE	OVER 50	OVER 79	VERY STIFF	16 - 30	25 - 48	2.0 - 4.0
			HARD	OVER 30	OVER 48	OVER 4.0

*NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE LAST 12 INCHES OF AN 18-INCH DRIVE

MOISTURE DESCRIPTIONS

FIELD TEST	APPROX. DEGREE OF SATURATION, S (%)	DESCRIPTION
NO INDICATION OF MOISTURE; DRY TO THE TOUCH	S<25	DRY
SLIGHT INDICATION OF MOISTURE	25≤S<50	DAMP
INDICATION OF MOISTURE; NO VISIBLE WATER	50≤S<75	MOIST
MINOR VISIBLE FREE WATER	75≤S<100	WET
VISIBLE FREE WATER	100	SATURATED

QUANTITY DESCRIPTIONS

APPROX. ESTIMATED PERCENT	DESCRIPTION
<5%	TRACE
5 - 10%	FEW
11 - 25%	LITTLE
26 - 50%	SOME
>50%	MOSTLY

GRAVEL/COBBLE/BOULDER DESCRIPTIONS

CRITERIA	DESCRIPTION
PASS THROUGH A 3-INCH SIEVE AND BE RETAINED ON A NO. 4 SIEVE (#4 TO 3")	GRAVEL
PASS A 12-INCH SQUARE OPENING AND BE RETAINED ON A 3-INCH SIEVE (3"-12")	COBBLE
WILL NOT PASS A 12-INCH SQUARE OPENING (>12")	BOULDER

BEDDING SPACING DESCRIPTIONS

THICKNESS/SPACING	DESCRIPTOR
GREATER THAN 10 FEET	MASSIVE
3 TO 10 FEET	VERY THICKLY BEDDED
1 TO 3 FEET	THICKLY BEDDED
3 ⅝-INCH TO 1 FOOT	MODERATELY BEDDED
1 ⅛-INCH TO 3 ⅝-INCH	THINLY BEDDED
⅝-INCH TO 1 ⅛-INCH	VERY THINLY BEDDED
LESS THAN ⅝-INCH	LAMINATED

STRUCTURE DESCRIPTIONS

CRITERIA	DESCRIPTION
ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LAYERS AT LEAST ⅛-INCH THICK	STRATIFIED
ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LAYERS LESS THAN ⅛-INCH THICK	LAMINATED
BREAKS ALONG DEFINITE PLANES OF FRACTURE WITH LITTLE RESISTANCE TO FRACTURING	FISSURED
FRACTURE PLANES APPEAR POLISHED OR GLOSSY, SOMETIMES STRIATED	SLICKENSIDED
COHESIVE SOIL THAT CAN BE BROKEN DOWN INTO SMALLER ANGULAR LUMPS WHICH RESIST FURTHER BREAKDOWN	BLOCKY
INCLUSION OF SMALL POCKETS OF DIFFERENT SOIL, SUCH AS SMALL LENSES OF SAND SCATTERED THROUGH A MASS OF CLAY	LENSED
SAME COLOR AND MATERIAL THROUGHOUT	HOMOGENOUS

CEMENTATION/INDURATION DESCRIPTIONS

FIELD TEST	DESCRIPTION
CRUMBLES OR BREAKS WITH HANDLING OR LITTLE FINGER PRESSURE	WEAKLY CEMENTED/INDURATED
CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE	MODERATELY CEMENTED/INDURATED
WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE	STRONGLY CEMENTED/INDURATED

IGNEOUS/METAMORPHIC ROCK STRENGTH DESCRIPTIONS

FIELD TEST	DESCRIPTION
MATERIAL CRUMBLES WITH BARE HAND	WEAK
MATERIAL CRUMBLES UNDER BLOWS FROM GEOLOGY HAMMER	MODERATELY WEAK
⅛-INCH INDENTATIONS WITH SHARP END FROM GEOLOGY HAMMER	MODERATELY STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **ONE** BLOW FROM GEOLOGY HAMMER	STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **COUPLE** BLOWS FROM GEOLOGY HAMMER	VERY STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **MANY** BLOWS FROM GEOLOGY HAMMER	EXTREMELY STRONG

