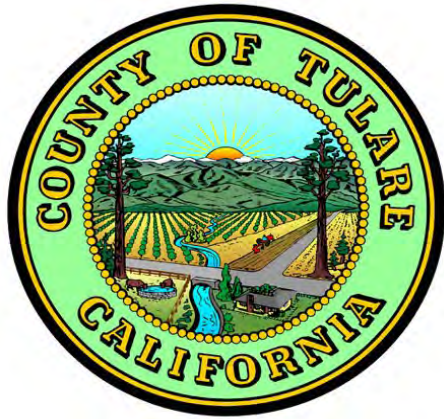


County of Tulare

Sheriff Morgue

Visalia, California



**Bid Documents
And
Specifications**

County of Tulare
General Services Agency
Capital Projects Division
2637 W Burrel Ave., Suite 200
Visalia, California 93291
Phone: 559-205-1100

2/20/24

SECTION 00005 – TABLE OF CONTENTS

<u>SECTION</u>		<u>NO. OF PAGES</u>
<u>DIVISION 0 – CONTRACT REQUIREMENTS</u>		
00005	Table of Contents	1
00020	Advertisement for Bids	2
00100	Instruction to Bidders	6
00310	Bid Form	4
00311	Subcontractor List Form	3
00312	Non-collusion Declaration	1
00313	Debarment and Suspension Certification	2
00501	Bid Bond	1
00502	Performance Bond	2
00503	Statutory Payment Bond	2
00504	Worker's Compensation Insurance Certificate	1
00506	Agreement	8
00507	State Wage Determination	1
00508	Payroll Submittal Information	1
00509	Conditional/unconditional Release Forms	5
00700	General Conditions	82

DIVISION 1 - GENERAL REQUIREMENTS

01000	Special Conditions	3
01010	Summary of Work	3
01040	Project Coordination	3
01045	Cutting and Patching	3
01050	Storm Water Pollution Control	4
01075	Construction Waste Management and Disposal	8
01090	Definitions and Standards	6
01100	Alternate Bid Items	1
01200	Project Meetings	3
01300	Submittals	9
01430	Tests and Inspections	3
01500	Temporary Facilities and Controls	3
01700	Project Closeout	4
01935	Extra Finish Materials	2

DIVISION 2 - SITE WORK

02050	Clearing and Site Demolition	3
02220	Earthwork	8
02281	Termite Control	2
02500	Paving and Surfacing	4
02810	Irrigation System	11
02830	Chain Link Fencing	3
02870	Site Furnishings	2
02900	Landscape Work	9

DIVISION 3 - CONCRETE

03300	Cast-In-Place Concrete	12
-------	------------------------	----

DIVISION 4 - MASONRY

04231	Reinforced Unit Masonry	7
-------	-------------------------	---

DIVISION 5 - METALS

05500	Metal Fabrications	3
05700	Miscellaneous Metal Work	2

DIVISION 6 - WOOD AND PLASTICS

06100	Rough Carpentry	6
06200	Finish Carpentry and Millwork	3
06400	Architectural Woodwork	8

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07200	Building and Acoustical Insulation	3
07250	Weather Barriers	5
07542	PVC Roofing System	13
07600	Flashing and Sheet Metal	5
07610	Metal Roof Panels	8
07713	Prefabricated Gutters and Downspouts	2
07720	Roof Accessories	3
07900	Sealants and Caulking	4

DIVISION 8 - DOORS AND WINDOWS

08100	Metal Doors and Frames	5
08110	Stainless Steel Doors and Frames	5
08220	Plastic Laminate Faced Doors	4
08305	Access Doors	2
08331	Overhead Coiling Doors	5
08400	Storefront System	5
08625	Tubular Daylighting Devices	5
08710	Finish Hardware	6
08800	Glass and Glazing	2

DIVISION 9 - FINISHES

09200	Lath and Plaster	5
-------	------------------	---

09252	Gypsum Wallboard and Cement Board	5
09500	Acoustical Ceiling Treatment	5
09660	Resilient Flooring	3
09672	Resinous Flooring	7
09851	Epoxy Chemical Resistant Wall Coating	6
09900	Painting	9
09986	Prefinished Wall Panels	2

DIVISION 10 - SPECIALTIES

10050	Miscellaneous Specialties	3
10426	Signage and Graphics	3
10500	Phenolic Lockers and Benches	4
10520	Firefighting Devices	3
10800	Toilet and Bath Accessories	3

DIVISION 11 - EQUIPMENT

11110	Laundry Equipment	2
11450	Residential Equipment	3
11490	Cleaning Equipment	4
11780	Morgue Equipment	3

DIVISION 12 - FURNISHINGS

Not Used

DIVISION 13 - SPECIAL CONSTRUCTION

Not Used

DIVISION 14 - CONVEYING SYSTEMS

Not Used

DIVISION 15 - MECHANICAL

15100	General Mechanical and Mechanical Requirements	9
15400	Plumbing	26
15800	Heating, Ventilating, and Air Conditioning	17

DIVISION 16 - ELECTRICAL

16100	General Conditions for Electrical Work	7
16200	Basic Electrical Materials and Methods	19
16620	Generator	10
16621	Automatic Transfer Switch	11

16721	Fire Alarm System	25
16200	Short Circuit & Protective Devices Coordination Study	5
16951	Arc Flash Hazard Study	3

ATTACHMENTS

Soils Investigation
Structural Calcs

SECTION 00020 – ADVERTISEMENT FOR BIDS

**ADVERTISEMENT FOR BIDS
Tulare County
Sheriff Morgue
1185 South O Street, Tulare, CA 93274**

NOTICE IS HEREBY GIVEN that individually sealed bids for the **County of Tulare Sheriff Morgue at 1185 South O Street, Tulare, CA 93274** will be accepted by the Clerk of the Board of Supervisors, County of Tulare, Administration Building, 2800 W. Burrel Avenue, Visalia, California until **2:00pm on Thursday, May 09, 2024.**

Project Description: The Project consists of constructing a new County Morgue, which will include site work and utility connections, and the construction of a single story 6,805 square foot facility for **County of Tulare Sheriff Morgue at 1185 South O Street, Tulare, CA 93274.**

A pre-bid conference will be held at the project site located at **1225 South O Street, Tulare, CA 93274** at **11:00am on April 18, 2024.** The pre-bid conference is **not** mandatory, however Bidders that attend shall sign the pre-bid conference attendance roster.

Bids shall be in accordance with the drawings and specifications which are on electronic file and may be obtained from the Capital Projects Division of the Tulare County General Services Agency. Electronic files will be provided at no cost. Email request for project plans and specifications to Andres Enciso at (AEnciso@tularecounty.ca.gov). Each bid shall be submitted individually on the Bid Forms that are provided in the Specifications along with accompanying documents and a Cashier's Check or Bid Bond for not less than ten percent (10%) of the total amount of the bid, sealed in an envelope marked with the bidder's name and business address, Project title and the scheduled time and date of the bid opening. It is the bidder's responsibility to print the necessary pages required for the bid.

The bids will be opened, examined, and declared by a Deputy Clerk of the Board of Supervisors at the time and on the date written above. The bid opening will be open to the public and held in the Conference Room of the Clerk of the Board in the Tulare County Administration Building, 2800 W. Burrel Avenue, Visalia, California. The results of the Bidding shall be reported to the Board of Supervisors at their next regular meeting thereafter.

The contract will be awarded to the responsible bidder submitting the lowest cost responsive bid.

TIME OF COMPLETION: The Project is to be completed within **540** calendar days from the date to be established in the "NOTICE TO PROCEED". The Agreement includes provisions for Liquidated Damages if the Project is not timely completed.

The successful Bidder shall possess a Class **"B"** California Contractor's License at the time the bid is submitted and maintain that license until the Project is completed.

The successful Bidder shall furnish the bonds, insurance policies and certificates, specified in the Instructions to Bidders and General Conditions.

The successful Bidder will be entitled to establish an Escrow in lieu of withheld payments pursuant to California Public Contract Code Section 22300, and the General Conditions.

Any Contractor to whom a contract is awarded and any subcontractor under the Contractor shall pay all workers employed on the work not less than the prevailing wage rates determined by the Director of the California Department of Industrial Relations ("DIR") and shall comply with all laws and regulations relating to the employment of apprentices. Said wage rates pursuant to Section 1773.2 of

the Labor Code are on file with the Tulare County General Services Agency, 2637 W. Burrel Avenue Suite 200, Visalia, California and will be made available to any interested person on request.

All contractors and subcontractors performing public works, before bidding or accepting any public works contract, must register within the statutory timelines and meet requirements using the DIR's online application at: <https://www.dir.ca.gov/Public-Works/PublicWorks.html>.

No contractor or subcontractor may be listed on this or any other bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

Contractor shall comply with Title VI of the Civil Rights Act of 1964, and in accordance with said Act, no person on the grounds of race, color, sex or national origin, shall be excluded from participation in, be denied the benefits of, or be otherwise subject to discrimination under any service or activity in connection with the Project.

Contractor shall comply with Title VII of the Civil Rights Act of 1964, which prohibits discrimination against any employee or applicant for employment because of race, color, religion, sex or national origin.

After the time set for opening of bids, no bid may be withdrawn for a period of sixty (60) days.

The Board of Supervisors reserves the right to deem a bid non-responsive for any information crossed out from the bid packet including information completed by a manufacturer.

The Board of Supervisors reserves the right to reject any or all bids, and/or waive any informality in any bid, and/or determine in its discretion the responsibility of any bidder.

The Tulare County Board of Supervisors reserves the right to reject any or all Bids or waive any or all discrepancies or failures in a Bid. The County of Tulare also maintains Part V, Chapter 15 of its ordinance Code, "Public Works Contractor Debarment" and any entity bidding on this project who is included in the list of debarred and suspended persons pursuant to 5-15-5000 of the Tulare County Ordinance Code shall be disqualified from bidding or being awarded a contract with Tulare County pursuant to Tulare County Ordinance 5-15-4000. The decision of the Tulare County Board of Supervisors regarding the amount of a bid, or existence or treatment of a discrepancy or failure in a bid will be final. The award of the contract, if it is awarded, will be to the lowest responsive and responsible bidder whose Bid complies with all the requirements prescribed. Such award, if made, will be made within sixty (60) days after the opening of the Bid. This period may be subject to an extension for such further period as may be agreed upon in writing between the Tulare County Board of Supervisors and the bidder concerned.

The Board of Supervisors further reserves all rights to use County Forces, or to negotiate contracts, or both, to the extent authorized by the Public Contract Code.

Date 4/5/24 & 4/12/24

By Order of the Board of
Supervisors of the County of
Tulare, State of California

Jason T. Britt
County Administrative Officer/Clerk
Board of Supervisors
County of Tulare

By _____
CAO

END OF SECTION 00020

SECTION 00100 - INSTRUCTIONS TO BIDDERS

To be considered, Bids must comply with these Instructions to Bidders.

DOCUMENTS:

Bidders may obtain electronic copies of the Plans and Specifications and related documents from the Capital Projects Division of the Tulare County General Services Agency via email request at (AEnciso@tularecounty.ca.gov). If bidders desire hard copies of the plans and specifications bidders may have them printed at the bidder's expense.

EXAMINATION:

Before submitting a bid, bidders shall carefully examine the Plans and Specifications, and related documents, visit the site of the work and fully inform themselves as to all existing conditions and limitations, and shall include in the bid a sum to cover the cost of all items included in the work.

A pre-bid conference will be held at the Project site located at **1225 South O Street, Tulare, CA 93274** at **11:00 am on April 18, 2024**. The pre-bid conference is **not mandatory**. Bidders that attend shall sign the pre-bid conference attendance roster.

INTERPRETATIONS, ADDENDA:

- A. Should a bidder find discrepancies, inconsistencies or omissions from the Drawings, Specifications and Related Documents, or should a bidder be in doubt as to their meaning, they shall at once notify the County by email: AEnciso@tularecounty.ca.gov. Any such item not brought to the County's attention by **12:00 p.m., April 25, 2024**, shall be done in accordance with the County's interpretation for the good of the work in accordance with the intent and meaning of the Contract Documents. Neither County nor County's Representative will be responsible for oral instructions or information. Questions received by **12:00 p.m., April 25, 2024**, will be answered by a written Addendum directed to all bidders.
- B. Any Addenda issued by the County or County's Representative during the time of bidding are to be considered in the Bid and will become a part of the Agreement between Contractor and County. Bidders shall acknowledge receipt of all Addenda on the Bid Form in the space provided.

SUBSTITUTION OF MATERIALS:

Materials, other than those specified, must be approved by Addenda issued by the County or County's Representative prior to bid opening, **otherwise** if the bidder submits non-approved materials with the bid, the bidder assumes the risk the bid may be

deemed nonresponsive because the County may not approve the desired substitution. See Article 15.1 of GENERAL CONDITIONS for detailed requirements regarding post-Bid substitution requests.

BIDS:

- A. Bids must be made on the Bid Form ("Bid Form") included in these Specifications, or a copy thereof, all blank spaces filled, the signature shall be in longhand, and the completed form shall be without alterations or erasures. All amounts must be in words as well as in figures. Any discrepancy between the words and figures shall be resolved using the amount stated in words. The Bid Form must be filled out in ink or be typewritten. Where the bidder is a corporation, the Bid Form must be signed using the name of the corporation followed by the name of state of incorporation and the signatures of an officer authorized to bind the corporation to a Contract. A bid which is incomplete, incorrect or non-conforming, may be disregarded, in the sole discretion of the Board of Supervisors.
- B. Bids shall be addressed and delivered to:
- Clerk of the Board of Supervisors
County of Tulare
Administration Building
2800 W. Burrel Ave.
Visalia, CA 93291
- C. Each bid shall be delivered in a separate opaque sealed envelope bearing on the outside, the name of the bidder, the bidder's business address, the name of the Project, and the scheduled date and time for the bid opening. Bids will be accepted until the date and time stated in the Advertisement for Bids. Also, included in each envelope shall be:
1. A certified Bid Bond or cashier's check for 10% of the bid amount referring to the Bid Package bid upon.
 2. No bid will be valid without the complete listing of subcontractors performing more than one-half (½) of one (1%) of total contract **with the signature of the contractor submitting the bid in the space indicated.**
 3. A completed, Non-Collusion Declaration referring to the Bid Package bid upon.
 4. County reserves the right to deem the bid non-responsive for any information crossed out from the bid packet including information completed by a manufacturer.
- D. All bids shall remain firm for a period of sixty (60) calendar days after the date of bid opening.

- E. Bids may not be modified after the designated time for bid opening. Upon presentation of satisfactory identification, bidders may withdraw and resubmit bids at any time prior to bid opening. No bid may be withdrawn until sixty (60) days after the bid opening.
- F. The responsibility of bidders and of their proposed Subcontractors will be considered in making the award.
- G. County will determine, at its own discretion, whether a bidder is responsible.
- H. The award of the contract, if awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements presented.
- I. County reserves the sole discretion to reject any or all bids or to waive informalities and irregularities in the Bid Form or the Bid process.
- J. The County of Tulare also maintains Part V, Chapter 15 of its ordinance Code, "Public Works Contractor Debarment" and any entity bidding on this project who is included in the list of debarred and suspended persons pursuant to 5-15-5000 of the Tulare County Ordinance Code shall be disqualified from bidding or being awarded a contract with Tulare County pursuant to Tulare County Ordinance 5-15-4000.
- K. Bids expressing exceptions or qualifications on Technical Specifications may be disregarded in the sole discretion of the Board of Supervisors.
- L. In accordance with the General Conditions, include in the Bid all costs for full performance of the work.
- M. The following failures are not waivable and will cause a bid to be considered nonresponsive:
- Failure to sign the bid;
 - Failure to furnish the required bid bond on the County form provided, or a cashier's check equal to 10% of the base bid
 - Failure to include a total amount of the bid
 - Failure to attend the pre-bid conference and/or sign the pre-bid conference attendance roster if the pre-bid conference is advertised as mandatory.
 - Failure to submit a completed addenda certification statement.
- N. The decision of the County regarding the amount of a bid, or existence or treatment of a discrepancy in a bid will be final.

BID PROTESTS:

Any bid protest must be in writing and filed with **Andres Enciso, Capital Projects Coordinator II, at AEnciso@tularecounty.ca.gov** or General Services Agency/Capital Projects Division, 2637 W. Burrel Ave., Suite 200, Visalia, California 93291 before 5:00 p.m. no later than two (2) working days following bid opening (the "Bid Protest Deadline") and must comply with the following requirements:

- A. General. Only a bidder who has submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors and material suppliers are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder but must timely pursue its own protest. For purposes of this Bid Protest Procedure, a "working day" means a day that County is open for normal business, and excludes weekends and holidays observed by County.
- B. Protest Contents. The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the person representing the protesting bidder if different from the protesting bidder.
- C. Copy to Protested Bidder. A copy of the protest and all supporting documents must be concurrently transmitted by fax or by email, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award of the contract for the Project depending upon the outcome of the protest.
- D. Response to Protest. The protested bidder may submit a written response to the protest, provided the response is received by County before 5:00 p.m., within two (2) working days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person representing the protested bidder if different from the protested bidder.
- E. Copy to Protesting Bidder. A copy of the response and all supporting documents must be concurrently transmitted by fax or by email, by or before the Bid Protest Deadline, to the protesting bidder and any other bidder who has a reasonable prospect of receiving an award of the contract for the Project depending upon the outcome of the protest.
- F. Exclusive Remedy. The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. A bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

- G. Right to Award. The County Board of Supervisors reserves the right to award the Contract to the bidder it has determined to be the responsible bidder submitting the lowest cost responsive bid, and to issue a notice to proceed with the Work notwithstanding any pending or continuing challenge to its determination.

BID SECURITY:

Each bidder shall submit, with its bid, a cashiers check upon a solvent bank and made payable to County, or a Bid Bond for the County's benefit, in an amount equal to 10% of the Base Bid. This bid security shall be given as a guarantee that the bidder will enter into the Agreement if awarded to the bidder and will produce the required bonds, certificates and insurance coverage, and **shall be retained as liquidated damages if the bidder refuses to enter into said Agreement** upon request to do so by County. Bid security will be returned to all unsuccessful bidders, and to each successful bidder upon the County's receipt of a satisfactory Performance Bond, Payment Bond, Policy of Insurance, Worker's Compensation Insurance Certificate, executed Agreement and any other document required by the Contract Documents prior to the execution of the Agreement by the County. Bid Bonds shall be executed on the form included in these specifications or a facsimile thereof.

NON-COLLUSION DECLARATION:

Each bidder shall submit to County, with its bid, a Non-Collusion Declaration covering the bidder and all sub-contractors. The Non-Collusion Declaration shall be executed on the form included in these Specifications or a facsimile thereof.

FORM OF AGREEMENT:

The Contractor is required to sign and submit to the County three (3) originals of the Agreement with the County, in the form shown in these Specifications. In the alternative, the Contractor may submit, with the permission of the County's representative noted above, the Agreement in electronic format.

PERFORMANCE BOND AND PAYMENT BOND:

The successful bidder shall file with County a Performance Bond and a Payment Bond. **The Payment and Performance Bonds required by these specifications will neither be accepted nor approved by the County unless the bonds are underwritten by a California admitted surety, and the requirements of California Code of Civil Procedure Section 995.630 are met.** Bonds shall be executed in three (3) original counterparts on the forms included in these Specifications or facsimile thereof.

CONTRACTOR'S LICENSE:

At the time the bid is submitted, the bidder shall possess a valid and current Contractor's License, classification **"B"**, issued by the State of California in order to

perform the work described in the Contract Documents. Required licensing shall be maintained until the completion of the Project.

CONTRACTOR'S INSURANCE:

Coverage: Contractor shall maintain, for the duration of the work and warranty period required under the Agreement, all Insurance in the minimum amounts required by the "GENERAL CONDITIONS."

Prior to approval of the Agreement by the County, Contractor shall file with the Clerk of the Board of Supervisors, evidence of the insurance in accordance with Article 11 of the General Conditions, which outlines the minimum scope, specifications and limits of insurance required for the Project. Additional insured endorsements required as outlined in Article 11 shall not be used to reduce limits available to County as an additional insured from the Contractor's full policy limits. Insurance policies shall not be used to limit liability or to limit the indemnification provisions and requirements of the Agreement or act in any way to reduce the policy coverage and limits available from the insurer(s). Failure to maintain or renew coverage, or to provide evidence of renewal, may be considered a material breach of the Agreement.

Department of Industrial Relations Requirements:

Contractor and any subcontractor under it shall pay all workers employed on the work not less than the prevailing wage rates determined by the Director of the Department of Industrial Relations and shall comply with all laws and regulations relating to the employment of apprentices. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Tulare County General Services Agency, 2637 W. Burrell Avenue Suite 200, Visalia, California and will be made available to any interested person on request.

No contractor or subcontractor may work on this public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

Contractor shall comply with Title VI of the Civil Rights Act of 1964, and in accordance with said Act, no person on the grounds of race, color, sex or national origin, shall be excluded from participation in, be denied the benefits of, or be otherwise subject to discrimination under any service or activity in connection with the Project.

Contractor shall comply with Title VII of the Civil Rights Act of 1964, which prohibits discrimination against any employee or applicant for employment because of race, color, religion, sex or national origin.

END OF SECTION 00100

SECTION 00310 - BID FORM

County: Board of Supervisors
County of Tulare
Administration Building
2800 W. Burrel Avenue
Visalia, CA, 93291

County's
Representative: Andres Enciso, Capital Projects Coordinator II
County of Tulare
General Services Agency
Capital Projects Division
2637 W. Burrel Ave., Suite 200
Visalia, CA, 93291
559.205.1137 - Phone
Email: AEnciso@tularecounty.ca.gov

Project Consultant: Chas Rhoads
Chas Rhoads Architecture
P.O. Box 889
Hanford, CA 93232
559. 584.3371-Phone
Email: chasrhoads@sbcglobal.net

Bid For: Tulare County – **Sheriff Morgue at 1185 South O Street, Tulare, CA 93274**

1. We, the undersigned, having attended the mandatory pre-bid conference (if the pre-bid conference was listed as mandatory for this project), and having familiarized ourselves with the local conditions, the Advertisement for Bids, Instructions to Bidders, General Conditions, Bid Form, Supplement to Bid Form, Agreement between County and Contractor, the Drawings and Specifications and Addenda issued by the County or County's Representative, do hereby propose to furnish all labor, materials, necessary tools, expendables, equipment, utility and transportation services necessary to complete the Work required for the above Bid Package in strict accordance with the contract documents, including all Addenda.
2. Undersigned declares that the cost of a Performance Bond in the full amount of the Agreement, and a Labor and Material Payment Bond of one hundred percent (100%) of the amount of the Agreement is included in this bid.
3. Undersigned agrees to enter into and execute an Agreement, if awarded on the basis of this Bid, **and to furnish Bonds and Insurance in accordance with Contract Documents within seven calendar (7) days after date of receipt of Notice of Intent to Award.**

4. **Liquidated Damages for Failure to Enter into the Agreement:**

Enclosed herewith is Cashiers Check or Bid Bond, made payable to the County, which is not less than ten percent (10%) of the total amount of the Bid. Should Contractor's bid be accepted and Contractor thereafter fail to enter into the Agreement on the basis of this bid, IT IS HEREBY UNDERSTOOD AND AGREED by County and Contractor that it is, and will be, extremely difficult or impracticable to determine the actual damages which County will sustain in the event of, and by reason of, such failure to enter into the Agreement and that the aforesaid amounts, as set forth on the Cashiers Check or Bid Bond, are reasonable estimate of and reasonable sums for such damages. Undersigned further agrees that said check or Bid Bond shall be forfeited as liquidated damages (not as a penalty) if undersigned fails to enter into an Agreement on the basis of this bid.