IGNEOUS/METAMORPHIC ROCK WEATHERING DESCRIPTIONS

DEGREE OF DECOMPOSITION	FIELD RECOGNITION	ENGINEERING PROPERTIES
SOIL	DISCOLORED, CHANGED TO SOIL, FABRIC DESTROYED	EASY TO DIG
COMPLETELY WEATHERED	DISCOLORED, CHANGED TO SOIL, FABRIC MAINLY PRESERVED	EXCAVATED BY HAND OR RIPPING (Saprolite)
HIGHLY WEATHERED	DISCOLORED, HIGHLY FRACTURED, FABRIC ALTERED AROUND FRACTURES	EXCAVATED BY HAND OR RIPPING, WITH SLIGHT DIFFICULTY
MODERATELY WEATHERED	DISCOLORED, FRACTURES, INTACT ROCK-NOTICEABLY WEAKER THAN FRESH ROCK	EXCAVATED WITH DIFFICULTY WITHOUT EXPLOSIVES
SLIGHTLY WEATHERED	MAY BE DISCOLORED, SOME FRACTURES, INTACT ROCK-NOT NOTICEABLY WEAKER THAN FRESH ROCK	REQUIRES EXPLOSIVES FOR EXCAVATION, WITH PERMEABLE JOINTS AND FRACTURES
FRESH	NO DISCOLORATION, OR LOSS OF STRENGTH	REQUIRES EXPLOSIVES

IGNEOUS/METAMORPHIC ROCK JOINT/FRACTURE DESCRIPTIONS

FIELD TEST	DESCRIPTION
NO OBSERVED FRACTURES	UNFRACTURED/UNJOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 1 TO 3 FOOT INTERVALS	SLIGHTLY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 4-INCH TO 1 FOOT INTERVALS	MODERATELY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 1-INCH TO 4-INCH INTERVALS WITH SCATTERED FRAGMENTED INTERVALS	INTENSELY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT LESS THAN 1-INCH INTERVALS; MOSTLY RECOVERED AS CHIPS AND FRAGMENTS	VERY INTENSELY FRACTURED/JOINTED

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

KEY TO LOGS

PROJECT NO. **S1534-05-07B** PROJECT NAME **1121 Shakori Way Geotech**

BORING B1

ELEV. (MSL.) **~6384 feet** DATE COMPLETED **10/16/2020**

ENG./GEO. **H. Losberger** DRILLER **V&W Drilling**

EQUIPMENT **Truck Mounted CME 55 with Solid flight auger** HAMMER TYPE **Automatic | 140 lbs**

DEPTH IN FEET	SAMPLE INTERVAL & RECOVERY	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	ADDITIONAL TESTS
0	B1-BULK			SM	**ASPHALT** 3 Inches				
1					**FILL** Moist, dense, yellowish brown Silty coarse SAND with Gravel				
2	B1-1.5 B1-2.0					49	114.9	5.8	
3									
4	B1-3.5 B1-4.0				- becomes medium dense, dark brown color	32	99.8	6.1	
5									
6	B1-5.5 B1-6.0					13	99.0	6.5	
7									
8	B1-8.0 B1-8.5			SP	**GLACIAL TILL** Moist, loose, yellowish brown Poorly Sorted Granitic SAND with Gravels	10	100.1	7.2	
9									
10									
11	B1-10.5 B1-11.0					23			
12					- becomes medium dense, granite rock at bottom				
					BORING REFUSAL ON GRANITE ROCK AT 12.0 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT				

Figure A2, Log of Boring, page 1 of 1

IN PROGRESS S1534-05-07B SHAKORI WAY.GPJ 12/17/20

GEOCON

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **S1534-05-07B** PROJECT NAME **1121 Shakori Way Geotech**

BORING B2

ELEV. (MSL.) **~6384 feet** DATE COMPLETED **10/16/2020**

ENG./GEO. **H. Losberger** DRILLER **V&W Drilling**

EQUIPMENT **Truck Mounted CME 55 with Solid flight auger** HAMMER TYPE **Automatic | 140 lbs**

DEPTH IN FEET	SAMPLE INTERVAL & RECOVERY	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	ADDITIONAL TESTS
0	B2-BULK			SM	**ASPHALT** 3 Inches				
1					**FILL** Moist, medium dense, dark brown Silty SAND with Gravel				
2	B2-1.5 B2-2.0					41	110.1	5.8	
3									
4	B2-3.5 B2-4.0					19	100.6	6.6	
5									
6	B2-5.5 B2-6.0					11	98.2	6.5	
7									
8	B2-8.0			SP	**GLACIAL TILL** Moist, loose, yellowish brown Poorly Sorted Granitic SAND with Gravels	11	103.0	5.5	
9	B2-8.5								
10									
11	B2-10.5 B2-11.0					34		11.6	
12					- becomes medium dense, granite rock at bottom - auger grinding				
					BORING REFUSAL ON GRANITE ROCK AT 12.5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT				

Figure A3, Log of Boring, page 1 of 1

IN PROGRESS S1534-05-07B SHAKORI WAY.GPJ 12/17/20

GEOCON

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **S1534-05-07B** PROJECT NAME **1121 Shakori Way Geotech**

BORING B3

ELEV. (MSL.) **~6388 feet** DATE COMPLETED **10/16/2020**

ENG./GEO. **H. Losberger** DRILLER **V&W Drilling**

EQUIPMENT **Truck Mounted CME 55 with Solid flight auger** HAMMER TYPE **Automatic | 140 lbs**

DEPTH IN FEET	SAMPLE INTERVAL & RECOVERY	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	ADDITIONAL TESTS
0									
1	B3-1.0			SM	**FILL** Moist, dense, tannish brown Silty coarse SAND with gravel and boulders	59/12"			
2	B3-1.5								
3					- auger grinding on boulders				
					BORING REFUSAL ON BOULDERS AT 3.5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS				

Figure A4, Log of Boring, page 1 of 1

IN PROGRESS S1534-05-07B SHAKORI WAY.GPJ 12/17/20

GEOCON

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◥ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **S1534-05-07B** PROJECT NAME **1121 Shakori Way Geotech**

BORING B4

ELEV. (MSL.) **~6385** DATE COMPLETED **10/16/2020**

ENG./GEO. **H. Losberger** DRILLER **V&W Drilling**

EQUIPMENT **Truck Mounted CME 55 with Solid flight auger** HAMMER TYPE **Automatic | 140 lbs**

DEPTH IN FEET	SAMPLE INTERVAL & RECOVERY	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	ADDITIONAL TESTS
0									
				SM	**ASPHALT** 3 inches				
1					**FILL** Moist, dense, tannish brown, Silty coarse SAND with gravel and boulders				
					BORING REFUSAL ON BOULDERS AT 1.0 FOOT GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS				

Figure A5, Log of Boring, page 1 of 1

IN PROGRESS S1534-05-07B SHAKORI WAY.GPJ 12/17/20

GEOCON

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◥ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

APPENDIX B

LABORATORY TESTING PROGRAM

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their in-place dry density and moisture content, grain size distribution, corrosion potential, and resistance value (R-Value). The results of the laboratory tests are presented below and on the following pages.

TABLE B1
SOIL CORROSION PARAMETER TEST RESULTS
(CALIFORNIA TEST METHODS 643, 417, AND 422)

Sample No.	Sample Depth (ft.)	pH	Minimum Resistivity (ohm-cm)	Chloride (ppm) / (%)	Sulfate (ppm) / (%)
B1,B2-Bulk	0-5	6.3	220	737.9/0.07379	16.6/0.00166

*Caltrans considers a site corrosive to foundation elements if one or more of the following conditions exist for the representative soil samples at the site:

- The pH is equal to or less than 5.5.
- The resistivity is equal to or less than 1,000 ohm-cm.
- Chloride concentration is equal to or greater than 500 parts per million (ppm).
- Sulfate concentration is equal to or greater than 2,000 ppm.

According to the 2019 California Building Code which refers to the durability requirements of American Concrete Institute (ACI) 318 (Chapter 4), Type II cement may be used where soluble sulfate levels in soil are below 2,000 ppm.