5. Undersigned acknowledges receipt of the following Addenda:

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____
Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

6. This Bid is valid for sixty (60) calendar days following the date for receiving Bids.

7. Undersigned proposes to enter into a contract for the following amounts:

Lump Sum Bid for work included in this Contract necessary to complete the work for the **Sheriff Morgue at 1185 South O Street, Tulare, CA 93274, COUNTY OF TULARE, CALIFORNIA** as shown in the drawings and specifications. The Project shall be completed within **540** calendar days from the date to be established in the Notice to Proceed. The Agreement includes provisions for Liquidated Damages if the Project is not completed within the agreed time of completion.

_____ \$ _____
Amount in Words Numbers

In the event of discrepancy between the words and numbers of the Lump Sum Bid, the words shall prevail.

Additive Alternate Bid 1: for work included in this Contract necessary to complete Additive Alternate Bid 1. Provision and installation of emergency generator and related accessories per Electrical drawings and Specifications. Related concrete work and chain link enclosure shall also be part of this Alternate Bid.

_____ \$ _____
Amount in Words Numbers

In the event of discrepancy between the words and numbers of the Lump Sum Bid the words shall prevail.

Type of Organization _____
(Individual, Partnership, Corporation, Etc.)

Company's Name _____
(Type or Print)

Partner's Names _____
(If Partnership)

Seal (If Corporation) _____
Date: _____

By: _____
(Signature of Contractor)

(Type Name of Contractor)

Address: _____

Telephone: _____

Contractor License:

Class: _____

Numbers: _____

Expiration Dates: _____

Department of Industrial Relations Registration:

DIR Registration No. _____

Attachments:

- _____ Bid Security
- _____ Sub-contractor List
- _____ Non-Collusion Declaration
- _____ Corporate Resolution authorizing Signature of Document, if Corporation

END OF SECTION 00310

SECTION 00311 - SUBCONTRACTOR LIST FORM

This attachment to the Bid shall be submitted with the Bid. If no subcontractors are to be involved and work is to be performed solely by the Contractor, so state.

Pursuant to the provision of Section 4100 to 4113, inclusive, of the Public Contract Code of the State of California, the Contractor shall set forth the type of work to be performed, name, location of the place of business, contractor's state license number ("CSLB #"), and Department of Industrial Relations Registration Number ("DIR #") of each subcontractor who will perform work or labor in or about the construction of the work of improvement (the "Work") in an amount in excess of one-half (1/2) of one percent (1%) of the Contractor's total bid.

Failure to submit a properly completed Subcontractor List form results in a nonresponsive bid. Note: (1) pursuant to Public Contract Code Section 4104(a)(2), an inadvertent error in listing the California contractor license number provided pursuant to this paragraph shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected contractor's license number is submitted to the County by the prime contractor within 24 hours after the bid opening and provided the corrected contractor's license number corresponds to the submitted name and location for that subcontractor; (2) pursuant to Labor Code Section 1771.1(c), an inadvertent error in listing a subcontractor who is not registered with the DIR in a bid proposal shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that any of the following apply:

- (1) The subcontractor is registered prior to the bid opening.
- (2) Within 24 hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in subparagraph (E) of paragraph (2) of subdivision (a) of Labor Code Section 1725.5 if required to do so.

The General Contractor to whom the contract is awarded will not be permitted, without the written consent of the Tulare County General Services Agency Director or designee, to substitute any person as subcontractor in place of the subcontractor designated in the original bid, or to permit any subcontract to be assigned or transferred, or to allow it to be performed by anyone other than the original subcontractor. Consent to the substitution of another person as subcontractor shall only be permitted in accordance with Public Contract Code Section 4107.

If the Contractor fails to specify a subcontractor for any portion of the Work in excess of one-half (1/2) of one percent (1%) of the Contractor's total bid, then the Contractor agrees that the Contractor will perform that portion of the Work itself. The subletting or subcontracting of work for which no subcontractor was designated in the original bid and which is in excess of one-half of one percent of the total contract price, will be allowed only in accordance with Public Contract Code Section 4109.

The following is the required list of subcontractors:

CONTRACTOR'S LIST OF SUBCONTRACTORS
(Use other side & extra sheets if necessary)

Type of Work	Name of Subcontractor	Address of Subcontractor	CSLB #	DIR #

_____ Date

_____ Contractor's Signature

(Continue list on page 2)

(Subcontractor List continued)

Type of Work	Name of Subcontractor	Address of Subcontractor	CSLB #	DIR #

END OF SECTION 00311

SECTION 00312 – NON COLLUSION DECLARATION

NONCOLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

(Public Contract Code section 7106)

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid.

The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on

_____ [date], at _____ [city],
_____ [state].

(signature)

(Print name and Title)

END OF SECTION 00312

SECTION 00313 – DEBARMENT AND SUSPENSION CERTIFICATION

DEBARMENT AND SUSPENSION CERTIFICATION

Bidder/Proposer shall provide either: (a) the certification requested below, or (b) the information requested on the next page. Failure to provide such certification or information may result in a determination that the Bidder/Proposer is nonresponsive. Failure to fully and accurately provide the requested certification or information may result in a determination that the Bidder/Proposer is not responsible.

Identify on the following page any debarment or suspension by any Federal, State, or local public agency arising out of the performance of a construction contract: (1) by the Bidder/Proposer submitting this Bid/Proposal, including any person who is an officer of, or in a management position with, or has an ownership interest in the contracting entity which is submitting this Bid/Proposal, or (2) by the qualifying person licensed by the Contractors' State License Board to perform the work described in the Bid/Proposal, including any debarment or suspension of any such person when they were an officer, manager, owner, or responsible managing employee of a construction contractor other than the Bidder/Proposer submitting this Bid/Proposal. Provide on the following page labeled "Debarment and Suspension Information."

HISTORY OF DEBARMENT AND SUSPENSION CERTIFICATION

If the Bidder/Proposer has no debarments to report as described above, complete the following:

I, _____, hereby certify that neither

(Print name of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

(Bidder/Proposer name as shown on Bid/Proposal)

nor _____

(Name of responsible managing person licensed by Contractors' State License Board)

has been debarred or suspended as described above.

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

Executed this _____ day of _____ at _____

(month and year)

(city and state)

by _____

(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal).

DEBARMENT AND SUSPENSION INFORMATION

(1) Date and duration of debarment or suspension: _____

(2) Project name or contract involved: _____

(3) Debarring or suspending agency: _____

(4) Stated reason for debarment or suspension: _____

(5) Exculpatory information: _____

Declaration: I declare under penalty of perjury that the above information is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

END OF SECTION 00313

SECTION 00501 - BID BOND

**COUNTY OF TULARE
STATE OF CALIFORNIA**

BIDDER'S BOND

TAKE NOTICE:

That we, _____
_____ as PRINCIPAL, and

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

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas, the Principal has submitted the above-mentioned bid to the Board of Supervisors, County of Tulare, for certain construction specifically described as follows, for which bids are to be opened at Visalia, California, on Thursday, **May 09, 2024**, for construction on the **County of Tulare Sheriff Morgue at 1185 South O Street Tulare, Ca 93274**. NOW, THEREFORE, if the aforesaid Principal is awarded the Contract, given the required notice of award and presented with the County-Contractor Agreement for signature, and, within the time and manner required under the Specifications, executes and files it with the Clerk of the Board of Supervisors in the prescribed form and in accordance with the bid, together with all insurance certificates, bonds, powers of attorney, certificates of authority and financial statements, proofs of licensing, and any other documents required by the Specifications to be filed with the executed Agreement, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect.

In the event suit is brought upon this bond by the Obligee and judgement 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 hereunto set our hands and seals on this _____ day of _____, **2024**.

Principal

Surety

Note: Signature of those executing for the surety must be properly acknowledged or notarized.

END OF SECTION 00501

County Counsel Approved as to Form 2.1.2024

SECTION 00502 – STATUTORY PERFORMANCE BOND

STATUTORY PERFORMANCE BOND PURSUANT TO
California Public Contract Code
Section 20129

TAKE NOTICE:

That, _____ (Hereinafter called the Principal), as Principal and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____, (hereinafter called the Surety), as Surety, are held and firmly bound unto the **COUNTY OF TULARE**, (hereinafter called the Obligee) in the amount of _____ Dollars (\$_____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Agreement with the Obligee, dated the _____ day of _____, to _____, which Agreement is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THE OBLIGATION IS SUCH, that if said Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, and conditions of said Agreement during the original term of the Agreement and any extension thereof, with or without notice to the Surety, and during the life of any guarantee required under the Agreement, and shall also perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized extensions or modifications of said Agreement that may hereafter be made, notice of said extensions or modifications to the Surety being hereby waived, and will indemnify, defend, and save harmless the Obligee, its governing board, officers, agents, and employees as required by the Agreement; then the above obligation shall be void. Otherwise, said obligation shall remain in full force and effect.

Whenever Obligee declares Principal to be in default under the Agreement, then the Surety will remedy the default pursuant to the Agreement, or will promptly do one of the following, at the Obligee's option:

- (1) Undertake through its agents or independent contractors, reasonably acceptable to the Obligee, to complete the Project in accordance with all terms and conditions in the Agreement, including without limitation, all obligations with respect to payments, warranties, guarantees, and liquidated damages, and with no requirement for a "take-over" or similar agreement; or
- (2) Permit the Obligee to complete the Project in any manner consistent with California law and reimburse the Obligee for all costs it incurs in completing the Project, and in correcting, repairing or replacing any defects in materials, equipment or workmanship, which do not conform to the Agreement.

Surety expressly agrees that the Obligee may reject any contractor or subcontractor that Surety may propose in fulfillment of its obligations in the event of default by the Principal. Surety will not utilize Principal in completing the Project or accept a bid from the Principal for completion of the Work if the Obligee, when declaring the Principal in default, notifies Surety of the Obligee's objection to Principal's further participation in the completion of the Project.

Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the construction work on this Project, and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing the Obligee's rights against the others.

No right of action will accrue on this bond to or for the use of any person or corporation other than the Obligee or its successors or assigns. If Obligee sues upon this bond, then Surety will pay reasonable attorney's fees and costs incurred by the Obligee in such suit, irrespective of the penal amount of this bond.

Witness our hands this _____ day of _____.

Principal Seal

By

Surety Seal

By

Agency of Record

Note: Bond surety must be admitted to transact surety insurance in the State of California

End of Section 00502

County Counsel Approved as to Form 2.1.2024

SECTION 00503 – STATUTORY PAYMENT BOND

STATUTORY PAYMENT BOND PURSUANT TO

California Civil Code
Sections 9550 through 9566

TAKE NOTICE:

That, _____ (hereinafter called the Principal), as Principal, and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____, (hereinafter called the Surety), as Surety, are held and firmly bound unto the **COUNTY OF TULARE** (hereinafter called the Obligee), in the amount of _____ Dollars (\$ _____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Agreement with the Obligee, dated the _____ day of _____, to _____ which Agreement is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, its heirs, executors, administrators, successors, or assigns, or subcontractor, shall fail to pay any person or persons named in Civil Code Section 9100; or fail to pay for any materials, provisions, or other supplies, used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Code, with respect to work or labor thereon of any kind; or shall fail to deduct, withhold, and pay over to the Employment Development Department, any amounts required to be deducted, withheld, and paid over by Unemployment Insurance Code Section 13020 with respect to work and labor thereon of any kind, then said Surety will pay for the same, in an amount not exceeding the amount herein above set forth, and in the event suit is brought upon this bond, also will pay such reasonable attorneys' fees as shall be fixed by the court, awarded and taxed as provided in California Civil Code Section 9550 et. seq.

This bond shall inure to the benefit of any person named in California Civil Code Section 9100 giving such person or his/her assigns a right of action in any suit brought upon this bond.

It is further stipulated and agreed that the Surety of this bond shall not be exonerated or released from the obligation of the bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, or specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described; or pertaining or relating to the furnishing of labor, materials, or equipment therefor; nor by any change or modification of any terms of payment or extension of time for payment pertaining or relating to any scheme or work of improvement herein above described; nor by any rescission or attempted rescission of the contract, agreement or bond; nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond; nor by any fraud practiced by any person other than the claimant seeking to recover on the bond; and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given; and under no circumstances shall the Surety be released from liability to those for whose benefit such bond has been given, by reason of any

breach of contract between the Obligee and the Principal or on the part of any obligee named in such bond; that the sole condition of recovery shall be that the claimant is a person described in California Civil Code Section 9100, and who has not been paid the full amount of his or her claim; and that the Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

Witness our hands this _____ day of _____

Principal Seal

By

Surety Seal

By

Agency of Record

Agency Address

Note: Bond surety must be admitted to transact surety insurance in the State of California.

End of Section 00503

SECTION 00504 - CERTIFICATION CONCERNING WORKER'S COMPENSATION

STATE OF CALIFORNIA)
) SS.
 COUNTY OF TULARE)

The undersigned is aware of the provisions of Section 3700 of the Labor Code of the State of California which require every employer to be insured against liability of worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and the undersigned will comply with such provisions, and will require all subcontractors to comply with such provisions, before commencing the performance of the work of this Contract.

Date

Contractor's Signature

END OF SECTION 00504

County Counsel Approved as to Form 2.1.2024

SECTION 00506 - AGREEMENT BETWEEN COUNTY AND CONTRACTOR

AGREEMENT

BETWEEN

COUNTY AND CONTRACTOR

AGREEMENT

Made as of the _____ day of _____ in the year of Two Thousand and Twenty-Four.

BETWEEN the County: **COUNTY OF TULARE, a political subdivision of the STATE OF CALIFORNIA** (hereinafter referred to as "County")

and the Contractor: (hereinafter referred to as "Contractor")

The Project: County of Tulare - **Sheriff Morgue at 1185 South O Street, Tulare, CA 93274**

The County's Representative: Andres Enciso – Capital Projects - County of Tulare

The Project Consultant: Chas Rhoads – Chas Rhoads Architecture

The County and the Contractor agree as set forth below.

ARTICLE 1

THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, the General Conditions and those documents enumerated in Sub-paragraph 1.1.1 of the General Conditions, which documents are hereby incorporated into this Agreement and made a part hereof.

ARTICLE 2

THE WORK

The Contractor shall perform all the Work required by the Contract Documents for the **County of Tulare Sheriff Morgue at 1185 South O Street, Tulare, CA 93274** hereinafter referred to as the "Work".

ARTICLE 3

TIME OF COMMENCEMENT AND COMPLETION

The Work to be performed under this Contract shall be commenced within Ten (10) calendar days after the date the Notice to Proceed is received by the Contractor and, subject to authorized adjustments, Completion of the Work shall be achieved for The Project within **540** calendar days from the date established in the Notice to Proceed. The Agreement includes provisions for

Liquidated Damages if the Project is not completed within the agreed time of completion. If Contractor fails to complete the Work within the Contract Time, Contractor shall pay to County, as liquidated damages and not as a penalty, the sum of five hundred dollars (\$500.00) for each day after the expiration of the Contract Time that the Work remains incomplete. County and Contractor agree that if the Work is not completed within the Contract Time, County's damages would be extremely difficult or impracticable to determine and that the aforesaid amounts are reasonable estimates of and reasonable sums for such damages. County may deduct any liquidated damages due to County from Contractor from any amounts otherwise due to Contractor under the Contract Documents. This provision shall not limit any right or remedy of County in the event of any other default of Contractor other than failing to complete the Work within the Contract Time.

ARTICLE 4

CONTRACT SUM

The County shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order or as otherwise provided in the Contract Documents, the Sum of (write out number as well) \$ _____.

ARTICLE 5

PROGRESS PAYMENTS

Based upon Applications for Payment submitted to the County by the Contractor and Project Certificates for Payment issued by the County's Representative, the County shall make progress payments on account of the Contract Sum to the Contractor as provided in the Contract Documents as follows:

Progress Payments: The Contractor shall, on or before the first day of each month, make an estimate of the work performed during the preceding month and submit same to the County's Representative for checking and approval. On or about the twentieth (20th) day of the month, following the month in which the work was performed, the County shall pay to the Contractor ninety-five (95%) percent of the value of said work in place, as checked and approved by the County's Representative. The balance of five (5%) percent of the estimate shall be retained by the County until the time of final acceptance of said work.

ARTICLE 6

FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be paid by the County to the Contractor when the Work has been completed; the Contract fully performed, the County's Representative has issued a Project Certificate for Payment, which approves the final payment due the Contractor and the Board of Supervisors of Tulare County has formally accepted the project as complete by Resolution.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 Terms used in this Agreement, which are defined in the "GENERAL CONDITIONS" of the contract shall have the meanings designated in those Conditions.

7.2 Notices shall be addressed as follows:

COUNTY

CONTRACTOR

BOARD OF SUPERVISORS

County of Tulare
Administration Building
2800 W. Burrel Avenue
Visalia, CA 93291
(559) 636-5000

COUNTY'S REPRESENTATIVE

Andres Enciso
County of Tulare
General Services Agency
Capital Projects Division
2637 W. Burrel Avenue Suite 200
Visalia, CA 93291
(559) 205-1137

SURETY

7.3 **PREVAILING WAGES.** The Contractor agrees that State Prevailing Wages apply to this Project, and that the Contractor will pay the rates for each trade or craft and shall require the subcontractors on the project to pay the rates for each trade and craft. The State Wage Determinations are on file with the Tulare County General Services Agency, 2637 W. Burrel Avenue, Suite 200, Visalia, California, and will be made available to any interested person on request; and the Payroll Submittal Information attached hereto as Section 00508 are incorporated herein as if set forth in full and are a part of this Contract. The Contractor agrees to repay the County any and all amounts paid to any subcontractor in violation of Public Contract Code Section 6109.

7.4 **COMPLIANCE WITH LAW:** Contractor shall provide services in accordance with applicable Federal, State, and local laws, regulations and directives. With respect to Contractor's employees, Contractor shall comply with all laws and regulations pertaining to wages and hours, state and federal income tax, unemployment insurance, Social Security, disability insurance, workers' compensation insurance, and discrimination in employment.

7.5 **RECORDS AND AUDIT:** Contractor shall maintain complete and accurate records with respect to the services rendered and the costs incurred under this Agreement. In addition, Contractor shall maintain complete and accurate records with respect to any payments to employees or subcontractors. All such records shall be prepared in accordance with generally accepted accounting procedures, shall be clearly identified, and shall be kept readily accessible. Upon request, Contractor shall make such records available within Tulare County to the Auditor of Tulare County and to his agents and representatives, for the purpose of auditing and/or copying such records for a period of five (5) years from the date of final payment under this Agreement.

7.6 **INDEPENDENT CONTRACTOR STATUS:**

a. This Agreement is entered into by both parties with the express understanding that Contractor will perform all services required under this Agreement as an independent contractor. Nothing in this Agreement shall be construed to constitute the Contractor or any of its agents, employees or officers as an agent, employee or officer of County.

b. Contractor agrees to advise everyone it assigns or hires to perform any duty under this agreement that they are not employees of County. Subject to any performance criteria contained in this Agreement, Contractor shall be solely responsible for determining the means and methods of performing the specified services and County shall have no right to control or exercise any supervision over Contractor as to how the services will be performed. As Contractor is not County's employee, Contractor is responsible for paying all required state and federal taxes. In particular, County will not:

- i. Withhold FICA (Social Security) from Contractor's payments.
- ii. Make state or federal unemployment insurance contributions on Contractor's behalf.
- iii. Withhold state or federal income tax from payments to Contractor.
- iv. Make disability insurance contributions on behalf of Contractor.
- v. Obtain unemployment compensation insurance on behalf of Contractor.

c. Notwithstanding this independent contractor relationship, County shall have the right to monitor and evaluate the performance of Contractor to assure compliance with this Agreement.

7.7 **INDEMNIFICATION AND DEFENSE:** Contractor shall hold harmless, defend and indemnify County, its agents, officers and employees in accordance with paragraph 4.17 of the General Conditions. This indemnification specifically includes any claims that may be made against County by any taxing authority asserting that an employer-employee relationship exists by reason of this Agreement, and any claims made against County alleging civil rights violations by Contractor under Government Code sections 12920 et seq. (California Fair Employment and Housing Act), and any fines or penalties imposed on County for Contractor's failure to provide form DE-542, when applicable. This indemnification obligation shall continue beyond the term of this Agreement as to any acts or omissions occurring under this Agreement or any extension of this Agreement.

The absence of insurance or insufficient insurance limits will not eliminate the obligation to indemnify and defend hereunder.

7.8 **CONFLICT OF INTEREST:**

a. Contractor agrees at all times in performance of this Agreement to comply with the law of the State of California regarding conflicts of interests or appearance of conflicts of interests, including, but not limited to Government Code Section 1090 et seq., and the Political Reform Act, Government Code Section 81000 et seq. and regulations promulgated pursuant thereto by the California Fair Political Practices Commission. The statutes, regulations and laws previously referenced include, but are not limited to, prohibitions against any public officer or employee, including Contractor for this purpose, from the making of any decision on behalf of County in which such officer, employee or

consultant has a direct or indirect financial interest. A violation can occur if the public officer, employee or consultant participates in or influences any County decision which has the potential to confer any pecuniary benefit on Contractor or any business firm in which Contractor has an interest, with certain narrow exceptions.

b. Contractor agrees that if any facts come to its attention which raise any questions as to the applicability of conflicts of interests' laws, it will immediately inform the County's designated representative and provide all information needed for resolution of this question.

- 7.9 **ENTIRE AGREEMENT REPRESENTED:** This Agreement represents the entire Agreement between Contractor and County as to its subject matter and no prior oral or written understanding shall be of any force or effect. No part of this Agreement may be modified without the written consent of both parties.
- 7.10 **HEADINGS:** Section headings are provided for organizational purposes only and do not in any manner affect the scope, meaning or intent of the provisions under the headings.
- 7.11 **CONSTRUCTION:** This Agreement reflects the contributions of both parties and accordingly the provisions of Civil Code section 1654 shall not apply to address and interpret any uncertainty.
- 7.12 **NO THIRD PARTY BENEFICIARIES INTENDED:** Unless specifically set forth, the parties to this Agreement do not intend to provide any other party with any benefit or enforceable legal or equitable right or remedy.
- 7.13 **GOVERNING LAW:** This Agreement shall be interpreted and governed under the laws of the State of California without reference to California conflicts of law principles. The parties agree that this contract is made in and shall be performed in Tulare County California.
- 7.14 **WAIVERS:** The failure of either party to insist on strict compliance with any provision of this Agreement shall not be considered a waiver of any right to do so, whether for that breach or any subsequent breach. The acceptance by either party of either performance or payment shall not be considered to be a waiver of any preceding breach of the Agreement by the other party.
- 7.15 **EXHIBITS AND RECITALS:** The Recitals and the Exhibits to this Agreement are fully incorporated into and are integral parts of this Agreement.
- 7.16 **CONFLICT WITH LAWS OR REGULATIONS/SEVERABILITY:** This Agreement is subject to all applicable laws and regulations. If any provision of this Agreement is found by any court or other legal authority, or is agreed by the parties, to be in conflict with any code or regulation governing its subject, the conflicting provision shall be considered null and void. If the effect of nullifying any conflicting provision is such that a material benefit of the Agreement to either party is lost, the Agreement may be terminated at the option of the affected party. In all other cases the remainder of the Agreement shall continue in full force and effect.
- 7.17 **FURTHER ASSURANCES:** Each party will execute any additional documents and perform any further acts which may be reasonably required to affect the purposes of this Agreement.