TABLE B2
R-VALUE TEST RESULTS
ASTM D2844

Boring Number	Sample Depth (feet)	Average Dry Density (pcf)	Average Moisture Content (%)	R-Value
Bulks B1 and B2 Composite	0-5	126.4	8.7	75

Sample ID	Depth (feet)	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Water Content (%)	Dry Density (pcf)
B1-2	2				---		5.8	114.9
B1-4	4				---	12.5	6.1	99.8
B1-6	6				---	10.0	6.5	99.0
B1-8.5	8.5				---		7.2	100.1
B2-2	2				---	11.1	5.8	110.1
B2-4	4				---		6.6	100.6
B2-6	6				---		6.5	98.2
B2-8.5	8.5				---		5.5	103.0
B2-11	11				---	21.7	11.6	

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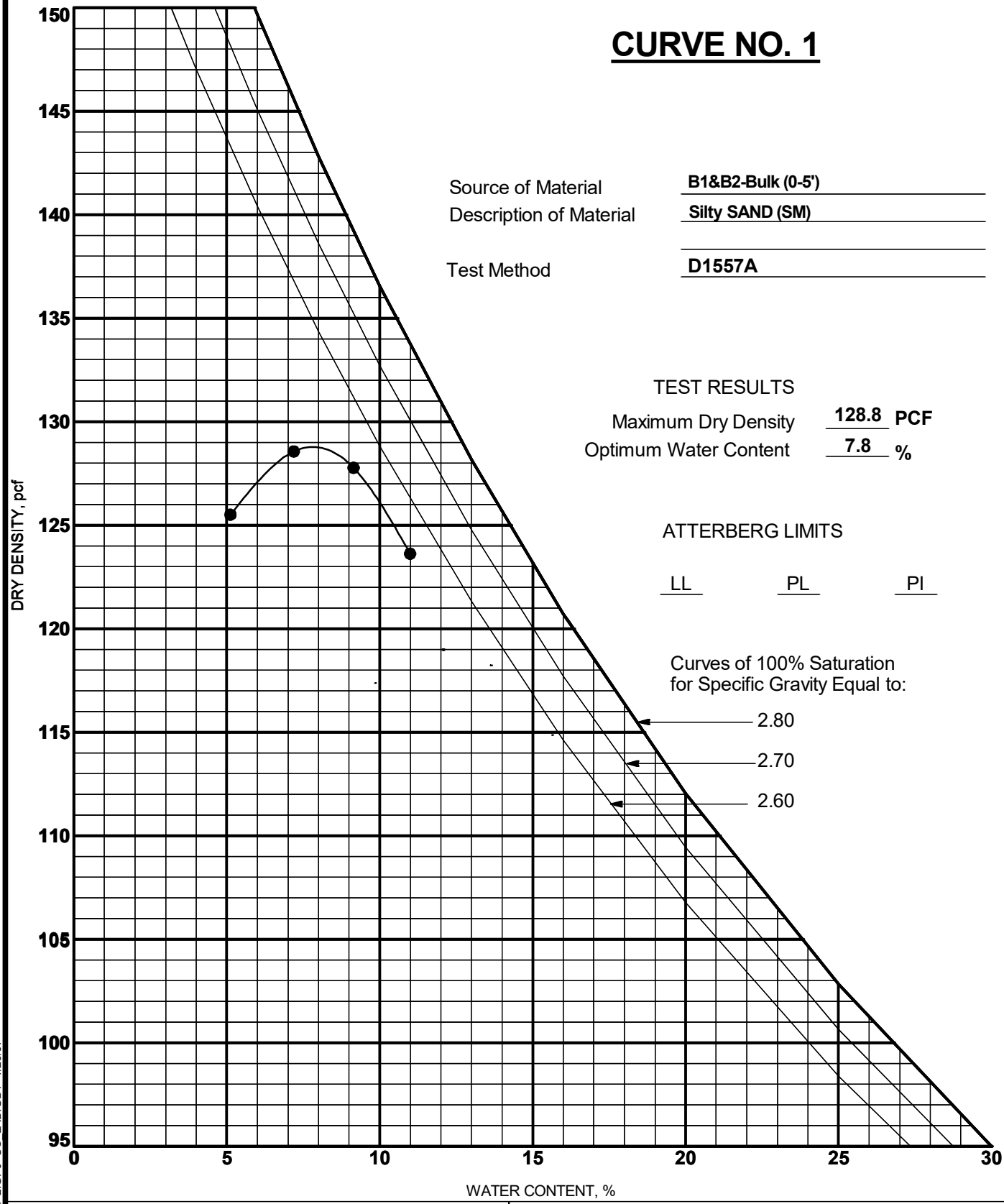
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742
Telephone: 916-852-9118

Summary of Laboratory Results

Project: 1121 Shakori Way Geotech
Location: Meyers, California
Number: S1534-05-07B
Figure: B1
Date:

US LAB SUMMARY GEOTECH 2 S1534-05-07B LOGS.GPJ US LAB.GDT 11/10/20

CURVE NO. 1



Source of Material: B1&B2-Bulk (0-5')

Description of Material: Silty SAND (SM)

Test Method: D1557A

TEST RESULTS

Maximum Dry Density: 128.8 PCF

Optimum Water Content: 7.8 %

ATTERBERG LIMITS

LL PL PI

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

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MOISTURE-DENSITY RELATIONSHIP

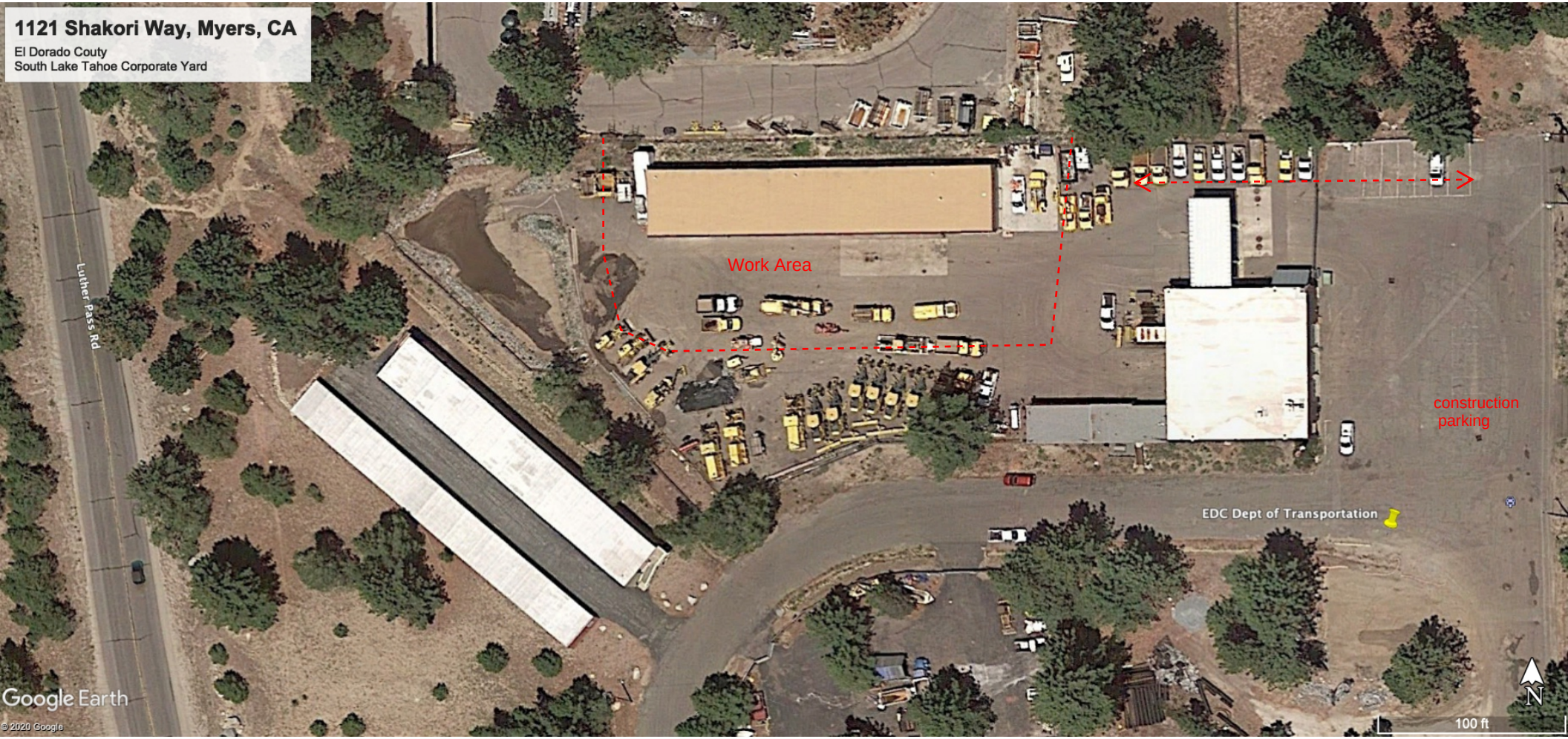
Project: 1121 Shakori Way Geotech

Location: Meyers, California

Number: S1534-05-07B

Figure: B2

US COMPACTION COPY 2.GPJ US LAB.GDT 1/26/07


1121 Shakori Way, Myers, CA
El Dorado Couty
South Lake Tahoe Corporate Yard
Work Area
construction
parking
EDC Dept of Transportation
Luther Pass Rd
Google Earth
© 2020 Google
N
100 ft

TAHOE REGIONAL PLANNING AGENCY

Mail
PO Box 5310
Stateline, NV 89449-5310

Location
128 Market Street
Stateline, NV 89449

Contact
Phone: 775-588-4547
Fax: 775-588-4527
www.trpa.org

Permit

PROJECT DESCRIPTION: EDC Department of Transportation Equipment Storage Building Tear Down/Rebuild Project

PERMITTEE(S): El Dorado County

APN: 035-181-009

COUNTY/LOCATION: El Dorado County/1121 Shakori Way

FILE #: ERSP2022-0259