- 7.18 **ASSURANCES OF NON-DISCRIMINATION:** Contractor shall not discriminate in employment or in the provision of services on the basis of any characteristic or condition upon which discrimination is prohibited by state or federal law or regulation.
- 7.19 **ASSIGNMENT/SUBCONTRACTING:** Unless otherwise provided in this Agreement, County is relying on the personal skill, expertise, training and experience of Contractor and Contractor's employees and no part of this Agreement may be assigned or subcontracted by Contractor without the prior written consent of County.
- 7.20 **DISPUTES AND DISPUTE RESOLUTION:** The Parties shall continue to perform their responsibilities under this Agreement during any dispute arising out of or relating to this Agreement or the breach thereof. If such a dispute arises between the Parties and if said dispute cannot be settled through negotiation, then the Parties agree first to try in good faith to settle the dispute by nonbinding mediation before resorting to litigation or some other dispute resolution procedure, unless the Parties mutually agree otherwise. The mediator shall be an attorney licensed in the State of California or a retired Judge, Magistrate or Justice mutually selected by the Parties, but in case of disagreement, the mediator shall be selected by lot from among two nominations provided by each Party. All costs and fees required by the mediator shall be split equally by the Parties; additionally, each Party shall bear its own costs of mediation. The mediation shall be held at a mutually agreeable location within Tulare County, California. Mediation shall be conducted consistent with California Evidence Code Section 1115-1128. The Mediator shall owe a professional duty to both Parties and shall be barred from testifying in any litigation concerning any information obtained or disclosed in the course of the mediation. The Parties agree that the mediation, including proceedings or discussions concerning the mediation, is to be considered a confidential settlement negotiation for the purpose of all state and federal rules protecting disclosures made during such conferences from later discovery or use in evidence. All conduct, statements, promises, offers, views and opinions, oral or written, made during the mediation by any Party or a Party's agent, employee, or attorney shall be deemed to be confidential and shall not be subject to discovery or admissible for any purpose, including impeachment, in any litigation or other proceeding, including and non-binding arbitration, involving the Parties; provided, however, that evidence otherwise subject to discovery or admissible is not excluded from discovery or admission into evidence simply as a result of it having been used in connection with the mediation. If mediation fails to resolve the dispute within thirty (30) days, or such other timeframe as the Parties may agree, then either Party may pursue litigation to resolve the dispute. The provisions of section 7.8 of the General Conditions shall apply to the resolution of disputes under this Agreement.
- 7.21 **UNEMPLOYMENT INSURANCE COMPLIANCE:** Contractor acknowledges that this Agreement is subject to filing obligations pursuant to Unemployment Insurance Code Section 1088.8. Accordingly, County has an obligation to file a report with the Employment Development Department, which report will include the Contractor's full name, social security number, address, the date this contract was executed, the total amount of the contract, the contract's expiration date or whether it is ongoing. Contractor agrees to cooperate with County to make such information available and to complete DE Form 542. Failure to provide the required information may, at County's option, prevent approval of this Agreement, or be grounds for termination by County.
- 7.22 **REDUCTION IN FUNDING:** Contractor expressly understands and agrees that County is dependent upon certain Federal and/or State and/or local funding to pay the services

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///
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This Agreement entered into as of the day and year first written above.

COUNTY

CONTRACTOR

LARRY MICARI, CHAIR, BOARD OF SUPERVISORS

Signature

Typed Name

Signature

Typed Name

COUNTY OF TULARE
Civic Center
Visalia, CA 93291

Address

ATTEST: Jason T. Britt
County Administrative Officer/Clerk of
The Board of Supervisors of the
County of Tulare

Pursuant to Corporations Code section 313, County policy requires that contracts with a Corporation be signed by both (1) the chairman of the Board of Directors, the president or any vice-president (or another officer having general, operational responsibilities), and (2) the secretary, any assistant secretary, the chief financial officer, or any assistant treasurer (or another officer having recordkeeping or financial responsibilities), unless the contract is accompanied by a certified copy of a resolution of the corporation's Board of Directors authorizing the execution of the contract. Similarly, pursuant to California Corporations Code section 17703.01, County policy requires that contracts with a Limited Liability Company be signed by at least two managers, unless the contract is accompanied by a certified copy of the articles of organization stating that the LLC is managed by only one manager.

BY: _____

APPROVED AS TO FORM

County Counsel Matter No. 2024380

END OF SECTION 00506

SECTION 00507 - STATE WAGE DETERMINATION

1.1 INSTRUCTIONS:

- 1.1.1 THE GENERAL CONTRACTOR IS REQUIRED TO POST ALL APPLICABLE STATE WAGE DETERMINATIONS/PREVAILING WAGE RATES ON THE JOB SITE FOR THE PROJECT IN A CONSPICUOUS LOCATION AVAILABLE TO EACH TRADE WORKING ON THE PROJECT.**

END OF SECTION 00507

County Counsel Approved as to Form 2.1.2024

SECTION 00508 - PAYROLL SUBMITTAL INFORMATION

1.1 INSTRUCTIONS FOR PAYROLL SUBMITTALS

1.1.1 The Contractor will submit payroll records to the California Department of Industrial Relations per their submittal requirements. The County of Tulare does not maintain Certified Payroll Records. Those requesting certified payroll records may obtain them from the Department of Industrial Relations via their website <https://www.dir.ca.gov/>.

END OF SECTION 00508

County Counsel Approved as to Form 2.1.2024

**CONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT
(Civil Code section 8132)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant: _____

Name of Customer: County of Tulare _____

Job Location: _____

Owner: County of Tulare _____

Through Date: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: County of Tulare _____

Amount of Check: \$ _____

Check Payable to: _____

Exceptions

This document does not affect any of the following:

- (1) Retentions.
- (2) Extras for which the claimant has not received payment.
- (3) The following progress payments for which the claimant has previously given a conditional waiver and release but has not received payment:

Date(s) of waiver and release: _____

Amount(s) of unpaid progress payment(s): \$ _____

- (4) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

UNCONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT
(Civil Code section 8134)

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant: _____

Name of Customer: County of Tulare _____

Job Location: _____

Owner: County of Tulare _____

Through Date: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment: \$ _____

Exceptions

This document does not affect any of the following:

- (1) Retentions.
- (2) Extras for which the claimant has not received payment.
- (3) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

CONDITIONAL WAIVER AND RELEASE UPON FINAL PAYMENT
(Civil Code section 8136)

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant: _____

Name of Customer: County of Tulare _____

Job Location: _____

Owner: County of Tulare _____

Through Date: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: County of Tulare _____

Amount of Check: \$ _____

Check Payable to: _____

Exceptions

This document does not affect any of the following:

Disputed claims for extras in the amount of: \$ _____

Signature

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**UNCONDITIONAL WAIVER AND RELEASE UPON FINAL PAYMENT
(Civil Code section 8138)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant: _____

Name of Customer: County of Tulare _____

Job Location: _____

Owner: County of Tulare _____

Through Date: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect any of the following:

Disputed claims for extras in the amount of: \$ _____

Signature

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

END OF SECTION 00509

County Counsel Approved as to Form 2.1.2024

SECTION 00700 - GENERAL CONDITIONS

TABLE OF ARTICLES

1. CONTRACT DOCUMENTS
2. ADMINISTRATION OF THE CONTRACT
3. COUNTY
4. CONTRACTOR
5. SUBCONTRACTORS
6. WORK BY COUNTY OR BY SEPARATE CONTRACTORS
7. MISCELLANEOUS PROVISIONS
8. TIME
9. PAYMENTS AND COMPLETION
10. PROTECTION OF PERSONS AND PROPERTY
11. INSURANCE
12. CHANGES IN THE WORK
13. UNCOVERING AND CORRECTION OF WORK
14. TERMINATION OF THE CONTRACT
15. ADDITIONAL INSTRUCTIONS
16. GUARANTEE

ARTICLE 1
CONTRACT DOCUMENTS

1.1 DEFINITIONS

Whenever the following terms, titles, or phrases are used in the Contract Documents, then the intent and meaning thereof shall be as defined in this article.

Addendum/Addenda.

"Addendum" or "Addenda" are written documents furnished by the County before award of the Contract, interpreting or modifying plans and specifications or answering questions of intended bidders, and shall be incorporated in and are a part of the Contract Documents.

Alternate.

The "Alternate" is the sum to be added to or deducted from the Base Bid if the change in scope of work as described in Alternates is accepted by the County.

ASTM.

"ASTM" shall mean the organization known as "ASTM International," formerly known as the American Society for Testing and Materials.

Bid.

"Bid" shall mean the offer of the bidder to do the Work, when submitted on the prescribed bid form, properly executed and bonded, at the designated time and location.

Change Order.

"Change Order" shall mean a written order to the Contractor, issued after execution of the Contract, authorizing a change in the Work and/or an adjustment in the Contract Sum and/or the Contract Time.

Closeout Documents.

"Closeout Documents" shall mean those Documents as required to meet the requirements of final completion.

Contract.

"Contract" shall mean the legally binding agreement between the County and the Contractor wherein the Contractor agrees to furnish the labor, materials, equipment, plant, and appurtenances required to perform the work described in the Contract Documents and the County agrees to pay the Contractor for such work.

Construction Manager.

"Construction Manager" shall mean the firm or County employee engaged by the County as an agent to perform all functions delegated to the Construction Manager by the Contract Documents. The Construction Manager will be the Contractor's primary contact during construction of the Project.

Construction Schedule.

The "Construction Schedule" is the schedule produced by the Contractor in response to the requirements shown in the Preliminary Bid Schedule.

Construction Administrative Procedures Manual.

The "Construction Administrative Procedures Manual" is the manual produced by the Construction Manager to describe the administrative procedures which will be used on the Site during construction. This manual outlines administrative procedures which are described in detail in these General Conditions, as well as describing other administrative procedures which may be specific to the Project.

Contract Documents.

The "Contract Documents" shall include the Advertisement for Bids, the Instructions for Bidders, the Bid Form, the Agreement between County and Contractor, the Bid Bond, the Performance Bond, the Payment Bond, these General Conditions, the Special Provisions, the General Requirements, Exhibits, the Technical Specifications, the contract drawings and plans, all duly issued Addenda, Modifications, Interpretations, and Change Orders, Supplemental Drawings, the Contractor's Guarantee and Bond, the Construction Administrative Procedures Manual, the Subcontractor Listing, Preliminary Construction Schedule and the Construction Schedule in its most recently updated and accepted version. A modification is a written amendment to the Agreement signed by both parties.

Contract Drawings or Plans.

The "Contract Drawings" (sometimes referred to as "drawings" or "plans") are the plans and working drawings which show the location, character, dimensions, and details of the Work to be performed, and all supplemental drawings issued by the County. Once approved, all such supplemental drawings are incorporated into and become a part of the Contract Documents.

Contract Sum.

"Contract Sum" is the total amount payable by the County to the Contractor for the performance of the Work under the Contract Documents. The Contract Sum is the amount stated in the Agreement for Construction, including authorized adjustments thereto.

Contract Time.

"Contract Time" shall mean the period specified for completion of the Work, as set forth in the Agreement for Construction and adjusted by any change order issued pursuant to the Contract Documents.

Contractor

"The Contractor" shall mean the person or persons, partnership, or corporation, who have entered into the Agreement with the County or its legal representatives, or successors, assigns, executors, or heirs. The Contractor is required by law to be licensed as and will perform work or render services as a prime contractor.

Date of Commencement.

"Date of Commencement" is the date established in the Notice to Proceed. If there is no Notice to Proceed, then it shall be the date of the Agreement between County and Contractor or such other date as may be established therein.

Date of Completion.

The "Date of Completion" is the date certified by the Construction Manager when construction of the Work is 100% complete, including acceptance by the Project Consultant of all punch list corrections.

Day.

Unless otherwise expressly defined, a "day" shall mean a calendar day of twenty-four (24) hours, including each and every day of the year.

Delegated-design Submittals.

"Delegated-design Submittals" shall mean drawings, diagrams, schedules, and analysis data specially prepared for certain elements of the Work the design of which has been delegated to the Contractor by the Specifications. Such design and the consequent submittals shall be by licensed design professionals under contract to the Contractor or a Subcontractor. The submittals are intended to demonstrate that the Work element as designed complies with applicable performance requirements and design criteria.

Equal (as in "or equal").

"Equal" shall mean a system, product or material which is similar in all respects to that shown or specified but produced by a manufacturer not listed in the specification. See also: Substitution.

Equipment.

"Equipment" shall mean all pre-manufactured or partially preassembled products or components, assembled, or partially assembled before delivery to the Site.

First Line Supervision.

"First Line Supervision" shall mean a working foreman or lead craft worker other than the Project Superintendent.

Inspector.

The "Inspector" shall mean the person or persons employed or engaged as an independent contractor(s) by the County to inspect the performance of the Work by the Contractor for compliance with the Contract Documents. The County Inspector is hereby designated as an agent of the County for such purpose and no other. The County Inspector is supervised by, and reports to, the County. The authority of the County Inspector to monitor the Work shall be strictly limited to that authority specified herein and in Title 24, California Code of Regulations, and no additional authority has been granted nor shall be inferred. The Project Consultant may be designated as the County Inspector, in which case the Project Consultant shall perform the function and have the authority of both positions.

Interpretations.

"Interpretations" are all clarifications, additional instructions, and explanations issued by the Project Consultant after award of the Contract.

Materials.

"Materials" is a generic term which shall include all building materials, articles, supplies, and equipment delivered to the Project for incorporation in the Work. "Materials" includes everything incorporated into the Work except labor, unless otherwise noted.

Milestone Completion Date.

The "Milestone Completion Date" is the date certified by the Construction Manager when construction of the Work of any phase is one hundred percent (100%) complete including acceptance by the Project Consultant of all punch list corrections.

Modification.

A "Modification" is a written amendment to the Agreement between the County and Contractor signed by both Parties.

Notice of Intent to Award.

The "Notice of Intent to Award" is issued following County approval of bids. It authorizes the Contractor to obtain required bonds and insurance and to procure all materials and equipment necessary to fulfill its contract within the time shown in the schedule.

Notice to Proceed.

"Notice to Proceed" is the notice given to the Contractor following execution of the Agreement for Construction and receipt of all required preconstruction submittals as itemized in the Notice of Intent to Award, which establishes the start of the Work and authorizes the Contractor to begin construction.

Owner.

"Owner" shall mean the County of Tulare, a political subdivision of the State of California.

Owner's Representative.

"Owner's Representative" shall mean Capital Projects Coordinator Andres Enciso, or such other person or entity as may be so designated by the Owner from time-to-time. The Owner shall provide written notice to the Contractor of any change in the designation or identity of the Owner's Representative.

Product Data.

"Product Data" shall mean illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.

Project.

"Project" shall mean the complete work of improvement referenced in the Contract Documents, of which the Work may be only a portion.

Project Consultant

The "Project Consultant" is the consulting firm engaged as an agent by the County to perform the services set forth in the Contract Documents. The Project Consultant is designated by the Board of Supervisors as the County's agent to perform all functions delegated to the Project Consultant by the Contract Documents.

Project Consultant's Instruction Bulletin

"Project Consultant's Instruction Bulletins" are supplemental drawings or instructions which may be issued as necessary from time to time to make clear or define in greater detail the intent of the Contract Drawings and Specifications. There may be a change in Contract Sum or Contract Time involved with the work shown in the Bulletin.

Project Manual.

"Project Manual" is the Introductory Information (Division 0), the General Requirements (Division 1) and the Project Specifications.

Proposed Change Order (PCO).

A "Proposed Change Order (PCO)" is the name given to a document issued by the Construction Manager authorizing work to proceed on a change in anticipation of approval and issuance by the County of a Change Order.

Provide.

"Provide" shall mean to furnish, install, and connect complete and ready for use.

Reference to Codes.

Unless otherwise noted, all references to statutes are to the laws of the State of California as codified in the various specified codes.

Request for Proposal (RFP).

A "Request for Proposal (RFP)" is the name given to a document issued by the Construction Manager requesting pricing information for a described scope of work.

Samples.

"Samples" shall mean physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

Shop Drawings.

"Shop Drawings" shall mean drawings, diagrams, schedules, and other data specifically prepared by the Contractor or any subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

Site.

"Site" is the area within which the Project is to be constructed.

Special Inspector.

The "Special Inspector" shall mean the person or persons employed or engaged as (an) independent contractor(s) by the County to inspect the performance of specific aspects of the work as required by Title 24, California Code of Regulations.

Special Provisions.

The "Special Provisions" are specific clauses setting forth conditions or requirements peculiar to the Work, and supplementary to the General Conditions and Technical Specifications.

Specifications.

"Specifications" include the special provisions, general conditions, general requirements, and technical specifications applicable to the Work, all duly executed and issued addenda and interpretations, and all modifications approved by the County pursuant to a change order.

Subcontractor.

"Subcontractor" shall mean each person or firm who is required by law to be and who is licensed to and will perform work, labor, or render services to the Contractor in or about the construction of the Work, or who, under subcontract to the Contractor, fabricates and installs a portion of the work or improvement.

"Subcontractor" shall include all persons or firms within the authority of the Subletting and Subcontracting Fair Practices Act, Chapter 2 of Division 5, Title I of the Public Contract Code, commencing with Section 4100.

Substitution.

"Substitution" shall mean a system, process, product, or material similar in form or function and equal in quality and performance to that shown or specified, but differing in some essential element, e.g., chemical composition, mechanism of action, surface finish, dimensions, durability, electrical or mechanical or plumbing requirements. See also: Equal.

Supply.

"Supply" shall mean to furnish only, complete, and ready for installation, including shipping, delivery, protection, and any assembly required prior to installation.

Work.

The "Work" shall mean that scope of work included in this Contract, including those elements of the work for which design has been delegated under the Specifications to the Contractor and its own licensed design professionals.

1.1.1 THE CONTRACT DOCUMENTS

The "Contract Documents" shall include the Advertisement for Bids, the Instructions to Bidders, the Bid Form, the Agreement between the County and Contractor, the Bid Bond, the Performance Bond, the Payment Bond, these General Conditions, the Special Provisions, the General Requirements, Exhibits, the Technical Specifications, the contract drawings and plans, all duly issued Addenda, Modifications, Interpretations, and Change Orders, Supplemental Drawings, the Contractor's Guarantee and Bond, the Construction Administrative Procedures Manual, the Subcontractor Listing, Preliminary Construction Schedule and the Construction Schedule in its most recently updated and accepted version.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified

only by a Modification as defined in Subparagraph 1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Construction Manager and the Contractor, but the Construction Manager shall be entitled to performance of the obligations of the Contractor intended for their benefit and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the County, the Construction Manager and any Subcontractor or Sub-subcontractor.

1.1.3 THE WORK

The Work comprises the completed construction required of the Contractor by the Contract Documents, and includes all labor, materials, equipment, and services necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction for the County of Tulare – **Sheriff Morgue at 1185 South O Street, Tulare, CA 93274** including those elements of the work for which design has been delegated under the Specifications to the Contractor and its own licensed design professionals.

1.1.4 THE PROJECT

The Project, as defined in the County-Contractor Agreement, is the total construction of which the Work performed under the Contract Documents is a part.

1.2 EXECUTION, CORRELATION, AND INTENT

1.2.0 Award of Contract – The County reserves the right to reject any or all bids or waive any discrepancy in a bid. The decision of the County regarding the amount of a bid, or existence or treatment of a discrepancy in a bid will be final. The award of a contract, if it is awarded, will be to the lowest responsible bidder whose bid complies with all the requirements prescribed. Such award, if made, will be made within sixty (60) days after the opening of bids. This period may be subject to an extension for such further period as may be agreed upon in writing by County and the bidder concerned. The following failures are not waivable and will cause the bid to be considered nonresponsive:

- a. Failure to sign the bid
- b. Failure to furnish the required bid bond on the provided County form, or a cashiers check in an amount equal to 10% of the base bid
- c. Failure to include a total amount of the bid
- d. Failure to attend the mandatory pre-bid conference and/or sign the pre-bid conference attendance roster if the pre-bid conference is advertised as mandatory
- e. Failure to submit a completed addenda certification statement

The above list is not inclusive of all failures that the Tulare County Board of Supervisors will consider nonresponsive. However, the Tulare County Board of Supervisors reserves the right to waive other types of discrepancies or failures. The Tulare County Board of Supervisor's decision or treatment regarding a bid will be final.

The Contract shall be signed by the successful bidder and returned within seven (7) calendar days, not including Tulare County legal holidays, after the bidder has received notice that the Contract has been awarded.

The Contractor shall file with the signed contract two (2) bonds. These bonds shall be in the amount and for the purposes specified below. They shall be surety bonds and shall be issued by corporations duly and legally licensed to transact business in the State of California. They shall be

maintained by the Contractor, at its expense, during the entire term of the Contract.

A Performance Bond shall be furnished in the amount of one hundred percent (100%) of the Contract Sum and shall guarantee faithful performance of the Contract and shall insure the County during the life of the Contract and for the term of three (3) years from the date of acceptance of the work against faulty or improper materials or workmanship that may be discovered during that time.

A Payment Bond shall be furnished in an amount not less than one hundred percent (100%) of the Contract Sum and shall guarantee the payment in full of all claims for labor and material in accordance with the provisions of Section 9550-9566 of the Civil Code of the State of California. The life of the Payment Bond shall extend to thirty (30) days after notice of completion is recorded.

All bonds required, whether Bid Bonds, Performance, Payment, or other Bonds, shall be issued by an admitted surety insurer. The Bid Bond, Performance Bond and Payment Bond must be issued by the same admitted surety insurer. The Payment and Performance Bonds required by these specifications will neither be accepted nor approved by the County unless bonds are in the forms shown in Sections 502 and 503 of the specifications and are underwritten by an admitted surety. The County further reserves the right to satisfy itself as to the acceptability of the surety and the form of bond. The Bidder may be required to submit the following documents:

1. The original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws, or other instrument authorizing the person who executed the bond to do so.
2. A certified copy of the certificate of authority of the insurer issued by the California Insurance Commissioner.
3. A certificate from the County Clerk that the certificate of authority has not been surrendered, revoked, canceled, annulled, or suspended, or in the event that it has, that renewed authority has been granted.
4. A financial statement of the assets and liabilities of the insurer to the end of the quarter calendar year prior to thirty (30) days next preceding the date of the execution of the bond, in the form of an officers' next preceding the date of the execution of the bond, in the form of an officers' certificate as defined in Corporations Code 173.

- 1.2.1 The Contract Documents shall be signed in not less than three (3) original copies by the County and the Contractor.
- 1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the Site, become familiar with the local conditions under which the Work is to be performed, and has correlated personal observations with the requirements of the Contract Documents.
- 1.2.3 Subject to Article 12, the Contract Documents, including the specifications and plans and drawings, are complementary and what is called for by anyone shall be as binding as if called for by all. In case of conflict, large scale (detail) drawings shall govern over small-scale drawings, the specifications shall govern over both the construction administrative procedures manual and the Contract Drawings except as noted below, special provisions shall govern over both the contract drawings and the general conditions, and subsequent addenda, interpretations, or change orders shall govern over the original documents, unless a different order of precedence is noted elsewhere in conjunction with a specific portion of the documents.
- 1.2.4 Subject to Article 15.10.1, in cases of discrepancy concerning dimension, quantity and location,

the Specifications shall take precedence over the Drawings. Explanatory notes on the Drawings shall take precedence over conflicting drawn indications. Large Scale details shall take precedence over smaller scale details and figured dimensions shall take precedence over scaled measurement. Where figures are not shown, scale measurements shall be followed but shall in all cases be verified by measuring actual conditions of Work already in place. In cases of discrepancy concerning quality and application of materials and non-technical requirements over materials, the specifications shall take precedence over Drawings. In the case of discrepancy between the General Conditions and the General Requirements, the General Requirements shall take precedence.

- 1.2.5 Where on any Drawing a portion of the Work is drawn out and the remainder is indicated in outline, the drawn-out parts shall apply to all other like portions of the Work. Where ornament or other detail is indicated as starting, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to other similar parts in the Work, unless otherwise indicated.
- 1.2.6 Scale drawings, full-size details, and specifications are intended to be fully coordinated and to agree. Where not specifically stated otherwise, all work and materials necessary for each unit of construction, even though only briefly mentioned or indicated, shall be furnished, and installed fully and completely, including, but not limited to, the manufacturer's instructions and/or recommendations, as part of this Contract.
- 1.2.7 Any material specified by reference to the number, symbol, or title of a specified standard such as a Commercial Standard, a Federal Specification, a trade association standard, or other similar standards, shall comply with the requirements in the latest approved revision thereof and any amendments or supplements thereto in effect on the date of Advertisement for Bids, except as limited to type, class, or grade, or modified in such reference. The standards referred to, except as modified in the Specifications, shall have full force and effect as though printed in these Specifications.
- 1.2.8 Diagrammatic Drawings: Drawings showing the locations of equipment, wiring, piping, etc., unless dimensioned, are diagrammatic, and conditions will not always permit their installation in the exact location shown. In such event, the Contractor shall notify the Construction Manager and obtain an interpretation before proceeding with the work in question. Unless Site conditions are significantly different than could have been reasonably anticipated, installation as specified in the interpretation shall be without any additional compensation to the Contractor.
- 1.2.9 Project Consultant's Instruction Bulletins and Drawings: In addition to the Drawings incorporated in the Contract Documents, the Project Consultant, through the Construction Manager, may furnish such supplemental drawings or instructions from time to time as may be necessary to make clear or to define in greater detail the intent of the Contract Drawings and Specifications. In furnishing additional drawings or instructions, the Project Consultant shall have the authority to make minor changes in the Work, not involving any extra cost, and not inconsistent with the overall design of the Project. If extra cost is known to be involved, then these instructions will be accompanied by a PCO/RFP. These supplemental drawings and instructions shall be signed and returned by the Contractor within five (5) days and shall become a part of the Contract Documents; the Contractor shall make its work conform to them.
- 1.2.10 If the Contractor observes any errors, discrepancies or omissions in the Contract Documents, then it shall promptly notify the Construction Manager requesting clarification. If the Contractor proceeds with work affected by such errors, discrepancies, or omissions, without having received such clarification, then it does so at its own risk. Any adjustments involving such circumstances made by the Contractor, prior to approval by the Construction Manager, shall be at the Contractor's risk and the settlement of any complications or disputes arising there from shall be at

the Contractor's sole expense and Contractor shall indemnify, hold harmless and defend County, and Construction Manager from any liability or loss with respect to said adjustments.

- 1.2.11 When the Contractor does not agree that work due to an interpretation or supplemental drawing or instruction is within the scope of the Contract Documents, the Contractor shall nevertheless perform such work without delay as directed in writing by the Construction Manager. Within seven (7) days after receipt of the interpretation or instruction, the Contractor shall submit a change order request to the Construction Manager specifying in detail in what particulars the Contract requirements were exceeded and the change in cost resulting there from. The Construction Manager shall then determine whether a Change Order shall be issued in accordance with Article 12 of these General Conditions.
- 1.2.12 The time during which a disagreement between the Contractor and Construction Manager is pending shall not affect the Contract Time. Contract time extensions shall be based solely on extra time required for work performed.
- 1.2.13 All work and material shall be the best of the respective kinds specified or indicated. Should any workmanship or materials be required, which are not directly or indirectly called for in the Specifications and/or shown on the Drawings, but which are necessary for proper fulfillment of the obvious intent thereof, then said workmanship or materials shall be the same for similar parts that are detailed, indicated or specified, and the Contractor shall understand the same to be implied and provide for it in its tender as if it were particularly described or delineated.

1.3 **OWNERSHIP AND USE OF DOCUMENTS**

- 1.3.1 All Drawings, Specifications and copies thereof furnished are and shall remain the property of the County. with the exception of one Contract set for each party to the Contract, such documents are to be returned by Contractor or suitably accounted for to the County on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Project Consultant's common law copyright or other reserved rights. The County's use of the documents will not increase the Project Consultant's design liability beyond the Project and the Site for which the design was originally intended.

ARTICLE 2 **ADMINISTRATION OF THE CONTRACT**

2.1 **THE PROJECT CONSULTANT**

- 2.1.1 The Project Consultant is the person lawfully licensed to practice architecture or design services, or an entity lawfully practicing architecture or design services, identified as such in the County-Contractor Agreement. The term Project Consultant means the Project Consultant or the Project Consultant's authorized representative.
- 2.1.2 The Project Consultant is the Project Consultant or firm engaged as an Independent Contractor by the County to design the Project, and all subconsultants or joint venturers of the Project Consultant. The authority of the Project Consultant to bind the County is limited to that authority specified in the Contract Documents, and no additional authority has been granted, nor shall be inferred.
- 2.1.3 The Project Consultant advises the Construction Manager in all aspects of the construction phase of the Project. Its functions include advice and assistance to the Construction Manager in the correct interpretation and application of the Contract Documents. However, the Construction Manager is the County's representative on the Project, not the Project Consultant.

- 2.1.4 The Contractor shall deliver all correspondence relating to the proper execution of the Work to the Construction Manager, with a copy delivered to the Project Consultant. The Construction Manager reserves the right to consult with the Project Consultant prior to responding to the Contractor's correspondence.
- 2.1.5 When discussions between the Contractor and the Construction Manager occur either on the Site or elsewhere, but the Project Consultant is not present, the Construction Manager reserves the right to consult with the Project Consultant prior to issuing his/her final decision or instructions.
- 2.1.6 The Project Consultant will review or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Delegated-Design Submittals, Product Data and Samples, but only for conformance with the design concept of the Work and the information given in the Contract Documents. Such action shall be taken within ten (10) working days so as to cause no delay. The Project Consultant's review of a specific item shall not indicate approval of an assembly of which the item is a component.

2.2 THE CONSTRUCTION MANAGER

- 2.2.1 The Construction Manager is the County's designated representative in all aspects of administering the construction Contract on behalf of the County. All communications from the Contractor will be channeled through the Construction Manager. **However, the Construction Manager does not have the authority to bind the County in matters affecting adjustments to the Contract Time or Contract Sum of the Project as defined in the Contract.**
- 2.2.2 The Construction Manager will be the County's representative during construction and until final payment to all contractors is due. The Construction Manager will advise and consult with the County. All instructions to the Contractor shall be forwarded through the Construction Manager. The Construction Manager will have authority to act on behalf of the County only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with Subparagraph 2.2.17.
- 2.2.3 The Construction Manager will determine in general that the Work of the Contractor is being performed in accordance with the Contract Documents and will endeavor to guard the County against defects and deficiencies in the Work of the Contractor.
- 2.2.4 The Construction Manager will be on-site for the duration of the construction process and will administer the Contract and observe and report on the progress of the Work. The Construction Manager will review the progress and quality of the Work and determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of on-site observations and communication with the Contractor, the Construction Manager will keep the County informed of the progress of the Work and will endeavor to guard the County against defects and deficiencies in the Work of the Contractor.
- 2.2.5 The Construction Manager shall at all times have access to the Work wherever it is, in preparation and progress. The Contractor shall provide facilities for such access so that the Construction Manager may perform their functions under the Contract Documents.
- 2.2.6 Based on the Construction Manger's observations, and an evaluation of the Contractor's Application for Payment, the Construction Manger will determine the amount owing to the Contractor and will issue to the County Certificates for Payment incorporating such amount, as provided in Paragraph 9.4.
- 2.2.7 The Construction Manager will be the initial interpreter of the requirements of the Contract Documents and the initial judge of the performance thereunder by the Contractor.

- 2.2.8 The Construction Manager will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with agreed upon time limits. Either party to the Contract may make written request to the Construction Manager for such interpretations.
- 2.2.9 Claims, disputes, and other matters in question between the Contractor and the Construction Manager relating to the execution or progress of the Work or the interpretation of the Contract Documents which cannot be resolved between the Contractor and the Construction Manager shall be referred to the County Administrative Officer of Tulare County or his/her designee for final resolution.
- 2.2.10 All interpretations and decisions of the Construction Manager shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in graphic form.
- 2.2.11 The County's decisions in matters relating to artistic effect will be final.
- 2.2.12 The Construction Manager will have the authority to reject or recommend to the County the rejection of work, materials, or workmanship which does not conform to the Contract Documents. Whenever, in the Construction Manager's opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, then the Construction Manager will have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.7.1 whether or not such Work be then fabricated, installed or completed.
- 2.2.13 The Construction Manager receives from the Contractor and reviews in conjunction with the Project Consultant all Shop Drawings, Delegated-Design Submittals, Product Data and Samples.
- 2.2.14 The Construction Manager will forward Contractor's submittals such as Shop Drawings, Delegated-Design Submittals, Product Data and Samples, to the Project Consultant for review and approval or for other appropriate action. The Project Consultant's action is only for conformance with the design concept of the Work and the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Project Consultant's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
- 2.2.15 Following consultation with the County, the Construction Manager will take appropriate action on Change Orders in accordance with Article 12 and will have authority to order minor changes in the Work as provided in Subparagraph 12.4.1.
- 2.2.16 The Construction Manager, in conjunction with the Project Consultant, will conduct inspections to determine the date of final completion, and will receive and forward to the County for the County's review written warranties and related documents required by the Contract and assembled by the Contractor. The Construction Manager will issue a final Project Certificate for Payment upon compliance with the requirements of Paragraph 9.8.
- 2.2.17 The duties, responsibilities, and limitations of authority of the Construction Manager as the County's representative during construction as set forth in the Contract Documents, will not be modified or extended without written consent of the County, and the Construction Manager, which consent shall not be unreasonably withheld.
- 2.2.18 In case of the termination of the employment of the Construction Manager, the County shall appoint a new Construction Manager, whose status under the Contract Documents shall be equal to that of the former Construction Manager, respectively.

ARTICLE 3
COUNTY

3.1 DEFINITION

3.1.1 The County is the person or entity identified as such in the County-Contractor Agreement. The term County means the County or the County's authorized representative for this Project.

3.2 INFORMATION AND SERVICES REQUIRED OF THE COUNTY

3.2.1 Except as provided in Subparagraph 4.7.1, the County shall secure and pay for necessary approvals, easements, assessments, and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

3.2.2 Information or services under the County's control shall be furnished by the County with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.3 The Contractor will not be furnished with any printed plans or specifications. It is the responsibility of the contractor to print plans and specifications for the Project.

3.2.4 The County shall forward all instructions to the Contractor through the Construction Manager.

3.2.5 The foregoing are in addition to other duties and responsibilities of the County enumerated herein and especially those in respect to Work By County or By Separate Contractors, Payments and Completion, and Insurance in Articles 6, 9 and 11, respectively.

3.3 COUNTY'S RIGHT TO STOP THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2, or persistently fails to carry out the Work in accordance with the Contract Documents, then the County, by a written order signed personally or by an agent specifically so empowered by the County in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the County to stop the Work shall not give rise to any duty on the part of the County to exercise this right for the benefit of any Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

3.4 COUNTY'S RIGHT TO CARRY OUT THE WORK

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within three (3) days after receipt of written notice from the County to correct such default or neglect with diligence and promptness, then the County may, after an additional written notice and without prejudice to any other remedy the County may have, make good such deficiencies and may further elect to complete that portion of the Work through such means as the County may select, including the use of a new contractor. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the additional services of the Construction Manager, Project Consultant or other Professionals made necessary by such default, neglect, or failure. Such action by the County and the amount charged to the Contractor are both subject to review by the Construction Manager. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, then the Contractor shall pay the difference to the County.

ARTICLE 4
CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or entity identified as such in the County-Contractor Agreement. The term Contractor means the Contractor or the Contractor's authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Construction Manager any error, inconsistency or omission that may be discovered. The Contractor shall not be liable to the County or the Construction Manager for any damage resulting from any such errors, inconsistencies, or omissions in the Contract Documents unless the Contractor recognized such error, inconsistencies or omissions and knowingly failed to report it to the Construction Manager. The Contractor shall perform no portion of the Work at any time unless authorized by the Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.2.2 Neither the County nor the Construction Manager nor Project Consultant assume any responsibility for an understanding or representation made by any of their agents or representatives prior to the execution of the Agreement unless (1) such understanding or representations are expressly stated in the Agreement, and (2) the Agreement expressly provides that responsibility therefore is assumed by the County.

4.2.3 Failure by the Contractor to acquaint itself with all available information will not relieve it from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

4.2.4 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 Construction Manager at once.

4.2.5 Before submitting any Request for Information (RFI), or other Contractor-initiated request for information the Contractor shall determine that the information requested is not clearly provided in the Contract Documents. RFI submittals shall be submitted to the Construction Manager only from the Contractor, or County, and not from any subcontractor, supplier, or other vendor, and shall be on a form approved by the Construction Manager and County. The Contractor shall provide a revised and updated RFI Priority Schedule on not less than a weekly basis. The RFI Priority Schedule shall rank RFIs in order of priority and include a brief statement of reason for priority. County-initiated RFIs will not be listed on the Contractor's RFI Priority Schedule. The County will provide the Construction Manager a separate list of County initiated RFIs upon request of the Construction Manager. The Construction Manager will endeavor to respect the order of priorities as requested by the Contractor or County for the overall benefit of the Project. The RFI process is for information and clarification only and may not be utilized to obtain approval for changes in the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, procedures, or safety procedures at the Site; and shall coordinate all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the County for the acts and omissions of the Contractor's

employees, Subcontractors and their agents and employees, and any other persons performing any of the Work under a contract with the Contractor.

- 4.3.3 The Contractor shall not be relieved from the Contractor's obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Construction Manager in their administration of the Contract, or by inspections, tests or approvals required or performed under Article 7 by persons other than the Contractor.
- 4.3.4 The County, Construction Manager, and Project Consultant will deal only with the Contractor, and not through subcontractors. The Contractor shall be responsible for the proper execution of the Work. Any and all discussions between any subcontractor and supplier and the County, Construction Manager or the Project Consultant shall be initiated through the Contractor or its representative.
- 4.3.5 The Contractor is to provide training to its employees as needed to ensure that proper safety procedures are followed when working with asbestos containing materials. All applicable OSHA standards are to be followed and the Contractor is responsible for proper handling and disposal of asbestos containing materials as a result of its work.

4.4 **LABOR AND MATERIALS**

- 4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, including those elements of the Work for which design has been delegated under the Specifications to the Contractor and its own licensed design professionals.
- 4.4.2 The Contractor shall at all times enforce strict discipline and good order among the Contractor's employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned them.
- 4.4.3 The Contractor shall deliver to the Construction Manager, prior to final acceptance of the Work as a whole, signed certificates from suppliers of materials and manufactured items stating that such items conform to the Contract Documents.
- 4.4.4 The Contractor, immediately upon Notice to Proceed (or where shop drawings, samples, delegated-design submittals, etc., are required, immediately upon receipt of approval thereof) shall place orders for all materials, work fabrication, and/or equipment to be employed by it in that portion of the Work contracted for. The Contractor shall keep all materials, work fabrications and/or equipment specified and shall advise the Construction Manager promptly, in writing, of all orders placed and of such materials, work fabrications and/or equipment which may not be available in a timely manner for the purposes of the Contract.
- 4.4.5 Workers whose work is unsatisfactory to the County or the Construction Manager or are considered by the County or Construction Manager to be careless, incompetent, unskilled or otherwise unfit shall be dismissed from work under the Contract upon written request to the Contractor from the County or the Construction Manager. Any costs associated with dismissal are the responsibility of the Contractor. Any termination of a subcontractor pursuant to this Section shall be in strict conformity with the requirements of the Subletting and Subcontracting Fair Practices Act, Part 1 of Division 2 of the Public Contract Code, commencing with Section 4100.
- 4.4.6 In the event that the Contractor furnishes a material, product, process, or article better than that specified in the Contract Documents, then the difference in cost of that material, product,

process, or article shall be borne by the Contractor.

- 4.4.7 Prior to the Notice to Proceed, Contractor shall submit a list of all subcontractors and material suppliers including company name, address, business, and emergency telephone numbers, and contact person.

4.5 **WARRANTY**

- 4.5.1 The Contractor warrants to the County that all materials and equipment furnished under this Contract will be new unless otherwise specified and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. The Contractor warrants to the County that to the best of the Contractor's knowledge, no installed materials or equipment contain asbestos. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Construction Manager, then the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Paragraph 13.2. Contractor shall guarantee all work required under the Agreement against faulty materials or poor workmanship during the construction period and for **one (1) year** after the date of completion and acceptance of the Work. The Contractor shall fulfill all warranty requests. Furthermore, the Contractor shall send a representative to review all warranty claims and the County shall not be required to sign any additional agreement, addendum, invoice, or document for a representative of Contractor to come to the Site and review warranty work. If a warranty request is determined to not fall within the warranty requirements, then the County will determine how and whom the County will have perform the repair, at its sole expense. The County shall not be required to provide additional funds to review any warranty request.

4.6 **TAXES**

- 4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are opened, whether or not yet effective.

4.7 **PERMITS, FEES, AND NOTICES**

- 4.7.1 Unless otherwise provided in the Contract Documents, the County shall secure and pay for the building permit and permanent utility connection fees. The Contractor shall secure and pay for temporary construction utilities, and all other permits, governmental fees, licenses, and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract, and which are legally required at the time bids are opened.
- 4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the performance of the Work.
- 4.7.3 If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, then the Contractor shall promptly notify the County in writing, and any necessary changes shall be accomplished by appropriate modification.
- 4.7.4 If the Contractor performs any Work contrary to any laws, ordinances, rules, and regulations, without notice to the Construction Manager, then the Contractor shall assume full responsibility therefore and shall bear all costs attributable thereto.
- 4.7.5 Any reference in the Project Manual text to codes, standard specifications, or manufacturer's instructions shall mean the latest printed edition of each in effect at the Contract date.

4.8 ALLOWANCES

- 4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Construction Manager may direct, but the Contractor will not be required to employ persons against whom the Contractor makes a reasonable objection.
- 4.8.2 Unless otherwise provided in the Contract Documents:
- .1 These allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance, delivered at the Site, and all applicable taxes;
 - .2 The Contractor's costs for unloading and handling on the Site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance; and
 - .3 Whenever the cost is more or less than the allowance, then the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the Site, labor, installation costs, overhead, profit and other expenses.

4.9 PROJECT SUPERINTENDENT

- 4.9.1 The Contractor shall employ a competent superintendent ("Project Superintendent") and necessary assistants who shall be in attendance at the Project Site during the progress of the Work. The Contractor shall provide résumés for all of the Contractor's supervisory employees to be assigned to the Project for County review, and the County may reject any supervisory employees not deemed to be qualified at the sole discretion of the County. The Project Superintendent shall represent the Contractor and all communications given to the Project Superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed upon written request in each case.
- 4.9.2 The Superintendent who begins the Project shall remain on the Project until the Project is completed, as long as that person is employed by the Contractor. The Superintendent shall not be replaced without the approval of the County.

If Contractor fails to provide a qualified full-time Project Superintendent on the Site on any given day when Work is being performed, then Contractor shall pay to County, as liquidated damages and not as a penalty, the sum of four hundred dollars (\$400.00) per day for each such day. County and Contractor agree that County's damages for such failure would be extremely difficult or impracticable to determine and that the aforesaid amounts are reasonable estimates of and reasonable sums for such damages. County may deduct any liquidated damages due from Contractor from any amounts otherwise due to Contractor under the Contract Documents. This provision shall not limit any right or remedy of County in the event of any other default of Contractor.

4.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

- 4.10.1 Contract Schedule Development.
Within 10 days after receiving the Notice to Proceed, the Contractor shall submit a detailed proposed Contract Schedule presenting an orderly and realistic plan for completion of the Work, in conformance with the requirements of this specification.

The Contract Schedule shall furnish or comply with the following requirements:

- A. Format: a time scaled CPM schedule.
- B. Overall time of completion and time of completion for each milestone shown on the Contract Schedule shall adhere to the times in the Project Manual, if applicable.
- C. Calendar Schedule: Calendar days are the basis of the schedule.
- D. No activity on the schedule shall have duration longer than seven (7) days, with the exception of fabrication and procurement activities, unless otherwise approved by the Construction Manager. Activity durations shall be the total number of actual days required to perform that activity including consideration of weather impact on completion of that activity.
- E. Procurement of major equipment, through receipt and inspection at the job Site, identified as a separate activity.
- F. County furnished materials and equipment if any, identified as separate activities.
- G. Dependencies (or relationships) between activities shown.
- H. Processing/approval of submittals, including delegated-design submittals, and shop drawings for major equipment shown. Activities that are dependent on submittal acceptance and/or material delivery shall not be scheduled to start earlier than the expected acceptance or delivery dates.
- I. The total cost of performing each activity shown. This cost shall be the total of labor, material, equipment, including overhead and profit. The sum of the cost for activities shall equal the total contract value.
- J. The resources required (manpower and major equipment) to perform each activity shown.
- K. Ten (10) days for developing punch list(s), completion of punch list items, and final clean up for the Work or any designated portion thereof.
- L. Interface with the work of other Contractors (or entities).
- M. Separate buildings and other independent Project elements shall be individually identified in the network.

Along with the schedule, Contractor shall provide a procurement log including the following information for each type of material or equipment to be provided:

- N. Material or equipment description.
- O. Technical specification reference.
- P. Duration in days required for preparation and review of submittals.
- Q. Duration in days required for fabrication and delivery.
- R. Cross references to activities, which will be affected by the delivery date of the material or equipment item.

S. Scheduled delivery dates.

The Contractor shall submit the reports and number of copies as required under Division One of this specification.

The Construction Manager will review the Proposed Contract Schedule for conformance with the requirements of the Contract. Within three (3) days after receipt, the Construction Manager will accept the Contract Schedule or will return it with comments. If the Proposed Contract Schedule is not accepted, then Contractor shall revise the schedule to incorporate comments and resubmit the schedule for acceptance within three (3) days after receiving the comments.

The accepted Contract Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. The responsibility for developing the Contract Schedule and monitoring actual progress as compared to the schedule rests with the Contractor.