Having made the findings required by Agency ordinances and rules, the TRPA approved the project on March 22, 2022, subject to the standard conditions of approval attached hereto (Attachment R) and the special conditions found in this permit.

This permit shall expire on March 22, 2025, without further notice unless the construction has commenced prior to this date and diligently pursued thereafter. Commencement of construction consists of pouring concrete for a foundation and does not include grading, installation of utilities or landscaping. Diligent pursuit is defined as completion of the project within the approved construction schedule. The expiration date shall not be extended unless the project is determined by TRPA to be the subject of legal action which delayed or rendered impossible the diligent pursuit of the permit.

NO TREE REMOVAL, CONSTRUCTION OR GRADING SHALL COMMENCE UNTIL:

(1) TRPA RECEIVES A COPY OF THIS PERMIT UPON WHICH THE PERMITTEE(S) HAS ACKNOWLEDGED RECEIPT OF THE PERMIT AND ACCEPTANCE OF THE CONTENTS OF THE PERMIT;
(2) ALL PRE-CONSTRUCTION CONDITIONS OF APPROVAL ARE SATISFIED AS EVIDENCED BY TRPA'S ACKNOWLEDGEMENT OF THIS PERMIT;
(3) THE PERMITTEE OBTAINS A COUNTY BUILDING PERMIT. TRPA'S ACKNOWLEDGEMENT IS NECESSARY TO OBTAIN A COUNTY BUILDING PERMIT. THE COUNTY PERMIT AND THE TRPA PERMIT ARE INDEPENDENT OF EACH OTHER AND MAY HAVE DIFFERENT EXPIRATION DATES AND RULES REGARDING EXTENSIONS; AND
(4) A TRPA PRE-GRADING INSPECTION HAS BEEN CONDUCTED WITH THE PROPERTY OWNER AND/OR THE CONTRACTOR.