Failure of the Contract Schedule to include any element of the Work or any inaccuracy in the Contract Schedule will not relieve Contractor from responsibility for accomplishing all the work in accordance with the Contract.

Acceptance of the Contract Schedule will not relieve the Contractor of the responsibility for accomplishing the work in accordance with the Contract.

Monthly Updates.

Contractor shall submit to the Construction Manager each month an up-to date status report of the work. The status report shall include:

- A. Contractor's estimated percentage complete for each activity not yet complete.
- B. Actual start/finish dates for activities as appropriate.
- C. Identification of processing errors, if any, on the previous update reports.
- D. Revisions, if any, to the assumed activity durations including revisions for weather impact for any activities due to the effect of the previous update on the schedule.
- E. Identification of activities that are affected by Proposed Change Orders issued during the update period.
- F. Resolution of conflict between actual work progress and work schedule. When out-of-sequence activities develop in the Contract Schedule because of actual construction progress, the Contractor shall submit revisions to the schedule to conform to current status and direction.

The Construction Manager will review the updated information and meet with the Contractor each month at the Site to determine the status of the Work. If agreement cannot be reached on any issue, then the Contractor will use the Construction Manager's determination in the processing of the update.

Progress payments pursuant to the Contract will be based on the update of the Contract Schedule.

Short Interval Schedules.

Contractor shall prepare a Short Interval Schedule (SIS) to be used throughout the duration of Work.

The SIS shall include all current activities and projected activities for the succeeding one (1) week. The SIS shall include actual start/finish dates for the preceding one (1) week. The SIS shall be submitted to the Construction Manager prior to the weekly construction meeting. The Contractor shall participate in short interval scheduling coordination during the weekly construction meetings.

Responsibility for Completion.

The Contractor shall furnish sufficient manpower, materials, facilities, and equipment and shall work sufficient hours, including night shifts, overtime operations, Sundays and holidays as may be necessary to insure the prosecution and completion of the Work in accordance with the accepted Construction Schedule. If work on the critical path is seven (7) days or more behind the currently updated Construction Schedule and it becomes apparent that the Work will not be completed within the Contract Time, then the Contractor will implement whatever steps it deems necessary to make up all lost time. If the Contractor's solution is not successful, then it will make further attempts using the following sequence of events:

- A. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.
- B. If the above cannot be achieved then;
 - 1. The Contractor shall increase manpower in such quantities and crafts as will substantially eliminate, in the judgment of the Construction Manager, the backlog of work; or increase the number of working hours, shifts per working day, working days per week or the amount of equipment or any combination of the foregoing sufficiently to substantially eliminate in the judgment of the Construction Manager the backlog of work.
 - 2. In addition, the Construction Manager may require the Contractor to submit a recovery schedule demonstrating its program and proposed plan to make up a lag in scheduled progress and to ensure completion of the Work within the Contract Time. If the Construction Manager finds the proposed recovery schedule unacceptable, then it may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second plan proposed are unsatisfactory, then the Construction Manager may require the Contractor to take any of the actions set forth in the previous paragraph without additional cost to the County to make up the lag in scheduled progress.

Failure of the Contractor to comply with the requirements of "Short Interval Schedules" shall be considered grounds for a determination by the County, pursuant to Article 14, that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.

Daily Reports

Contractor shall submit a Daily Activity Report to the Construction Manager for each workday including weekends and holidays, when worked.

Contractor may use its own report, provided it contains the same information included in the standard form furnished by the Construction Manager.

4.11 RECORDS, DOCUMENTS AND SAMPLES AT THE SITE

- 4.11.1 The Contractor shall maintain all records of required City, County or State inspections and shall promptly notify the Construction Manager of the results of any inspection. Copies of all such records shall be provided to the County upon request.

- 4.11.2 The Contractor shall secure and maintain required certificates of inspection, testing or approval and shall promptly deliver them to the Construction Manager.
- 4.11.3 The Contractor shall maintain a master set of drawings and specifications at the Site which shall be regularly updated to reflect current as-built conditions of the Work. The Contractor shall update the drawings as work progresses. The information to be recorded by the Contractor will be determined by the Project Consultant, who will be responsible for preparing the final, reproducible as-built drawings based upon the information submitted by the Contractor. At a minimum, the following information shall be inserted and dimensioned on those drawings and specifications, in RED, by the Contractor: the exact horizontal and vertical location of all installations in their finished condition, including all electrical, plumbing and mechanical installations; all changes in construction, materials and installed equipment; adequate dimensional data, both horizontal and vertical, to allow location of covered installations and the identification of changes authorized by Change Order. The updated drawings and specifications shall be available for review by the Construction Manager and the Inspector.

4.12 SHOP DRAWINGS, DELEGATED-DESIGN SUBMITTALS, PRODUCT DATA AND SAMPLES

- 4.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

Delegated-design Submittals are drawings, diagrams, schedules, and analysis data specially prepared for certain elements of the Work the design of which has been delegated to the Contractor by the Specifications. Such design and the consequent submittals shall be by licensed design professionals under contract to the Contractor or a Subcontractor. The submittals are intended to demonstrate that the Work element as designed complies with applicable performance requirements and design criteria.

- 4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.
- 4.12.3 Samples are physical examples, which illustrate materials, equipment, or workmanship, and establish standards by which the work will be judged.
- 4.12.4 The Contractor, at its sole cost and expense, shall furnish to the Construction Manager all drawings, delegated-design submittals, and other descriptive material as are required by the specifications or requested by the Project Consultant. Shop drawings and delegated-design submittals shall be done with sufficient detail to adequately describe items proposed to be furnished or methods of installation to enable the County and Project Consultant to determine compliance with the specifications and with the design and arrangement shown on the working drawings. The Construction Manager will not accept shop drawings, delegated-design submittals, or manufacturers' instructions which are not sufficiently dimensioned and detailed to demonstrate compliance with the Contract Documents.

The Contractor shall check and coordinate all submittals with the work of all trades involved before they are submitted.

All submittals for the Project shall be made within fifteen (15) days of the Notice of Award; however, the Contractor shall have the additional responsibility to coordinate the schedule of its submittals with the requirements of the Construction Schedule so as not to delay the Project. No delay claims related to submittals will be entertained on the Project for any submittal originally received after the 15-day submittal period.

All submissions must be marked with the name of the Project and the name of the Contractor and shall be numbered consecutively and complete in every respect. All submittals will be complete with all items asked for in the specification section. Submittals will be transmitted for review under the specific specification number and not partial submittals under separate numbers. The County's Project Consultant is contracted to do a maximum of two (2) submittal reviews per specification section. Any additional submittal reviews beyond two (2) reviews will be billed to the Contractor for reimbursement payment to the County's Project Consultant.

The drawings and instructions shall be submitted promptly, so as to cause no delay in the work. The drawings and instructions shall be submitted so as to allow the Construction Manager and the Project Consultant a review period of no less than five (5) days. Some extensive submittals, such as California State Fire Marshal reviews, 3rd party code reviews, commissioning agent reviews, can take up to forty (40) working days or more. Contractor shall prepare for long lead review times and illustrate submittals and Delegated-design Submittals on the Submittal Schedule. The Submittal Schedule shall illustrate enough time is being accounted for in the review time of submittals and Delegated design Submittals.

- 4.12.5 By preparing, approving, and submitting Shop Drawings, Delegated-design Submittals, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so with reasonable promptness, and has checked and coordinated the information contained within such submittals with the requirements of the Work, the Project, and the Contract Documents. The Contractor shall adhere to any supplementary processing and scheduling instructions pertaining to shop drawings and delegated-design submittals as may be issued by the Construction Manager.
- 4.12.6 The Contractor shall not be relieved from responsibility to fulfill the Contract at no extra cost to the County, within the Contract Time, by the Project Consultant's approval of Shop Drawings Delegated-design Submittals, Product Data or Samples. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Construction Manager's approval of Shop Drawings, Delegated-design Submittals, Product Data or Samples under Subparagraph 2.2.14, unless the Contractor has specifically informed the Construction Manager in writing of such deviation at the time of submission and the Project Consultant has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Delegated-design Submittals, Product Data or Samples by the Project Consultant's approval of them.
- 4.12.7 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, which includes delegated-design elements of the Work, the Project Consultant shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.
- 4.12.8 The Contractor shall direct specific attention, in writing or on resubmitted Shop drawings, Delegated-design Submittals, Product Data, or Samples, to revisions other than those requested by the Project Consultant on previous submittals. It shall be the responsibility of the Contractor to specifically point out any variation or discrepancy between the shop drawings, Delegated-design Submittals, or manufacturers' instructions submitted and the Contract Documents.

The Contractor shall make specific mention of all variations, along with an explanation of why they are requested, in its letter of transmittal.

FAILURE BY THE CONTRACTOR TO IDENTIFY IN ITS LETTER OF TRANSMITTAL ANY VARIATION, DISCREPANCY, OR CONFLICT WITH THE CONTRACT DOCUMENTS SHALL RENDER THE APPROVAL NULL AND VOID, AND THE CONTRACTOR SHALL BEAR ALL RISK OF LOSS AND RECONSTRUCTION COSTS OR

DELAYS.

If any architectural, plumbing, mechanical, electrical, or structural modifications are required as a result of the approval of shop drawings, Delegated-design Submittals, or manufacturers' instructions which deviate from or do not comply with the Contract Documents, then those modifications shall be made without extra cost to the County, and without extension of the Contract Time. Any other resultant costs, including but not limited to design fees, Construction Management fees, costs incurred by other contractors, or inspection fees, shall be at the expense of the Contractor.

- 4.12.9 No portion of the work requiring submission of a Shop Drawing, Delegated-design Submittals, Product Data or Sample shall be commenced until the submittal has been approved by the Project Consultant as provided in Subparagraph 2.2.14. All such portions of the Work shall be in accordance with approved submittals.
- 4.12.10 Submission of Shop Drawings, Delegated-design Submittals, and Samples to the Construction Manager is required for only those items specifically mentioned in the Specification Sections. If Contractor submits Shop Drawings for items other than the above, then the Construction Manager will not be obligated to distribute or review them. Contractor shall be responsible for the procuring of Shop Drawings for its own use as it may require for the progress of the Work.
- 4.12.11 The term "Shop Drawings" as used herein also includes, but is not limited to fabrication, erection, layout and setting drawings, manufacturer's standard drawings, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment or systems and the positions and layout of each conform to the Contract requirements. As used herein the term "manufactured" applies to standard units usually mass-produced and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall establish the actual detail of all manufactured or fabricated items; indicate proper relation to adjoining Work; amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure; and incorporate minor changes of design or construction to suit actual conditions.

Review of Shop Drawings.

Following submission, the shop drawings will be returned with one or more of five possible responses by the Construction Manager or Project Consultant. These possible responses are as follows:

- A. Unreviewed: If the submittal is not required, or if it is not complete, or if it does not meet the form, format, and number requirements specified, then it may be returned unreviewed. If the submittal is not required, then work may commence; if the submittal was returned due to form requirements, then it shall be resubmitted, and approval obtained prior to commencement of the work.
- B. Approved, Reviewed, or No exceptions taken: In the event the submittal is acceptable as submitted, then it will be returned with this status. Work may proceed upon receipt of approved submittal.
- C. Make Corrections Noted: If the submittal is acceptable except for certain items which have been noted by the Project Consultant, then it will be so designated. Work may proceed with the corrections made, and no resubmittal is necessary.
- D. Revise and Resubmit: This status indicates that revisions are noted on the submittal, and an additional submittal is required to reflect those revisions and/or additional information. Work may not commence until the resubmittal is approved.

- E. Rejected: A submittal may be rejected if it is not in compliance with the Contract Documents, or if it proposes an "or equal" or substitution which is not acceptable to the Project Consultant. A superseding submittal shall be submitted and approved prior to commencement of the work.

Should the Contractor proceed with the work shown on a submittal before approval is received, then it shall remove and replace or adjust any work which is not in accordance with the shop drawings or manufacturers' instructions as ultimately approved, and it shall be responsible for any resultant damage, defect, or added cost. The County shall be under no obligation to pay for work installed prior to approval of shop drawings, until the shop drawings are approved and the work in place is found to be in compliance with the Contract Documents.

The Contractor shall resubmit submittals in categories "D" and "E" above after making any changes required so that submittals will comply with the Contract Documents. When resubmitting, the Contractor shall direct specific attention to deficient areas. Resubmittals shall be made in the same number of copies as the original submittal. Resubmittals shall be made within five (5) days of return of previous submittal, and in any event in sufficient time so as to avoid delay to the Work. No delay claims related to resubmittals will be entertained on the Project for any resubmittal originally received after the five (5) days.

The Project Consultant shall determine the adequacy and completeness of all submittals. Where the Project Consultant deems a submittal to be inadequate, incomplete, or otherwise unsuitable for proper review, the Contractor shall submit all additional information requested by the Project Consultant. There shall be no change to the Contract Time or the Contract Sum when such additional information is required.

- 4.12.12 Drawings: Following Contractor's review and approval, Contractor shall submit to the Construction Manager five (5) copies of each drawing for approval. The Construction Manager will check the submittal to see if it is complete. If complete, then the Construction Manager will forward the drawings to the Project Consultant. The Project Consultant will check the drawings and affix a stamp to the prints, indicating the status of acceptance, and will return same to the Contractor, each retaining prints for its records. Comments, if any, will be noted directly on the prints. The Contractor shall then print and distribute the appropriate number of copies to its job personnel as required. If a print is stamped "Rejected", then the Contractor shall correct and resubmit as outlined above.
- 4.12.13 Samples: Following Contractor's review and approval, it shall submit to the Construction Manager, two samples of all materials in quantities and sizes as specified herein. Submittals shall be given to the Construction Manager at a time determined by the Contractor, which allows for any necessary resubmittal, and which will not cause any delay in the work. Samples will be forwarded to the Project Consultant. If a sample is rejected, then one sample noted so will be returned to the Contractor. If a sample is marked "Note Markings", then one sample so noted will be returned. Corrected samples shall be resubmitted for approval as per the original submittal.
- 4.12.14 Brochures: Following Contractor's review and approval, it shall submit to the Construction Manager, six (6) copies of all manufacturer's catalogs or brochures as required. If a brochure is stamped "No Exception Taken", then two (2) copies will be returned to the Contractor. If stamped "Rejected", then one marked copy and two (2) unmarked copies will be returned. Corrected copies shall be resubmitted for approval as per the original submittal.
- 4.12.15 Manufacturer's Instructions: Where any item of work is required by Project Manual to be furnished, installed, or performed in accordance with a specified product manufacturer's instructions, Contractor shall procure and distribute the necessary copies of such instructions to all concerned

parties.

- 4.12.16 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, and the Project Consultant has no information creating doubt as to the reliability of such certification, the Project Consultant shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.
- 4.12.17 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.
- .1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, then the County and the Project Consultant will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, Delegated-design Submittals, and other submittals prepared by such professional. Shop Drawings, Delegated-design Submittals, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Project Consultant. The County and the Project Consultant shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the County and Project Consultant have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 4.12.17, the Project Consultant will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
- .2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, then the Contractor shall furnish such certifications to the Project Consultant at the time and in the form specified by the Project Consultant.

4.13 USE OF SITE

- 4.13.1 The Contractor shall confine operations at the Site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the Site with any materials or equipment. The Contractor shall be liable for any and all damage caused by it to County's premises. The Contractor shall hold and save the County, its agents, representatives, Project Consultant and Construction Manager, free and harmless and defend them from liability of any nature or kind arising from any use, trespass, or damage occasioned by its operations on premises or third persons.
- 4.13.2 The Contractor shall coordinate all of the Contractor's operations with, and secure approval from, the Construction Manager before using any portion of the Site.
- 4.13.3 All workers, contractors, or contractors' representatives are admitted to the Site only for the proper execution of the Work and have no tenancy.

4.13.4 The Site will remain open to the public during construction of this Project. Areas of the Site may be closed where the Contractor is working at a given time. Permission to close an area of the Site must be obtained from the Construction Manager in advance of the proposed closure. Contractor is responsible for all warning devices and barriers required to protect the health and welfare of the public at all times.

4.14 CUTTING AND PATCHING OF WORK

4.14.1 The Contractor shall be responsible for all cutting, fitting, or patching that may be required to complete the Work or to make its several parts fit together properly.

4.14.2 The Contractor shall not damage or endanger any portion of the Work or the work of the County or any separate contractors by cutting, patching, or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the County or any separate contractor except with the written consent of the County and of such separate contractor. The Contractor shall not unreasonably withhold from the County or any separate contractor consent to cutting or otherwise altering the Work.

4.14.3 In all cases, the Contractor exercise extreme care in cutting operations, and perform such operations under adequate supervision by competent mechanics skilled in the applicable trade. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage.

4.14.4 All replacing, patching, and repairing of all materials and surfaces cut or damaged in the execution of the Work shall be performed by experienced mechanics of the several trades involved. Such replacing, repairing, or patching shall be done with the applicable materials, in such a manner that all surfaces so replaced, etc., will, upon completion of the Work, match the surrounding similar surfaces.

4.15 CLEANING UP

4.15.1.1 The Contractor shall at all times maintain its work area in an orderly manner. The Contractor shall keep the premises, including the Site, the Project, the adjacent sidewalks, and street free from accumulation of waste materials or rubbish caused by the Contractor's operations on a daily basis or as directed by the Construction Manager. At the completion of the Work, the Contractor shall remove all of the Contractor's waste materials and rubbish from and about the Project as well as all the Contractor's tools, construction equipment, machinery and surplus materials.

The Contractor shall clean the portions of existing improvements and facilities which are used by, traversed, or dirtied by the workers on the Work (normal maintenance due to use by the County's employees or the public excepted).

The Contractor, at its sole cost, shall contract with a disposal company to remove all rubbish, and shall have the refuse containers emptied at frequent enough intervals so that waste does not overflow the containers.

4.15.2 If the Contractor fails to clean up during progress or at the completion of the Work, then the County may do so as provided in Paragraph 3.4 and the cost thereof shall be paid by the Contractor.

4.15.3 Final Cleaning of Project.

Prior to final acceptance and occupancy by the County, the Contractor shall thoroughly clean the interior and exterior of the buildings, and the Site and adjacent areas, of all material related to its performance of the Work, including spots, stains, paint spots, trade markings and labels, and accumulated dust and dirt. The following list is not inclusive but to act as a guideline to include:

- .1 Removal of all paint spots, stains, rubbish, debris, tools and equipment from all areas and broom clean. Steam clean all carpets and mop floors.
- .2 Cleaning interior and exterior of the buildings including all windows in any area affected by the Work.
- .3 Brush off, broom sweep, dust and clean ledges, stairs, doors, hardware, chalk board trays and any adjoining rooms or areas that were affected by the work.
- .4 The Contractor shall clear grounds and exterior paved areas and walks of all construction debris, dirt and dust and shall repair any Site areas damaged during the course of construction.

Prior to final completion or County occupancy, the Contractor shall conduct an inspection of sight-exposed surfaces, and all work areas, to verify that the entire work is clean. In the event the Contractor fails to do so, then the County may cause this work to be done at the Contractor's expense in accordance with subparagraph 3.4.1.

4.16 **ROYALTIES AND PATENTS**

- 4.16.1 The Contractor shall pay all royalties and license fees, shall defend all suits, or claims for infringement of any patent rights and shall defend and save the County harmless from loss on account thereof, except that the County shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is selected by the Project Consultant. If the Contractor has reason to believe that the design, process, or product selected is an infringement of a patent, then the Contractor shall be responsible for such loss unless such information is promptly given to the County, Project Consultant and Construction Manager in writing.

4.17 **INDEMNIFICATION AND DEFENSE**

- 4.17.1 To the fullest extent permitted by law, Contractor must indemnify, defend (at Contractor's sole cost and expense and with legal counsel approved by County, which approval may not be unreasonably withheld), protect and hold harmless County, Construction Manager, Project Consultant, Inspector, all subsidiaries, divisions and affiliated companies of County, and all of the Parties' representatives, partners, designees, officers, directors, shareholders, employees, consultants, agents, successors and assigns, and any lender of County with an interest in the Project (collectively, the "Indemnified Parties"), from and against all claims (including, without limitation, claims for bodily injury, death or damage to property), demands, obligations, damages, actions, causes of action, suits, losses, judgments, fines, penalties, liabilities, costs and expenses (including, without limitation, attorneys' fees, disbursements and court costs, and all other professional expert or consultants' fees and costs and County's general and administrative expenses) of every kind and nature whatsoever (individually, a "Claim"; collectively, "Claims") which may arise from or in any manner relate (directly or indirectly) to any work performed or services provided under the Contract (including, without limitation, defects in workmanship or materials and/ or design defects or Contractor's presence or activities conducted under the Contract (including, without limitation, the negligent and/ or willful acts, errors and/or omissions of Contractor, its principals, officers, agents, employees, vendors, suppliers, consultants, sub-

consultants, subcontractors, anyone employed directly or indirectly by any of them or for whose acts they may be liable or any or all of them). The Contractor's obligation to indemnify applies unless it is finally adjudicated that the liability was caused by the sole active negligence or sole willful misconduct of an Indemnified Party. If it is finally adjudicated that liability is caused by the comparative active negligence or willful misconduct of an Indemnified Party, then Contractor's indemnification obligation shall be reduced in proportion to the established comparative liability.

The duty to defend is a separate and distinct obligation from Contractor's duty to indemnify. Contractor shall be obligated to defend, in all legal, equitable, administrative, or special proceedings, the Indemnified Parties immediately upon tender to Contractor of the Claim in any form or at any stage of an action or proceeding, whether or not liability is established. Payment to Contractor by any Indemnified Party or the payment or advance of defense costs by any Indemnified Party cannot be a condition precedent to enforcing the Indemnified Party's rights to indemnification under the Contract. An allegation or determination that persons other than Contractor are responsible for the Claim does not relieve Contractor from its separate and distinct obligation to defend under this section. The obligation to defend extends through final judgment, including exhaustion of any appeals. The defense obligation includes an obligation to provide independent defense counsel if Contractor asserts that liability is caused in whole or in part by the negligence or willful misconduct of an Indemnified Party. If it is finally adjudicated that liability was caused by the comparative active negligence or willful misconduct of an Indemnified Party, then Contractor may submit a claim to the County for reimbursement of reasonable attorneys' fees and defense costs in proportion to the established comparative liability of the Indemnified Party. Contractor's indemnification obligations under the Contract will survive the expiration or earlier termination of this Contract until action against the Indemnified Parties for the matter indemnified is fully and finally barred by the applicable statute of limitations or statute of repose. Contractor's liability for indemnification under the Contract is in addition to any liability Contractor may have to County for a breach by Contractor of any of the provisions of the Contract. Under no circumstances may the insurance requirements and limits set forth in the Contract be construed to limit Contractor's indemnification obligation or other liability under the Contract. The terms of the Contract are contractual and the result of negotiation between the Parties.

Contractor must indemnify and hold County harmless from all loss and liability, including attorneys' fees, court costs and all other litigation expenses, for any infringement of the patent rights, copyright, trade secret or any other proprietary right or trademark, and all other intellectual property claims of any person or persons in consequence of the use by County, or any of its officers or agents, of articles or services to be supplied in the performance of the Contract.