Brandy McMahon — 3/22/2022

TRPA Executive Director/Designee — Date

PERMITTEE'S ACCEPTANCE: I have read the permit and the conditions of approval and understand and accept them. I also understand that I am responsible for compliance with all the conditions of the permit and am responsible for my agents' and employees' compliance with the permit conditions. I also understand that if the property is sold, I remain liable for the permit conditions until or unless the new owner acknowledges the transfer of the permit and notifies TRPA in writing of such acceptance. I also understand that certain mitigation fees associated with this permit are non-refundable once paid to TRPA. I understand that it is my sole responsibility to obtain any and all required approvals from any other state, local or federal agencies that may have jurisdiction over this project whether or not they are listed in this permit.

Signature of Permittee(s) R. J. Ruell — Date 4/8/22

Russell Fackrell/Facilities Division Manager

PERMIT CONTINUED ON NEXT PAGE

APN: 035-181-009

FILE NO. ERSP2022-0259

Security Posted (1): Amount $_____ Paid ____ Receipt No. _____

Excess Coverage Mitigation Fee (2): Amount $_____ Paid ____ Receipt No. _____

Security Administration Fee (3): Amount $_____ Paid __ Receipt No. _____

Notes:

(1) See Special Condition 3.A, below.
(2) See Special Condition 3.B, below.
(3) Refer to the TRPA Fee Schedule for the current security administration fee.

Required plans determined to be in conformance with approval: Date: _____

TRPA ACKNOWLEDGEMENT: The permittee has complied with all pre-construction conditions of approval as of this date and is eligible for a county building permit:

_____ _____

TRPA Executive Director/Designee Date

SPECIAL CONDITIONS

1. This permit authorizes tearing down the existing El Dorado County Department of Transportation Equipment Storage Building and replacing it with a new 8,160 square foot building at 1121 Shakori Way, El Dorado County, California. The project will result in 40,495 square feet of Land Capability District (LCD) Class 5 land coverage and 38,480 square feet of LCD Class 6 land coverage. A total of 141 square feet of LCD Class 5 land coverage will be banked with this project. Temporary and permanent Best Management Practices (BMPs) will be installed with the project.

2. The Standard Conditions of Approval listed in Attachment Q shall apply to this permit.

3. Prior to permit acknowledgement, the following conditions of approval must be satisfied.

   A. The security required under Standard Condition I.B. of Attachment Q shall be equal to 110% of the estimated BMP cost and shall be determined upon the permittee's submittal of required BMP plan and related cost estimate. Please see Attachment J, Security Procedures, for appropriate methods of posting the security and for calculation of the required security administration fee.

   B. The affected property has 51,459 square feet of excess land coverage. The permittee shall mitigate a portion or all of the excess land coverage on this property by removing coverage within Hydrologic Transfer Area 5 – Upper Truckee or in a different hydrologically related area provided the restoration occurs on more

sensitive land than the project area or by submitting an excess coverage mitigation fee.

To calculate the amount of excess coverage to be removed, use the following formula:

Estimated project construction cost multiplied by the fee percentage of 3.5% (as identified in Table 30.6.1, Chapter 30 of the TRPA Code of Ordinances) divided by the mitigation factor of 8. If you choose this option, please revise your final site plans and land coverage calculations to account for the permanent coverage removal.

An excess land coverage mitigation fee may be paid in lieu of permanently retiring land coverage. The excess coverage mitigation fee shall be calculated as follows:

Coverage reduction square footage (as determined by formula above) multiplied by the coverage mitigation cost fee of $8.50 for projects within Hydrologic Transfer Area 5 – Upper Truckee. Please provide a construction cost estimate for the structural elements of the structure by your licensed contractor, architect or engineer. The structural elements include, without limitation: pier pilings, bracing and supports, bearing walls, rafters, foundations, and base materials under asphalt or concrete.

C. The permittee shall provide evidence that the fire department has reviewed and approved the project.

D. The amount of coverage being banked with this project shall be added to the coverage table (141 square feet of Class 5 land coverage).

E. The location of temporary construction fencing shall be shown on the plans.

F. The final construction drawings shall have notes indicating conformance to the following design standards for color, roofs, and fences:

(1) Color: The color of this structure, including any fences on the property, shall be compatible with the surroundings. Subdued colors in the earthtone and woodtone ranges shall be used for the primary color of the structure. Hues shall be within the range of natural colors that blend, rather than contrast, with the existing vegetation and earth hues. Earthtone colors are considered to be shades of reddish brown, brown, tan, ochre, and umber.

(2) Roofs: Roofs shall be composed of non-glare earthtone or woodtone materials that minimize reflectivity.

(3) Fences: Wooden fences shall be used whenever possible. If cyclone fence must be used, it shall be coated with brown or black vinyl, including fence poles.

(4) Metal siding: The metal siding shall be treated to minimize reflectivity.

G. The permittee shall submit a project construction completion schedule to TRPA prior to commencement of construction. Said schedule shall include completion dates for each item of construction, as well as BMP installation for the entire project area.

H. All proposed combustion appliances (gas heaters, water heaters, etc.) shall be identified on the plans and comply with the air quality standards in TRPA Code, Section 65.1.4.

I. A BMP Inspection and Maintenance Plan shall be submitted detailing the maintenance requirements and schedules for all BMPs installed on the property.

J. The permittee shall e-mail one final set of plans to TRPA for electronic stamping.

4. Maximum excavation depths shall not exceed six feet. If groundwater is encountered during excavation, immediately stop work and contact TRPA.

5. All exterior lighting shall be consistent with TRPA Code of Ordinances Section 36.8 Exterior Lighting Standards. Specifically, all exterior lighting shall be fully shielded and directed downward so as not to produce obtrusive glare onto adjoining properties.

6. Temporary and permanent BMPs may be field fit by the Environmental Compliance Inspector where appropriate.

7. Prior to security release, photos shall be provided to TRPA taken during the construction of any subsurface BMP's or of any trenching and backfilling with gravel.

8. All BMPs shall be maintained in perpetuity to ensure effectiveness which may require BMPs to be periodically reinstalled or replaced.

9. TRPA reserves the right to amend any portion of this permit or construction operation while in progress if it is determined that the project construction is causing significant adverse effects.

10. To the maximum extent allowable by law, the Permittee agrees to indemnify, defend, and hold harmless TRPA, its Governing Board, its Planning Commission, its agents, and its employees (collectively, TRPA) from and against any and all suits, losses, damages, injuries, liabilities, and claims by any person (a) for any injury (including death) or damage to person or property or (b) to set aside, attack, void, modify, amend, or annul any actions of TRPA. The foregoing indemnity obligation applies, without limitation, to any and all suits, losses, damages, injuries, liabilities, and claims by any person from any cause whatsoever arising out of or in connection with either directly or indirectly, and in whole or in part (1) the processing, conditioning, issuance, or implementation of this permit; (2) any failure to comply with all applicable laws and regulations; or (3) the design, installation, or operation of any improvements, regardless of whether the actions or omissions are alleged to be caused by TRPA or Permittee.

Included within the Permittee's indemnity obligation set forth herein, the Permittee agrees to pay all fees of TRPA's attorneys and all other costs and expenses of defenses as they are incurred, including reimbursement of TRPA as necessary for any and all costs and/or fees incurred by TRPA for actions arising directly or indirectly from issuance or implementation of this permit. TRPA will have the sole and exclusive control (including the right to be represented by attorneys of TRPA's choosing) over the defense of any claims against TRPA and over their

settlement, compromise or other disposition. Permittee shall also pay all costs, including attorneys' fees, incurred by TRPA to enforce this indemnification agreement. If any judgment is rendered against TRPA in any action subject to this indemnification, the Permittee shall, at its expense, satisfy and discharge the same.

END OF PERMIT

EL DORADO COUNTY
SHAKORI WAY
GARAGE REPLACEMENT

Owner Furnished and Installed Equipment

ITEM		Notes
Brine making equipment & tanks		See Accu-Brine Installation Guide for manufacturer supplied connections installed by Contractor
Air Compressor		
Plasma cutter		
Welder		
Steam cleaner		
"Hot pot"		
Data/comm cabling		Conduits & pathways by Contractor
Wireless access point		Conduits & pathways by Contractor