- 4.17.2 In any and all claims against the County, the Construction Manager and Project Consultant or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.17 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.
- 4.17.3 The obligations of the Contractor under this Paragraph 4.17 shall not extend to the liability of the Project Consultant or Construction Manager, their agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Project Consultant, their agents or employees, provided such that giving or failure to give directions or instructions is the primary cause of the injury or damage.

The indemnity obligation expressly extends to and includes any and all claims, demands, damages, costs, expenses, or liability occasioned as a result of damages to adjacent property caused by the conduct of the Work.

The indemnity obligation expressly extends to and includes any and all claims, demands, damages, costs, expenses, or liability occasioned as a result of the violation by the Contractor, the Contractor's agents, employees, or independent contractors or subcontractors, of any provisions of federal, state or local law, including applicable administrative regulations.

The indemnity obligation also expressly extends to and includes any claims, demands, damages, costs, expenses, or liability occasioned by injury to or death of any person, or any property damage to property owned by any person while on or about the Site or as a result of the Work, whether such persons are on or about the Site by right or not, whenever the Work is alleged to have been a contributing cause in any degree whatsoever.

Nothing contained in the foregoing indemnity provisions shall be construed to require the Contractor to indemnify the County in contravention of Section 2782 of the Civil Code for the sole negligence or willful misconduct of the County.

Indemnification of Adjacent Property Owners.

In the event the Contractor enters any agreement with the owners of any adjacent property to enter upon or adjacent to such property for the purpose of performing this Contract, then the Contractor shall fully indemnify, defend, and save harmless such person, firm, or corporation, state or other governmental agency which owns or has any interest in the adjacent property. The form and content of the indemnification agreement shall be approved by the County prior to commencement of any work on or about such property. The Contractor also shall indemnify the County as provided in this Article 4. These provisions shall be in addition to any other requirements of the owners of adjacent property.

4.18 FAIR EMPLOYMENT PRACTICES CLAUSE

4.18.1 Nondiscrimination: In connection with the performance of Work under the Contract, the Contractor agrees (as prescribed in Chapter 6 of Division 3 of Title II of the Government Code of the State of California, commencing at Section 12900 and by Labor Code Section 1735) not to discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status or sex. The aforesaid provisions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, Notices to be provided by the County, setting forth the provisions of this discrimination clause. The Contractor further agrees to insert the foregoing provisions in all subcontracts hereunder, except subcontracts for standard commercial supplies of raw materials.

ARTICLE 5
SUBCONTRACTORS

5.1 DEFINITION

- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the Site. The term Subcontractor means a Subcontractor or a Subcontractor's authorized representative. The term Subcontractor does not include any separate contractor or any separate contractor's subcontractors.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the work at the Site. The term Sub-subcontractor means a Sub-sub contractor or an authorized representative thereof.

5.2 AWARDS OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- 5.2.1 The Contractor shall only use subcontractors included in its sealed bid unless first approved by the County pursuant to statute. With respect to subcontractors ineligible to perform work on public works projects under Public Contract Code section 6109, the Contractor shall not use any such subcontractor, shall repay to the County any money paid to any such subcontractor, and shall pay the wages of the workers for any such subcontractor allowed to work on the Project.

5.3 SUBCONTRACTUAL RELATIONS

- 5.3.1 By an appropriate agreement, written where legally required for enforceability, the Contractor shall require each Subcontractor, to the extent of the work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the County, the Project Consultant, and the Construction Manager. Said agreement shall preserve and protect the rights of the County, the Project Consultant and the Construction Manager under the Contract Documents with respect to the work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor Agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the County. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with their Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3 and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to their Sub-subcontractors. Nothing contained herein shall be deemed to create an agency relationship between the County and any Subcontractor or material supplier.
- 5.3.2 The substitution or addition of Subcontractors shall be permitted only as authorized by Public Contracts Code Section 4100, et. seq. The Subcontractors employed by the Contractor shall be appropriately licensed in conformity with the laws of the State of California. Should the Contractor violate any of the provisions of this Section, then the violation shall be deemed a breach of this Contract and the County shall have all remedies provided by California law, including but not limited to those provided in Public Contract Code Section 4100, allowing termination of the Contract or a penalty assessment of ten percent (10%) of the subcontract amount.
- 5.3.3 Nothing contained in this Contract shall create any contractual relationship between any

Subcontractor and the County nor create any contractual relationship between any Subcontractor and the Construction Manager or the Project Consultant.

- 5.3.4 Jurisdictional disputes between Subcontractors or between Contractor and Subcontractor shall not be mediated or decided by the County, Project Consultant, or the Construction Manager. The Contractor shall be responsible for the resolution of all such disputes based upon its contractual relationship with its Subcontractors. If, through acts or neglect on the part of the Contractor, including failure to supervise and control its subcontractors or suppliers, any other contractor, subcontractor or supplier, or worker suffers loss or damage, then the Contractor agrees to settle with such other contractor, subcontractor, supplier, or worker by agreement or arbitration, if such other contractor, subcontractor, or worker shall assert any claim against the County or any of its officers, agents, or employees, or account of any damage alleged to have been so sustained.

In the event of the receipt of any such claim, then the County shall notify the Contractor, who shall defend, indemnify, and save harmless the County and all of its officers, agents, and employees against any such claim.

ARTICLE 6
WORK BY COUNTY OR BY
SEPARATE CONTRACTORS

6.1 COUNTY'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

- 6.1.1 The County reserves the right to perform work related to the Project with the County's own forces, and to award separate contracts in connection with other portions of the Project or other work on the Site under these or similar Conditions of the Contract. If the Contractor claims that delay, damage, or additional cost is involved because of such action by the County, then the Contractor shall make such claim as provided elsewhere in the Contract Documents.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other work on the Site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate County-Contractor Agreement.
- 6.1.3 The County shall provide for coordination of the activities of the County's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the County in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors, and the County until subsequently revised.
- 6.1.4 Unless otherwise provided in the Contract Documents, when the County performs construction or operations related to the Project with the County's own forces, the County shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract including, without excluding others, those stated in Article 4, this Article 6, and Articles 10, and 13.

6.2 MUTUAL RESPONSIBILITY

- 6.2.1 The Contractor shall afford the County and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

- 6.2.2 When any part of the Contractor's Work depends for proper execution or results upon the work of the County or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Construction Manager any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acceptance of the County's or separate contractor's work as fit and proper to receive the Work, except as to defects which may subsequently become apparent in such work by others.
- 6.2.3 If, following the reporting of any discrepancy or defect as required in Subparagraph 6.2.2, the Contractor suffers damage due to disruption or delay caused by the separate contractor, without fault by the County, then the Contractor's remedy shall be limited to seeking recovery from the separate contractor.
- 6.2.4 Any costs caused by defective or ill-timed work shall be borne by the Contractor or Subcontractor responsible therefore.
- 6.2.5 Should the Contractor cause damage to the work or property of the County, or to other work or property on the Site, then the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.
- 6.2.6 Should the Contractor wrongfully delay or cause damage to the work or property of any separate contractor, then the Contractor shall, upon due notice, promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues the County on account of any delay or damage alleged to have been caused by the Contractor, then the County shall notify the Contractor who shall defend such proceedings, and if any judgment or award against the County arises there from, then the Contractor shall pay or satisfy it and shall reimburse the County for all costs which the County has incurred.
- 6.3.1 **COUNTY'S RIGHT TO CLEAN UP**
- 6.3.2 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.15, then the County may clean up and the Contractor therefore shall pay the County such portions of the cost thereof as the Construction Manager shall determine to be just.

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

- 7.1.1 The Contract shall be governed by the Laws of the State of California.

7.2 SUCCESSORS AND ASSIGNS

- 7.2.1 The County and the Contractor, respectively, bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other.

7.3 WRITTEN NOTICE

- 7.3.1 Except as may be otherwise required by law, any notice to be given shall be written and shall be

either personally delivered, sent by facsimile transmission, or sent by first class mail, postage prepaid and addressed as follows:

COUNTY:

Tulare County
General Services Agency
Capital Projects Division
2637 W. Burrel Ave., Ste. 200
Visalia, CA 93291
Phone: 559.205.1100
Email: AEnciso@tularecounty.ca.gov

CONTRACTOR

Phone: _____
Email: _____

PROJECT CONSULTANT

Chas Rhoads
Chas Rhoads Architecture
P.O. Box 889
Hanford CA 93232
Phone: 559.584.3371
Email: chasrhoads@sbcglobal.net

Notice personally delivered is effective when delivered. Notice sent by first class mail shall be deemed received on the fifth day after the date of mailing. Either party may change the above address by giving written notice pursuant to this paragraph.

7.4 CLAIM REQUIREMENTS

7.4.1 A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract, extension of time, arising out of or relating to the Contract or a request for equitable adjustment or Change Order which cannot be resolved per provisions of Article 12. **Any Claim shall be reduced to writing and filed (sent by registered mail or certified mail within return receipt requested) with the Tulare County Administrative Officer (or his/her designee), within twenty calendar days after the Contractor has notice of the condition giving rise to the Claim, and final action per Article 12 procedures has taken place or has been declared as such in writing, by either party.** Such twenty-day notice of an asserted claim is in addition to the requirement for prompt notice required per Paragraph 12.3.

7.4.2 Except as provided by Public Contract Code Section 7102, the Contractor shall not claim or recover any overhead cost administrative or otherwise, particularly 'Home Office' expenses, 'Extended site overhead', or any other overhead cost on the basis of any 'Home Office' damages formula, 'Eichleay' formula, 'Total Cost' recovery formula or any other such formula.

7.4.3 Except as provided by Public Contract Code Section 7102, the Contractor shall have no claim for damages or compensation for any delay or hindrance. Contractor shall make any claims in writing within the time set forth above, for any unreasonable delay or hindrance caused by County, and specifying the cause thereof as required in **7.4.4 below**.

7.4.4 REQUIREMENTS FOR FILING A CLAIM. Claims must be filed within the time specified in 7.4.1 above,

but in no event later than the date of final payment. Claims shall be submitted to the Tulare County Administrative Officer (or his/her designee) **by registered mail or certified mail within return receipt requested**. The claim shall be in writing and shall be sum certain if known. If unknown, then Contractor shall specify the basis for establishing the sum certain. Claim shall include a statement of the reasons for the asserted entitlement and include the documents necessary to substantiate the claim. Such documents may include but are not limited to payroll records, purchase orders, quotations, invoices, estimates, subcontracts, daily logs, supplier contracts, subcontract billings, bid takeoffs, equipment rental invoices, ledgers, journals, daily reports, job diaries, and any documentation related to the requirements of Article 12. In the case of a continuing delay, only one claim is necessary. If adverse weather conditions are the basis for a claim for additional time, then 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 critical activities on the construction schedule. 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 foregoing claim is made in good faith, that the supporting data are accurate, and in my opinion, justify the contract adjustments requested”.

By: _____
(Contractor’s signature)

Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by Contract for the filing of claims. The County of Tulare adopts the claims procedures found in Chapter 9 of the Public Contract Code:

1. Upon receipt of a Claim by the Contractor, the Tulare County Administrative Officer (or his or her designee) shall provide the Contractor with a written statement, identifying what portion of the claim is disputed and what portion is undisputed. The County of Tulare will make payment as to any undisputed portion of the claim within sixty (60) days of this written statement.
2. As to any remaining disputed claim or portion thereof (or, if the County does not respond to the claim within forty-five (45) days, the Contractor may demand a meet and confer settlement “conference” to resolve the dispute. This conference shall be scheduled within thirty (30) days of the Contractor’s request.
3. Within ten (10) days following the settlement conference, the County of Tulare shall deliver a written statement identifying what portion of the claim is still disputed and what portion is undisputed. The County of Tulare will make payment for any portion of the claim that is undisputed within sixty (60) days of this written statement.
4. If after the settlement conference there exists any disputed claim, or portion thereof, then the Contractor shall identify this portion in writing. The remaining disputed claim, or portion thereof, shall be submitted to nonbinding mediation, with the County and the Contractor sharing the associated costs equally. The County and the Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, then each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator.
5. If mediation is unsuccessful, then 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. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference.

7.4.5 Public Contract Code Section 9204 Statement.

As required by the Public Contract Code, the text of section 9204 is listed below.

PUBLIC CONTRACT CODE SECTION 9204 STATEMENT

AB 626, approved by the Governor of the State of California on September 29, 2016, created a new Public Contract Code section 9204, which specifies new procedural requirements for claims submitted by a contractor on any public works project.

The full text of the current legislation is set forth below:

§ 9204. Legislative findings and declarations regarding timely and complete payment of contractors for public works projects; claims process

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

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

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

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

(3)(A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

(iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.

(v) The Military Department as to any project under the jurisdiction of that department.

(vi) The Department of General Services as to all other projects.

(vii) The High-Speed Rail Authority.

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

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

(d)(1)(A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

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

(2)(A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

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

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

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

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

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

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on their own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within forty-five (45) days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

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

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

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

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

(i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2027, deletes or extends that date.

7.4.6 CLAIMS AND DISPUTES EXEMPT FROM FILING REQUIREMENTS.

The procedures and remedies provided in this Article 7.4 do not apply to:

- .1 Any claims by the County;
- .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; and
- .4 Any claim related to the approval, refusal to approve, or substitution of subcontractors, regardless of tier, and suppliers.

7.4.7 PAYMENT OF UNDISPUTED PORTION OF CLAIM.

County shall pay claimant such portion of a claim which is undisputed except as otherwise provided in the Contract.

7.4.8 CONTINUE WORK DURING DISPUTE.

In the event of any dispute between the County and the Contractor, then the Contractor will not stop work but will prosecute the work diligently to completion in the manner directed by the County, and the dispute shall be resolved by a court of competent jurisdiction after completion of the Work. However, all disputes must be submitted by Contractor in accordance with the provisions of Article 7.

7.5 **PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND**

7.5.1 The Contractor shall furnish a Performance Bond in the amount of 100% of the Contract amount and Payment Bond in the amount of 100% of the Contract amount. The Bonds shall use the forms shown in Sections 00502 and 00503, respectively.

7.5.2 All bonds required, whether Bid bonds, Performance, Payment, or other bonds, shall be on the forms provided in Sections 00501, 00502 and 00503 above. **The Bid Bond, Performance Bond, and Payment Bond must be issued by the same California admitted surety insurer.** The payment and performance bonds required by these specifications will neither be accepted nor approved by the County unless the bonds are underwritten by an admitted surety and the requirements of California Code of Civil Procedure section 995.630(a) and (b) are met and the bonds are accompanied by the County Clerk's certificate as provided for in California Code of Civil Procedure Section 995.640(b). The County further reserves the right to satisfy itself as to the acceptability of the surety and the form of bond. **Upon request of Tulare County, the bidder must submit the following documents:**

- .1 **The original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws, or other instrument authorizing the person who executed the bond to do so.**
- .2 **A certified copy of the certificate of authority of the insurer issued by the California Insurance Commissioner.**
- .3 **A certificate from the county clerk that the certificate of authority has not been surrendered, revoked, canceled, annulled, or suspended, or in the event that it has, that renewed authority has been granted.**
- .4 **A financial statement of the assets and liabilities of the insurer to the end of the quarter calendar year prior to thirty (30) days next preceding the date of the execution of the bond, in the form of an officers' certificate as defined in Corporations Code § 173. If the surety insurer is not found to be an "admitted surety insurer" then the bid shall be determined non-responsive and shall be rejected. If the surety insurer's assets do not exceed its liabilities in an amount equal to or in excess of the amount of the bond, subject to Section 12090 of the Insurance Code; or if the bidder fails to provide the specified documents; then the bid may be determined non-responsive and may be rejected.**

7.5.3 All costs for applicable bid bonds, payment bonds and performance bonds shall be included in the bid.

7.6 **RIGHTS AND REMEDIES**

7.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

7.6.2 No action or failure to act by the County, the Construction Manager, the Project Consultant, or the Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

7.7 **TESTS AND INSPECTIONS**

7.7.1 Materials Which May be Tested.

The County reserves the right to require the Contractor to provide samples, and to perform tests on any materials, articles, equipment, installations, or construction performed by the Contractor in addition to those specified in the Contract Documents. The County shall assume the cost of sampling and testing materials only when the Contract Documents do not require the Contractor to do so.

7.7.2 Testing.

All tests shall be performed under the supervision of the testing laboratory or Project Consultant employed by the County and at such times as are convenient to the County. The Contractor shall provide written notice to the Construction Manager prior to the need for off-site tests or inspections, and the Construction Manager will arrange such tests or inspections.

7.7.3 Selection of Samples.

All samples and specimens for testing shall be selected by the Inspector or by the testing laboratory, but not by the Contractor.

7.7.4 Delivery of Samples.

The Contractor shall, at its sole cost and expense, furnish, package, mark, and deliver all samples to be tested at locations other than the Site. Samples shall be delivered either to the Inspector or to the testing laboratory or such other address specified by the Construction Manager.

Delivery of all samples to the testing laboratory shall be made in ample time to allow the test to be made without delaying construction. No extra time will be allowed for the completion of the Work by reason of delay in testing samples required by the Contract Documents or due to the Contractor's request for substitution.

The Contractor shall allow free access at all times to the representatives of the testing laboratory to the Work and shall point out the sources from which samples are taken.

All test reports shall be sent to all parties specified by the Construction Manager.

7.7.5 Approval of Samples.

No materials or work of which samples and/or tests are required shall be used or covered until the Construction Manager informs the Contractor that such samples and/or tests have been approved. If the Contractor installs, uses, or covers any such material, article, or work prior to testing and approval, then such shall be at the Contractor's sole risk and expense, and it shall bear all costs of uncovering, repair, and replacement thereof. The approval of any samples shall be for the characteristics thereof, or for the uses named in such approval, and no other. No approval of any samples shall be deemed a change or modification in any requirement of the Contract Documents. Upon testing of any sample of material or work, no additional sample shall be considered. All material or work installed after the sampling and testing is performed and approved shall be equal

to or better than the approved sample in all respects.

7.7.6 Damage Due to Testing.

The Contractor shall, at its sole cost and expense, repair all damage resulting from testing specified in the Contract Documents. The County shall issue a Change Order for repair of damage due to sampling or testing other than specified in the Contract Documents.

The Contractor shall not make any tests upon portions of the Project already completed, except with the prior written consent and under the direction and supervision of the Construction Manager.

7.7.7 Retesting.

If as a result of any test, whether originally specified or not, any material or work is found to be unacceptable, then it shall be rejected, and all further sampling and testing required by the County or Construction Manager shall be at the Contractor's expense.

7.7.8 Effect of Sampling and Testing.

The County assumes no obligation, and the Contractor shall be relieved of no obligation undertaken pursuant to the Contract Documents by virtue of sampling and testing specified in this article.

The responsibility for incorporating satisfactory materials and workmanship which meet the Contract Documents in the work rest entirely with the Contractor, notwithstanding any prior samples or tests.

7.7.9 Inspection shall be provided as required under CCR Title 24, current edition. All inspection costs will be paid for by the County, including special inspection required by Title 24, except as noted otherwise below. A list of required inspections for the Project is included in the Contract Documents.

The Inspector shall be approved by the County. The Inspector will be employed by the County and will perform all inspections in accordance with Title 24, parts 1-5.

The designated Inspector shall be considered to be a representative of the County. It is the inspector's duty to inspect those portions of the Work which the County has designated.

The Inspector shall have the authority to order the work designated for inspection stopped if a determination is made that work is proceeding in violation of the Contract Documents or any orders issued by the County, Construction Manager, or Project Consultant.

Upon issuing a stop work notice, the Inspector shall notify the Project Consultant, who shall inspect the work in question and determine whether it does or does not comply with the Contract Documents. The decision of the Project Consultant shall be final. The Contractor shall thereafter comply with the instructions of the Project Consultant regarding corrections needed to cure the defect. The suspended work shall be resumed only when the instructions are fulfilled. The Contractor shall not be entitled to an extension of time in the event of such suspension of work.

Neither the final inspection and payment, nor any interim inspection or progress payment shall relieve the Contractor of its obligation to fulfill the Contract as required by the Contract Documents.

Any work, materials or equipment not meeting the requirements and intent of the Contract Documents may be rejected, and unsuitable work or materials shall be made good, notwithstanding the fact that such work or materials may previously have been inspected and/or payment therefore may have been made.

Should the Construction Manager or the Project Consultant determine that it is necessary or advisable to make an inspection of work already completed at any time before final inspection and

acceptance of the Work, by removing or exposing any work, then the Contractor shall, upon instruction of the Construction Manager, promptly furnish all necessary facilities, labor, and materials to do so. If the work is found to be defective in any respect due to the fault of the Contractor or any subcontractor, then the Contractor shall bear all expenses of such examination and satisfactory reconstruction. If, however, the work is found to meet the requirements of the Contract Documents, then the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor and a change order shall be issued for such cost and any time extension justified by delays to the critical path.

Where the Contract Documents, instructions by the Inspector, Construction Manager or the Project Consultant, laws, ordinances, or any public authority having jurisdiction require work to be inspected, tested, or approved before the Work proceeds, such work shall not proceed, nor shall it be covered up without inspection. If any part of the Work is covered prior to inspection, then the County may order the work to be uncovered so that inspection may be accomplished. The Contractor shall bear all expenses of such examination and satisfactory reconstruction.

The Contractor shall provide written notice to the Inspector at least twenty-four (24) hours in advance of the readiness for inspection.

All work shall be available for inspection and the Inspector shall have full access to review all work during all working times. The Contractor shall provide all necessary means of access (e.g., ladders) for the Inspector to perform its duties. The Contractor shall furnish the Inspector with any information necessary to fully inform it of conditions. Inspection does not relieve the Contractor from fulfilling the requirements of the Contract Documents.

7.8 DISPUTES AND DISPUTE RESOLUTION

7.8.1 In the event a dispute arises between the Parties concerning, or arising out of, this Contract, or an alleged breach thereof, then each Party shall continue to perform its respective duties and responsibilities under this Contract during the pendency of any such dispute. The Parties shall utilize the following procedures to attempt to resolve such disputes.

7.8.2 **Informal Negotiations.** The Parties shall make their best efforts to informally resolve disputes that arise out of or relate to this Contract. To foster a spirit of cooperation and efficiency in the administration of this Contract, disputes between the Parties shall first be subjected to a good faith negotiations process as follows:

- .1 The aggrieved Party shall give the other Party, as soon as possible after the event giving rise to the concern, written notice setting forth, with specificity, the issues to be resolved. Notice shall be provided consistent with the terms of the Contract. Said notice shall suggest a date, time, and place for the negotiations session. The Parties may jointly decide to meet at another time and place; provided, however, the Parties agree that such negotiations session shall commence within fifteen (15) calendar days after the date that the original notice was given to the applicable Party, unless the Parties agree that there is good cause to extend this time limit.
- .2 The Parties agree that the negotiations session(s), including proceedings or discussions concerning the proposed negotiations session(s), are to be considered confidential settlement negotiations for the purpose of all state and federal rules protecting disclosures made during such conferences from later discovery or use in evidence. All conduct, statements, promises, offers, views and opinions, oral or written, made during a negotiations session by any Party or a Party's agent, employee, or attorney shall be deemed to be confidential and shall not be subject to discovery or admissible for any purpose, including impeachment, in any litigation or other proceeding, including

mediation, involving the Parties; provided, however, that evidence otherwise subject to discovery or otherwise admissible is not excluded from discovery or admission into evidence simply as a result of it having been used in connection with the negotiations session(s).

- .3 Absent mutual consent of the Parties, if a noticed negotiations session fails to commence within the fifteen (15) calendar day period, or if a reasonable attempt to schedule or reschedule the negotiations session has not been made within those fifteen (15) calendar days, then the negotiations obligation imposed under this subparagraph shall be deemed to have been satisfied and the Parties shall be free to pursue their rights and remedies under this Paragraph 7.8, unless the reason for such failure to convene a negotiations session is the refusal of the Party asserting a claim to participate in the negotiations session, in which event said claim will be deemed to have been waived.
- .4 If the dispute is not resolved to the satisfaction of the Parties within thirty (30) calendar days after the first negotiations session, then upon the written request of either Party, the dispute may be submitted to non-binding mediation in accordance with this Paragraph 7.8 ("Mediation Request").

7.8.3 **Mediation.** If a dispute arising out of or relating to this Contract is not resolved through the above-described negotiations process, then within thirty (30) days after notice is provided through a Mediation Request, the Parties shall participate in non-binding mediation administered by a mediator to help mediate and settle the dispute as soon as practicable. The mediation shall proceed as follows:

- .1 The mediation shall be held at a mutually agreeable location within Tulare County, California.
- .2 The Parties shall mutually select the mediator who shall be an attorney currently licensed to practice law in the State of California, or a retired federal or state judge or magistrate, but in case of disagreement, then the Parties will select the mediator by lot from among two nominations provided by each Party.
- .3 The mediator shall meet with and hear presentations by the Parties as soon as practicable after appointment.
- .4 Mediation will be conducted consistent with California Evidence Code sections 1115-1128. The mediator shall owe a professional duty to both Parties and shall be barred from testifying in any litigation concerning any information obtained or disclosed in the course of the mediation.
- .5 Each side shall bear its own costs and attorneys' fees, and one-half of all fees and expenses of the mediator.
- .6 Unless otherwise agreed upon by the Parties in writing, the mediation shall be completed within thirty (30) days of the selection of the mediator.
- .7 The Parties agree that the mediation, including proceedings or discussions concerning the mediation, is to be considered a confidential settlement negotiation for the purpose of all state and federal rules protecting disclosures made during such conferences from later discovery or use in evidence. All conduct, statements, promises, offers, views and opinions, oral or written, made during the mediation by any Party or a Party's agent, employee, or attorney shall be deemed to be confidential and shall not be subject to discovery or admissible for any purpose, including impeachment, in any litigation or other proceeding

involving the Parties; provided, however, that evidence otherwise subject to discovery or admissible is not excluded from discovery or admission into evidence simply as a result of it having been used in connection with the mediation.

- .8 The mediator's decision shall not be binding on or admissible against either Party. If mediation fails to resolve the dispute, then either Party may pursue litigation to resolve the dispute.

ARTICLE 8

TIME

8.1 DEFINITIONS

- 8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto. "Date of Completion" is the date certified by the Construction Manager when construction of the Work is 100% complete including acceptance by the Project Consultant on all punch list corrections.
- 8.1.2 The Date of Commencement of the Work is the date established in a Notice to Proceed. If there is no Notice to Proceed, then it shall be such other date as may be established in the County-Contractor Agreement and receipt of all required preconstruction submittals, bonds, and insurance, or as established elsewhere in the Contract Documents.
- 8.1.3 The Date of Completion of the Work or designated portion thereof is the Date certified by the Construction Manager when construction is sufficiently complete, in accordance with the Contract Documents, so that the County or separate contractors can occupy or utilize the Work or a designated portion thereof for the use for which it is intended.
- 8.1.4 The Date of Completion of the Project (if more than one phase or contractor) or designated portion thereof is the Date certified by the Construction Manager when construction is sufficiently complete so the County can occupy or utilize the Project or designated portion thereof for the use for which it was intended.
- 8.1.5 The term Day as used in the Contract Documents shall mean calendar day of twenty-four (24) hours, including each and every day of the year unless specifically designated otherwise.
- 8.1.6 Abnormal Weather Conditions as used in the Contract Documents shall be defined as weather conditions that the area does not encounter more than once, on an average of every ten or fifteen years.
- 8.1.7 Normal Weather Conditions are weather conditions which are normal for the location of the Project, according to the U. S. Weather Bureau Records. The Contractor shall reasonably anticipate that normal weather conditions will be encountered, which based on the weather data from the Western Regional Climate Center, National Weather Service, for Visalia, California, average precipitation days per month are as follows:

January	5 days
February	5 days
March	4 days
April	2 days
May	1 day
June	0 days
July	0 days
August	0 days
September	0 days
October	1 day
November	3 days
December	4 days
Total:	25 days/year

Final determination of the final impact of adverse weather may be deferred to the conclusion of the Work. Extensions of time may be requested for any month of construction for days lost, which affect the critical path of construction, due to adverse weather in excess of the normal weather conditions, as defined above. If adverse weather conditions are the basis for a Claim for additional time, then such Claim shall be documented by data substantiating days claimed and the impact on the critical path of construction.

The Contractor will not be granted time extensions for weather conditions which are normal for the Project location.

8.2 PROGRESS AND COMPLETION

- 8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.
- 8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2.
- 8.2.3 The Contractor shall carry the Work forward expeditiously with adequate forces and shall achieve Completion of the Work within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF CONTRACT TIME

- 8.3.1 Extensions of Contract Time; Unavoidable Delays.
The Contractor shall not be granted an extension of time except on the issuance of a Change Order by the County, upon a finding of good cause for such extension.

A. As used herein, the following terms shall have the following meanings:

"Excusable Delay" means any delay in completion of the Work beyond the expiration of the Contract Time caused by conditions beyond the control and without the fault or negligence of the Contractor. These events may include strikes, embargoes, fire, unavoidable casualties, national emergency, and stormy and inclement weather conditions in which the Construction Manager

and Inspector agree that work on the critical path cannot continue. The financial inability of the Contractor or any Subcontractor or supplier and any default of any Subcontractor, without limitation, shall not be deemed conditions beyond the Contractor's control. An Excusable Delay may entitle the Contractor to an extension of the Contract Time, in accordance with this Section of the general conditions, but shall not entitle the Contractor to any adjustment of the Contract Sum.

"Compensable Delay" means any delay in the completion of the Work beyond the expiration date of the Contract Time caused solely by the wrongful acts of the County and which delay is unreasonable under the circumstances and not within the contemplation of the parties. A Compensable Delay may entitle the Contractor to an extension of the Contract Time, in accordance with this Section of the General Conditions and/or an adjustment of the Contract Sum, in accordance with Article 12. Except as provided herein, the Contractor shall have no claim for damage or compensation for any delay, interruption, hindrance, or disruption.

"Inexcusable Delay" means any delay in completion of the Work beyond the expiration of the Contract Time resulting from causes other than those listed in Subparagraphs A1 and A2, above. An Inexcusable Delay will not entitle the Contractor to an extension of the Contract Time or an adjustment of the Contract Sum.

B. The Contractor may make a claim for an extension of the Contract Time, for an Excusable Delay or a Compensable Delay, subject to the following:

1. If an Excusable Delay and a Compensable Delay occur concurrently, then the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last. Any adjustment of the Contract Sum shall be in accordance with Article 12 and shall be based only on the non-concurrent portion of any Compensable Delay.

2. If an Inexcusable Delay occurs concurrently with either an Excusable Delay and/or a Compensable Delay, then the maximum extension of the Contract Time shall be the number of days, if any, by which the duration of the Excusable Delay and/or the Compensable Delay calculated in accordance with Subparagraph B1, if applicable, exceeds the Inexcusable Delay. The duration of the concurrence is non-compensable.

Delays in the prosecution of parts or classes of the Work which do not prevent or delay the completion of the whole Work within the Contract Time are not to be considered Excusable or Compensable.

8.3.2 Notice of Delays.

Whenever the Contractor foresees any delay in the prosecution of the Work, and in any event immediately upon the occurrence of any delay which the Contractor regards as good cause for an extension, then the Contractor shall notify the Construction Manager in writing of the delay. The notice shall specify with detail the cause asserted by the Contractor to constitute good cause for an extension together with a description of the effect of the delay on the Construction Schedule and a quantification of the length of the requested extension of time. Failure of the Contractor to submit such a notice within seven (7) days after the initial occurrence of the event giving rise to the delay shall constitute a waiver by the Contractor of any request for extension, and no extension shall be granted as a consequence of such delay. Any claim or extension of time shall be made in writing to the Construction Manager not more than ten (10) days after the commencement of the delay; otherwise, it shall be waived. In the case of a continuing delay only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

The County shall have no obligation to consider any time extension request unless the requirements of the Contract Documents are complied with. The County shall not be responsible or liable to the Contractor for any constructive acceleration due to failure of the County to grant time extensions under the Contract Documents, should the Contractor fail to comply with the submission and justification requirements of the Contract Documents for time extension requests. The Contractor's failure to perform in accordance with the Construction Schedule shall not be excused because the Contractor has submitted time extension requests, unless and until such requests are approved by the County.

8.3.3 Investigation; Procedure.

Upon receipt of a request for extension, the Construction Manager shall conduct an investigation of the facts asserted by the Contractor to constitute good cause for an extension. The Construction Manager shall report the results of this investigation, as well as the propriety of the time extension requested, to the Contractor in writing within 10 days of receipt of the request and shall indicate whether it will recommend for or against the extension.

Upon receiving the Construction Manager's recommendation, the Contractor may either concur in the recommendation, or reject the recommendation and proceed with a claim as provided for in Article 7.4.

8.3.4 Discretionary Contract Time Extensions for Best Interest of County.

The County reserves the right to extend the time for completion of the Work if the County determines that such extension is in the best interest of the County. In the event that a discretionary extension is granted at the request of the Contractor, then the County shall have the right to charge to the Contractor all or any part, as the County may deem proper, of the actual cost of construction management, Consulting, inspection, supervision, incidental and other overhead expenses that accrue during the period of the extension, and to deduct all or any portion of that amount from the final payment for the Work.

In the event a discretionary time extension is ordered over the objection of the Contractor, and the decision rests solely with the County and is not legally compelled for any cause, then the Contractor shall be entitled to a Change Order adjusting the price paid to reflect the actual costs incurred by the Contractor as a direct result of the delay, upon its written application therefore, accompanied with such verification of costs as the Construction Manager requires. The decision of the County on any discretionary time extension and the costs thereof shall be final and binding on the County and the Contractor.

8.3.5 Liquidated Damages.

If the Work is not completed by the Contractor in the time specified in, or within any period of extension authorized pursuant to this Article, then the Contractor acknowledges and admits that the County will suffer damage, and that it is impracticable and infeasible to fix the amount of actual damages. Therefore, it is agreed by and between the Contractor and the County that the Contractor shall pay to the County as fixed and liquidated damages, and not as a penalty, the sum specified in the Agreement for Construction for each calendar day of delay until the Date of Completion, and that both the Contractor and the Contractor's surety shall be liable for the total amount thereof, and that County may deduct Liquidated Damages from any monies due or that may become due to the Contractor. If it appears during the course of construction that the Contractor is behind schedule and the imposition of liquidated damages is likely, or if liquidated damages begin to accrue prior to the time for final payment, then the amount accrued shall be withheld from any progress payment that would otherwise be due. This right to withhold funds is intended to complement the County's rights under Section 9.6.1.

This liquidated damages provision shall apply to all delays of any nature whatsoever, save and except only delays found to be excusable or compensable pursuant to Section 8.3, or time

extensions granted by the County pursuant to Section 8.3.

Payment by the County of any progress payments after expiration of the Contract Time shall not constitute a waiver by the County of its right to claim liquidated damages in accordance with this Section.

8.3.6 Extension of Contract Time Not a Waiver.

Any extension of time granted the Contractor pursuant to this Article shall not constitute a waiver by the County of, nor a release of the Contractor from the Contractor's obligation to perform this Contract in the time specified by the Agreement, as modified by the particular extension in question.

The County's decision to grant a time extension due to one circumstance set forth in one request, shall not be construed as a grant of an extension for any other circumstance or the same circumstance occurring at some other time, and shall not be viewed by the Contractor as a precedent for any other request for extension.

8.3.7 Suspensions Exceeding One Year.

Should the Work be suspended for a period exceeding one calendar year due to war conditions, labor conditions, legal actions, or for other conditions constituting the legal defense of impossibility of performance, then the Contractor and County agree to enter into an agreement terminating the Agreement upon the following terms and conditions.

County shall be responsible only to pay the Contractor the actual value of the work performed from the Date of Commencement or from the date of the last progress payment, whichever is later, plus the five percent (5%) retention from such prior progress payments, less any deductions authorized by the Contract Documents.

As between the Contractor and County, it shall be conclusively presumed that the actual value for the Contractor's work to the date of the last progress payment is no more than the actual amount of that prior progress payment plus the five percent (5%) retention from such those progress payments; provided, however, that this Section shall not preclude County from deducting charges for work or materials which do not meet the requirements of the Contract Documents.

8.3.8 Effect of Stop Work Notice.

If the County orders a suspension of the Work pursuant to Article 14, then the days on which the suspension is in effect shall be included in determining the required completion date and shall not otherwise modify or extend the time within which the Contractor is to perform. In such event, the Contractor shall not be entitled to any damages or compensation on account of such suspension or delay, unless the Contractor can establish that Stop Work Notice was not warranted.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 **CONTRACT SUM**

9.1.1 The Contract Sum is stated in the County-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the County to the Contractor for the performance of the Work under the Contract Documents.

9.2 **SCHEDULE OF VALUES**

9.2.1 As part of the required post-bid submittals, and at least fourteen (14) days prior to the first payment application, the Contractor shall submit to the Construction Manager a Schedule of Values allocated to the various portions of the Work, prepared in such form and in sufficient detail to allow

evaluation of the progress of construction. In no event shall an individual line item on a schedule of values exceed five percent of the Contract Sum. Labor, material, and subcontract costs shall be shown separately. Cost of contract closeout shall be shown as an individual line item, up to five percent of the Contract Sum. All other General Conditions items should be prorated among the actual construction values. The Schedule of Values shall be supported by such data to substantiate its accuracy as the Construction Manager may require. This schedule, unless objected to by the Construction Manager, shall be used only as a basis for the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

- 9.3.1 At least fifteen (15) days before the date for each progress payment established in the County-Contractor Agreement, the Contractor shall submit to the Construction Manager an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the County or the Construction Manager may require, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. AIA Documents G702, Application and Certificate for Payment and G703, Continuation Sheet, or other substitute form supplied and required by the County shall be used. Payment is expressly conditioned upon submission by the Contractor and all of its subcontractors and material suppliers warranting that title to all work, labor, materials and equipment covered by the application is free and clear of all liens, claims, security interests or encumbrances. Additionally, the Contractor and all of its subcontractors and material suppliers shall submit unconditional lien releases for all work through the prior progress payment. For final payment, the Contractor shall submit a notarized unconditional lien release. Waiver and Release forms must be submitted on forms provided or approved by the County of Tulare. Copies of said forms shall comply with Civil Code §3262.
- 9.3.2 No progress payment will be made unless all general conditions items (as-built updates, schedule updates, certified payroll or other pay records, lien releases, etc.) have been received by the Construction Manager in acceptable form. The onsite master set of drawings will be reviewed by the Construction Manager to verify that all changes have been noted and that the drawings are current prior to the processing of any pay application.
- 9.3.3 Unless otherwise provided in the Contract Documents, payments may be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the Site and, if approved in advance by the County, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the Site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the County to establish the County's title to such materials or equipment or otherwise protect the County's interest, including applicable insurance and transportation to the Site for those materials and equipment stored off the Site. Materials stored off-site, to be considered for payment, shall, in addition to the above requirements, be stored in a bonded warehouse, fully insured, and available to the Project Consultant and Construction Manager for inspection. The Construction Manager shall have complete discretion as to the amount of material and equipment that may be stored on the Site at any given time.
- 9.3.4 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the County either by incorporation in the construction or upon receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, stop notices, claims, security interest or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the Site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such

other person.

The Contractor agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by this Contract shall have any right to a lien upon the premises or any improvement or appurtenances thereon; provided, however, that nothing contained in this Section shall defeat or impair the rights of persons furnishing materials or labor under the payment bond given by the Contractor, nor any rights under any law permitting such persons to look to funds due to the Contractor but retained by County.

The Contractor shall cause the provisions of this Section to be inserted in all subcontracts and material contracts executed by the Contractor and notice of this provision shall be given to all persons furnishing materials for the Work.

This Section shall not disallow the Contractor's installing any devices or equipment of utility companies or of governmental agencies, the title to which is commonly retained by the utility company or the agency.

9.3.5 Progress Payments: The Contractor shall on or before the assigned billing date of each month make an estimate of the work performed during the preceding month and submit an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the County or the Construction Manager may require, including appropriate updates to the CPM Construction Schedule, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. The Contractor will assemble the Application and forward it to the Construction Manager within seven days for checking and approval.

At a meeting held on or before the assigned billing date of each month, the Construction Manager, Project Consultant, Inspector and Contractor will review the Contractor's proposed percentages of completion and agree on a final percentage to be paid for that month.

On or about the twenty-fifth (25th) day following the assigned billing date of the month in which the work was performed, the County shall pay to the Contractor ninety-five (95%) percent of the value of said work in place, as checked and approved by the Construction Manager. The balance of five (5%) percent of the estimate shall be retained by the County until the time of final acceptance of said work. In lieu of the five (5%) percent retainage, the Contractor may substitute securities as provided in Article 9.3.5 below.

- .1 If the County does not pay the Contractor within thirty (30) days after receipt of an undisputed and properly submitted payment request for a progress payment, excluding that portion of the final payment designated by the Contract as retention earnings, then the County shall pay interest to the Contractor as provided by Public Contract Code § 20104.50. Payment for Change Orders, if any, under this Contract shall be made in like manner. Said interest penalty is the sole recourse of Contractor and Contractor shall have no right to stop the Work until payment of the amount owing has been received, nor shall the Contract Time be extended, nor shall the Contract Sum be increased in any way, including by reason of any costs incurred by Contractor, except to the extent of said interest payment.
- .2 Pursuant to Public Contract Code § 7107, in the event of a dispute between the County and Contractor, the County may withhold from the final payment an amount not to exceed one hundred and fifty (150%) percent of the disputed amount. Except as so provided, the County shall release the retention withheld within sixty (60) days after the date of completion of the work of improvement, as "completion" is defined in Public Contract Code § 7107. In the event that retention payments are not made within the time periods required by Public Contract Code § 7107, then the County may be subject to the

interest provisions of Public Contract Code § 7107.

- 9.3.6 Security Substitutions and Escrow for Moneys Withheld to Insure Contractor's Performance. Pursuant to Public Contract Code section 22300, the Contractor may deposit in an escrow, equivalent securities for any moneys withheld to ensure performance and have said moneys paid directly to Contractor, or, in the alternative, have the County deposit such moneys directly into an escrow. Upon the closing of any such escrow, Contractor shall pay to each subcontractor, not later than twenty (20) days after receipt of the closing payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the Contractor. Any escrow established pursuant to this article shall be with a state or federally chartered bank, shall be at the sole expense of the Contractor, and shall be established using an escrow agreement in substantially the following form:

Either alternative under this Section may be exercised only if requested in writing by the Contractor within five (5) days after receipt of Notice of Intent to Award. The Contractor shall notify its subcontractors in writing within fifteen (15) days of exercising this option.

**ESCROW AGREEMENT FOR
SECURITY DEPOSITS IN LIEU OF RETENTION**

This Escrow Agreement ("Escrow Agreement") is made and entered into by and between the County of Tulare, _____ (hereinafter _____ called "County"), _____ (hereinafter called "Contractor"); and _____, a state or federally chartered bank in California, (hereinafter called "Escrow Agent").

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

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by County pursuant to the Construction Contract entered into between the County and Contractor for _____ in the amount of \$ _____, and dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the County shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the County within ten (10) days of the deposit. The market value of the securities at the time of the substitution, as valued by the County, shall be at least equal to the cumulative total cash amount then required to be withheld as retention under the terms of the Contract. If the County determines that the securities are not adequate then it will notify Contractor and Escrow Agent, and Contractor shall deposit additional security as further determined by the County. Securities shall be held in the name of the County and shall designate the Contractor as the beneficial owner.
2. Upon the deposit of adequate securities, County shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions.
3. When the County, at Contractor's written request, makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this Escrow Agreement is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the County pays the Escrow Agent directly.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the County. These expenses and payment terms shall be determined by the County, Contractor, and Escrow Agent.
5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the County.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from County to the Escrow Agent that County consents to the withdrawal of the amount sought to be withdrawn by Contractor.
7. The County shall have the right to draw upon the securities or any amount paid directly to Escrow Agent in the event of default by the Contractor. Upon seven (7) days written notice to the Escrow Agent from the County of the default, the Escrow Agent shall immediately convert the securities to

cash and shall distribute the cash, including any amounts paid directly to Escrow Agent, as instructed by the County. Escrow Agent shall not be concerned with the validity of any notice of default given by County pursuant to this paragraph and shall promptly comply with County's instructions to pay over said escrowed assets. Escrow Agent further agrees to not interplead the escrowed assets in response to conflicting demands and hereby waives any present or future right of interpleader.

8. Upon receipt of written notification from the County certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.
9. Escrow Agent shall rely on the written notifications from the County and Contractor pursuant to Sections (3), (5), (6), (7) and (8) of this Escrow Agreement and the County and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.
10. Securities eligible for investment under this Escrow Agreement, as provided by Public Contract Code § 22300, shall be those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and County.
11. The venue of any litigation concerning the rights and obligations of the parties to this Escrow Agreement shall be the County of Tulare and the removal provisions of Code of Civil Procedure Section 394 shall not apply to any such litigation.
12. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the County and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of County:

Title
Name
Signature
Address

On behalf of Contractor:

Title
Name
Signature
Address

On behalf of Escrow Agent:

Title
Name
Signature
Address

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

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

County:

Title
Name
Signature
Address

Contractor:

Title
Name
Signature
Address

Agent:

Title
Name
Signature
Address

9.3.7 Itemized Breakdown.

The Contractor shall submit a financial breakdown of the Work, itemized by crafts or sections as designated by the Construction Manager. The Contractor's payment shall be based upon the monthly percentage of completion of these items.

9.3.8 Lien Waivers.

The County or Construction Manager may require the Contractor to submit, along with the progress payment request, notarized lien waivers from each subcontractor, materials, or equipment supplier. Lien waivers shall comply with Civil § Code 3262. The aggregate sum of which shall reflect previous progress payments.

9.4 **CERTIFICATES FOR PAYMENT**

9.4.1 The Construction Manager will, within seven (7) days after the receipt of the Project Application for Payment, review the Project Application for Payment and either issue a Project Certificate for Payment to the County for such amounts as the Construction Manager determines are properly due, or notify the Contractor in writing of the reasons for withholding a Certificate as provided in Subparagraph 9.6.1. The application for payment shall be made on AIA Documents G702 and G703 of the latest edition, in triplicate.

9.4.2 The issuance of a Project Certificate for Payment will constitute a representation by the Construction Manager, Project Consultant and Inspector to the County that, based on their observations at the Site as provided in Subparagraph 2.2.4 and the data comprising the Project Application for Payment, the Work has progressed to the point indicated; that, to the best of the Construction Manager's, Project Consultant's and Inspector's knowledge, information and belief, the quality and timeliness of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Completion of the Work, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in the Certificate); and that the Contractor is entitled to payment in the amount certified. However, by issuing a Project Certificate for Payment, the Construction Manager, Project Consultant and Inspector shall not thereby be deemed to represent that they have made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, have reviewed the construction means, methods, techniques, sequences or procedures, or have made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

9.5 **PROGRESS PAYMENTS**

9.5.1 After the Construction Manager has issued a Project Certificate for Payment, the County shall make payment in the manner and within the time provided in the Contract Documents.

9.5.2 The Contractor shall promptly pay each Subcontractor upon receipt of payment from the County, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to their Sub-subcontractors in similar manner.

9.5.3 The Construction Manager may on request, at the Construction Manager's discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Construction Manager on account of Work done by such Subcontractor.

9.5.4 Neither the County nor the Construction Manager shall have any obligation to pay or to see to the payment of any monies to any Subcontractor or Material Suppliers except as may otherwise be required by law.

9.5.5 Neither certification of a progress payment, delivery of a progress payment, nor partial or entire use or occupancy of the Project by the County, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.6 PAYMENTS WITHHELD

9.6.1 The Construction Manager may decline to certify payment and may withhold the Certificate in whole or in part to the extent necessary to reasonably protect the County, if, in the Construction Manager's opinion, the Construction Manager is unable to make representations to the County as provided in Subparagraph 9.4.2. If the Construction Manager is unable to make representations to the County as provided in Subparagraph 9.4.2, and to certify payment in the amount of the Project Application, then the Construction Manager will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor and the Construction Manager cannot agree on a revised amount, then the Construction Manager will promptly issue a Project Certificate for Payment for the amount for which the Construction Manager is able to make such representations to the County. The Construction Manager may also decline to certify payment or, because of subsequently discovered evidence or subsequent observations, the Construction Manager may nullify the whole or any part of any Project Certificate for Payment previously issued to such extent as may be necessary, in the Project Consultant's opinion, to protect the County from loss because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, including claims by separate contractors;
- .3 failure of the Contractor to make payments properly to Subcontractors, or for labor, materials, or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the County or another contractor;
- .6 reasonable evidence that the Work will not be accomplished in compliance with the Contract Time;
- .7 persistent failure to carry out the Work in accordance with the Contract Documents; or
- .8 stop notice served upon the County.
- .9 Failure of the Contractor to comply with any lawful or proper direction concerning the Work given by any County representative authorized to have given such instruction;
- .10 Claims and/or penalties which state law assesses against the Contractor for violation of such law;
- .11 Any claim or penalty asserted against the County by virtue of the Contractor's failure to comply with the provisions of all governing laws, ordinances, regulations, rules, and orders;
- .12 Any liquidated damages which may accrue as a result of the Contractor's progress failing to meet the schedule milestones or failing to achieve completion within the Contract Time.
- .13 Any reason specified elsewhere in the Contract Documents as grounds for a retention or that would legally entitle the County to a withhold.

9.6.2 When the grounds in Subparagraph 9.6.1 above are removed, payment shall be made for amounts withheld because of them.

In order to adequately protect the County, the Contractor agrees that the basic standard to determine the amount to be withheld pursuant to this Section shall be one hundred fifty percent (150%) of the amounts claimed or the value of the work not done or defectively done; provided,

however, that County reserves the authority to retain greater sums should such sums be necessary in the County's discretion to adequately protect it.

Disbursement of Withheld Amounts.

The County, in its sole discretion, may apply any withheld amount or amounts to the payment of any claim resulting in a withhold. The Contractor agrees and hereby designates the County as its agent for such purposes, and any payment so made by the County shall be considered as a payment made under this Contract by the County to the Contractor. The County shall not be liable to the Contractor for any payments made in good faith. Such payments may be made without a prior judicial determination of the claim or claims. The County shall render to the Contractor a proper accounting of any funds disbursed on behalf of the Contractor.

Prior to disbursing any amounts, County shall afford the Contractor an opportunity to present good cause, if any it has, why the claim or claims in issue are not valid or just claims against the Contractor. The County reserves the right then to take such further steps as are appropriate, in its sole discretion, including, but not limited to, seeking a judicial resolution of the controversy.

Correction of Statement and Withholding of Payment.

No inaccuracy or error in any statement provided by the Contractor shall operate to release the Contractor or any surety from the error, or from damages arising from such work, or from any obligation imposed by the Contract Documents. The County shall retain the right subsequently to correct any error made in any previously issued claim for the progress payment, or progress payment issued, by adjustments to subsequent payments.

Effect of Progress Payments.

Neither the payment, the withholding, nor the retention of all or any portion of any progress payment claimed to be due and owing to the Contractor shall operate in any way to relieve the Contractor from its obligations under this Agreement. The Contractor shall continue diligently to prosecute the Work without reference to the payment, withhold, or retention of any progress payment. The payment, withhold, or retention of any progress payment shall not be grounds for an extension of the Contract Time.

9.7 COMPLETION, INSPECTION, AND OCCUPANCY BY COUNTY

9.7.1 Notice of Punch List Inspection.

When the Contractor believes that a phase of its Work is complete, it shall request in writing a punch list inspection. Within five (5) days of the receipt of such request, the Construction Manager and the Project Consultant shall make a punch list inspection or inform the Contractor that the Work is not ready for punch list inspection; upon completion of the deficient work, the Contractor shall again request a punch list inspection. The Contractor or its representatives shall be present at the punch list inspection. The purpose of the punch list inspection is to determine whether the Work has been completed in accordance with the Contract Documents, including all Change Orders, all interpretations and instructions previously issued.

If Contractor fails to attend any punch list inspection, then the Contractor shall be charged for the cost of the Construction Manager, Project Consultant, the Inspector, and other design professionals who attended the punch list inspection.

Punch List.

The Construction Manager and the Project Consultant shall notify the Contractor in writing of any deficiencies to be remedied prior to final acceptance, by preparing a written list, known in the industry as a punch list.

The Contractor shall remedy all items shown on the punch list prior to final acceptance by the

Construction Manager and the Project Consultant.

No one is authorized to amend the Contract Documents by use of the punch list; it is provided solely for the benefit of the Contractor to enable it to determine what items must be corrected before final acceptance will be recommended by the Construction Manager and the Project Consultant. The County reserves the right to require compliance with the Contract Documents, notwithstanding the issuance of a punch list or the completion by the Contractor of all items on the punch list.

In the event that the Work still does not comply with the Contract Documents, then the County reserves the right to issue such further punch lists as may be required, or to deduct from the final payment the cost of correcting any work not completed in accordance with the Contract Documents, but accepted by the County, without the issuance of further punch lists.

If punch list work needs to be performed after the County has taken occupancy of a phase, then the work shall be conducted outside of normal operating hours at the direction of the Construction Manager.

9.7.2 Use of Work Prior to Acceptance.

Whenever, in the opinion of the County, the Work, or any part thereof, is in a condition suitable for use, and the best interests of the County require such use, then the County may take possession of, connect to, and open for public or County use that portion of the Work.

9.7.3 Repairs or Renewal in the Work.

Prior to the Date of Completion, the Contractor shall make all repairs or renewals in the portion of the Work occupied made necessary due to defective material or workmanship, or the operations of the Contractor, ordinary wear and tear accepted.

9.7.4 Effect of Occupancy.

The County occupancy as contemplated in this Article shall not constitute acceptance by the County of the Work or any part thereof. Such use shall neither relieve the Contractor of any of its responsibilities under the Contract Documents, nor act as a waiver by the County of any of the terms or conditions of the Contract Documents. Any damage done by the County is the responsibility of the County.

9.7.5 Coordination with Other Activities.

The Contractor shall conduct its operations so as not to interfere unreasonably with the County's use of the occupied portions of the Site. The Contractor shall submit periodic schedules to the Construction Manager proposing the times, areas, and types of work to be done within such areas.

If the Work produces conditions rendering the occupied portions of building, the Site, or other areas uninhabitable, either because of noise, dust, vibration, smoke, fumes, or for any other cause whatsoever, then the Construction Manager may suspend the Work or direct the Contractor to modify the Construction Schedule, and the Contractor shall comply.

Except as provided by Change Order, the Contractor shall not be entitled to a time extension or increase in the Contract Sum by virtue of conflicts between the Contractor's work and the County's occupancy.

9.7.6 Warranties required by the Contract Documents shall commence on the date of the recording of the Notice of Completion on the Project.

9.8 **FINAL COMPLETION, CONTRACT CLOSEOUT AND FINAL PAYMENT**

9.8.1 Contractor's Request for Final Payment.

When the Contractor determines that the Contract is complete and all items on the punch list have been satisfied, or contends that such items are not required by the Contract Documents, the Contractor shall submit a request for final payment.

9.8.2 Additional Submissions.

Simultaneously with the Contractor's request for final payment, the Contractor shall submit the following items to the Construction Manager:

- A. As-built drawing information pursuant to Section 4.11.3.
- B. Three (3) sets of documentation completely covering the operation and maintenance of the mechanical and electrical installation, elevators, kitchen equipment, and all other equipment required by the technical specifications to be furnished with such manuals. The documentation shall include charts, diagrams, performance curves, catalog information, lubrication manuals, and details pertaining to the functioning of various items of equipment. The documentation shall be divided logically into "systems" on the basis of operation, without respect to trades, subcontractors or arbitrary specifications sections. The relationship of the "systems" shall be clearly and concisely detailed.

No payment will be processed unless accompanied by the listed documents in acceptable form.

Final Estimate.

Upon receipt of the submittals required by this Article, the Construction Manager shall prepare a written estimate of the sum due to the Contractor. This estimate shall take into account the Contract Sum, as adjusted by any Change Orders; amounts already paid; and sums to be retained for incomplete work, liquidated damages, and for any other cause under the Contract Documents.

The Project Consultant shall prepare a statement of final inspection, stating that the Work has been given a final inspection, that the Contractor has submitted the required documents, setting forth with detail any deviations in the Work as completed from the Contract Documents, and estimating the cost of correction of such deviations.

The Project Consultant's statement shall be transmitted to the County along with the Contractor's request for final payment. The Construction Manager shall provide a copy of the Project Consultant's statement of final inspection and the Construction Manager's estimate of the sum due to the Contractor.

If the Contractor contests the estimate of sums due prepared by the Construction Manager, within seven (7) calendar days following service of Construction Manager's estimate of the sum due, then the Contractor shall file its protest in writing with the County, setting forth in detail all grounds alleged by it to justify an adjustment to the Construction Manager's final estimate. Failure to file a timely protest shall constitute a waiver and acceptance by the Contractor of the Construction Manager's estimate.

Notice of Completion and Acceptance of Contract.

Acceptance of the Work by the County and the recordation of a Notice of Completion shall be in the manner prescribed by law, provided that the Work shall then be fully and satisfactorily completed, and the provisions of the Contract Documents fully and satisfactorily performed in all respects.

Certificate of Final Payment.

Within ten (10) days after the recordation of the Notice of Completion, the County shall present a certificate of final payment stating the entire balance found to be due the Contractor. The amount set forth in that certificate shall then be due and payable, less retentions due to stop notices.

Approval of Final Payment.

Following receipt of the certificate of final payment by the County, the County shall authorize final payment to the Contractor in the sum specified on the certificate of final payment, subject to retentions for stop notices as provided in Article 14. Final payment shall be made within sixty (60) days after recordation of the Notice of Completion and in accordance with Public Contract Code Section 7107.

Withholding for Stop Notices.

The County may, in its sole discretion, and at any time, withhold from the Contractor any unpaid claims alleged in Stop Notices filed pursuant to Civil Code Section 9000 et seq. The County reserves all remedies it may have in the event of a stop notice dispute. The basic standard to determine a sufficient withholding in the event of a Stop Notice shall be one hundred fifty percent (150%) of the total of all stop notices filed; provided, however, the County reserves the right to withhold different or greater sums in its discretion.

Non-Waiver.

Neither acceptance of, nor payment for, the Work or any part thereof, nor any extension of time, nor any possession taken by County shall operate as a waiver of any of the provisions of this Contract, nor shall a waiver of any breach of this Contract be held to be a waiver of any other or subsequent breach. In addition, the recordation of a Notice of Completion shall not be deemed an acceptance of latent defects, nor shall it constitute a waiver of any of the provisions of this Agreement.

- 9.8.3 Final completion of the Work is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting final completion, and the Construction Manager so confirms, the County shall, upon application by the Contractor and certification by the Construction Manager and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Paragraph 7.5, then the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Construction Manager prior to certification of such payment. Such payment shall be made under the Terms and Conditions governing final payments, except that it shall not constitute a waiver of claims. AIA Documents G707, Consent of Surety Company to Final Payment or if appropriate G707-A, Consent of Surety to Reduction in or Partial Release of Retainage, shall be used.
- 9.8.4 The acceptance of final payment shall, after the Date of Completion of the Project, constitute a waiver of all claims by the Contractor.
- 9.8.5 All provisions of the Agreement, including without limitation those establishing obligations and procedures, shall remain in full force and effect notwithstanding the making or acceptance of final payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

- 10.1.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. The responsibility for maintaining a safe working site shall be the Contractor's, and the County and Construction Manager are under no obligation to suspend the work or notify the Contractor of any hazardous conditions or

noncompliance with safety laws.

10.2 SAFETY OF PERSONS AND PROPERTY

- 10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:
- .1 all employees on the Work and all other persons who may be affected thereby;
 - .2 all the work and all materials and equipment to be incorporated therein, whether in storage or off the Site, under the care, custody, or control of the Contractor or any of the Contractor's Subcontractors or Sub-subcontractors;
 - .3 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; and
 - .4 the work of the County or other separate contractors.
- 10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury, or loss.
- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and the progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying County and users of adjacent facilities. The Contractor shall enforce any instructions from the Construction Manager or County regarding placement of signs, fires, danger signals, barricades, radios, noise, and smoking.
- 10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.
- 10.2.5 The Contractor shall promptly remedy all damage or loss to any property referred to in Clauses 10.2.1.2. and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, anyone directly or indirectly employed by any of them, or any one for whose acts any of them may be liable, and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable solely to the acts or omissions of the County, the Construction Manager, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 4.17.
- 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the Site whose duty shall be the prevention of accidents. This person shall be the Contractor's Project Superintendent unless otherwise designated by the Contractor in writing to the County and the Construction Manager.
- 10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.
- 10.2.8 Traffic Signs and Traffic Control
Existing signs, lights, traffic signals, control boxes, hydrants, meters, and other similar items occurring

within the street or sidewalk areas shall be kept free of obstructions and accessible at all times. All such items shall be protected from the Contractor's operations and shall not be obliterated or obscured by its equipment or materials.

Should it be necessary to cover up, move, or alter such items, then this shall be done only with permission of the authorities having jurisdiction over the items involved.

Should it be necessary to block a street or sidewalk, then the Contractor shall first notify the Construction Manager and the police and fire departments and other agencies with jurisdiction, and shall comply with their instructions, including scheduling limitations.

10.2.9 Security of the Site.

The Contractor's attention is directed to Specifications Section 01500 (if applicable) regarding requirements for fencing the Site, gates, and screening. The Contractor's attention is further directed to the security requirements in the Construction Administrative Procedures Manual.

10.2.10 Removal of Barricades.

Upon completion of the Work, the Contractor shall remove from the Site all materials used for barricades, temporary scaffolding, or any other temporary uses.

10.2.11 Protection of Adjacent Property; Notices.

In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin, and protect as may be necessary all foundations and other parts of all existing structures on the Site or adjacent to the Site which are in any way affected by the excavations or other operations connected with the completion of the Work.

Prior to excavation, the Contractor shall notify all public utilities and governmental agencies of the work proposed and shall ascertain from them the exact location of their utilities.

Prior to commencing any work which in any way affects adjoining or adjacent land or buildings thereon, or public utilities, the Contractor shall notify the Construction Manager, who will send the County and occupants thereof a notice, which specifies the type of work to be done, the schedule of the work, the impacts expected from the work and the protective measures being taken by the Contractor. The notice shall also specify that any person receiving notice who has questions regarding it may contact the Construction Manager.

Whenever any notice is required to be given to any adjoining or adjacent landowner, utility, governmental agency, or other party before commencement of any work, then the notice shall be given by the Contractor at least seven (7) days in advance of the work, or longer if required by law or regulation, with a copy delivered to the Construction Manager.

The Contractor shall, at the written instruction of the Construction Manager, meet with any recipient of such notice to explain and discuss the proposed work.

10.2.12 Fire Protection.

The Contractor shall take all steps necessary to protect all structures from fires and sparks originating from the Work, shall comply with all laws and regulations regarding fire protection, and shall comply with all instructions of the fire department with jurisdiction.

The Contractor shall notify the Construction Manager and the fire department in writing at least seventy-two (72) hours prior to disconnection of either water or electrical service to the Site and shall comply with the fire department's instructions regarding fire safety.

10.2.13 Repairs or Replacement.

Any damage to existing conditions, or to any other improvement or property above or below the surface of the ground, whether private or public, arising from performance of this Contract shall be repaired within forty-eight (48) hours by the Contractor without expense to the County, unless disruption of existing facility operations or creation of a safety hazard has occurred, in which case damage will be corrected immediately.

If, in the opinion of the Project Consultant, the best interest of the County requires that repairs be made prior to the execution of any further work, then the Construction Manager will so notify the Contractor who shall delay or discontinue that part of the Work until the necessary repair has been made. Such delay shall not be considered unavoidable, and no extension of the Contract Time will be granted therefore.

Upon the failure of the Contractor to comply with any such order, or upon the Contractor's failure to make immediate emergency repairs which are necessary to protect the Work, the County shall do that work itself as is necessary to protect life and property, in its sole discretion, and deduct the total cost of such work from the next progress payment. No prior notice to the Contractor shall be necessary for the County to take this action.

10.3 **EMERGENCIES**

10.3.1 In any emergency affecting the safety of persons or property, including adjoining property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. The Contractor shall immediately notify the Construction Manager of such actions. Any costs to the Contractor for expenditures or time shall be borne by the Contractor.

ARTICLE 11 **INSURANCE**

11.1 **CONTRACTOR'S INSURANCE.**

Bidders' and their subcontractors attention are directed to the insurance requirements below. It is highly recommended that Bidders confer with their respective insurance carriers or brokers to determine in advance of bid submission the availability of insurance certificates and endorsements as prescribed and provided herein. If an apparent low bidder fails to comply strictly with the insurance requirements, then that Bidder may be disqualified from award of the Contract and will forfeit its Bid Bond.

Contractor and subcontractors shall provide and maintain insurance for the duration of the warranty period against claims for injuries to persons and damage to property, which may arise from, or in connection with, performance under the Agreement by the Contractor, its agents, representatives, employees, or subcontractors, if applicable.

A. Minimum Scope & Limits of Insurance

1) Coverage at least as broad as Commercial General Liability, insurance Services Office Commercial General Liability coverage occurrence form GC 00 01, with limits no less than \$2,000,000 per occurrence including products and completed operations, property damage, bodily injury, and personal & advertising injury. If a general aggregate limit applies, then either the general aggregate limit shall apply separately to this Project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.

- 2) Automobile Liability Insurance of \$1,000,000 per occurrence for bodily injury and property damage covering any auto. If the annual aggregate applies, then it must be no less than \$2,000,000.
- 3) Workers' Compensation Insurance as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than \$1,000,000 per accident for bodily injury or disease.
- 4) Builders Risk. (County shall be named loss payee as its interest may appear)
- 5) All Risk (Special Perils) covering completed value of the Project with no coinsurance penalty provision but not necessarily including flood and earthquake coverage.
- 6) Professional Liability of \$1,000,000 per occurrence or claim for design and build.
- 7) Contractors Pollution Legal Liability and/or Asbestos Legal Liability and/or errors and omissions of \$1,000,000 each occurrence with \$2,000,000 policy aggregate.

B. Specific Provisions of the Certificate.

1. If any of the required insurance is written on a claims made form, then the retroactive date must be before the date of the contract or the beginning of the contract work and must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract work.
2. The General Liability and Automobile Liability policies are to be endorsed to contain the following provisions:
 - a. *The COUNTY, its officers, agents, officials, employees, and volunteers are to be covered as additional insureds as respects: liability arising out of work or operations performed by or on behalf of the Contractor; or automobiles owned, leased, hired, or borrowed by the CONTRACTOR.*
 - b. *For any claims related to this Project, the CONTRACTOR's insurance coverage shall be primary insurance as respects the COUNTY, its officers, agents, officials, employees, and volunteers. Any insurance or self-insurance maintained by the COUNTY, its officers, agents, officials, employees, or volunteers shall be excess of the CONTRACTOR's insurance and shall not contribute with it.*
 - c. *Each insurance policy required by this agreement shall be endorsed to state that coverage shall not be canceled by either party, except after thirty (30) days prior written notice has been provided to the COUNTY.*
 - d. *CONTRACTOR hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation.*
3. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the County for all work performed by the Contractor, its employees, agents, and subcontractors. Contractor waives all rights against the County and its officers, agents, officials, employees, and volunteers for recovery of damages to the extent these damages are covered by the workers compensation and employer's liability.

- C. Deductibles and Self- Insured Retentions.
Self-insured retentions must be declared, and the County Risk Manager must approve any deductible or self-insured retention that exceeds \$100,000.
- D. Acceptability of Insurance.
Insurance must be placed with insurers with a current rating given by A.M. Best and Company of no less than A-: VII and a Standard & Poor's Rating (if rated) of at least BBB and from a company approved by the Department of Insurance to conduct business in California. Any waiver of these standards is subject to approval by the County Risk Manager.
- E. Verification of Coverage.
Prior to approval of this Agreement by the County, the Contractor shall file with the Tulare County Board of Supervisors, certificates of insurance with original endorsements effecting coverage in a form acceptable to the County. Endorsements must be signed by persons authorized to bind coverage on behalf of the insurer. The County reserves the right to require certified copies of all required insurance policies at any time.

11.1.2 ADDITIONAL CONSTRUCTION INSURANCE REQUIREMENTS.

- a. Payment Bond: For public works projects of more than \$25,000 a "payment bond" is required in the full amount of the Contract price and shall insure to the benefit of persons performing labor or furnishing materials in connection with the Work of the Contract. This bond shall be maintained in full force and effect until all work under the Contract is completed and accepted by the County, or until all claims for materials and labor have been paid, whichever is longer.
- b. Performance Bond: For public works projects of more than \$25,000 a "performance bond" is required in the full amount of the Contract price and shall ensure the faithful performance by Contractor of all work under the Contract. It shall also insure the replacing of, or making acceptable, any defective materials or faulty workmanship.
- c. Acceptability of Surety: Only California admitted sureties with current AM Best Rating of no less than VII are acceptable.

ARTICLE 12
CHANGES IN THE WORK

12.1 **CHANGE ORDERS**

- 12.1.1 Definition: A Change Order is a written order to the Contractor signed to show the agreement of the County, the Contractor, the Project Consultant, and the Construction Manager issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time shall be changed only by Change Order. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including the adjustment in the Contract Sum or the Contract Time, for full and final settlement of all costs (direct, indirect, and overhead) related to the Work authorized by the Change Order.
- 12.1.2 Subject to legal requirements relating to competitive bidding, the County, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletion or other revisions, the Contract Sum and Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order and shall be performed under the applicable conditions of the Contract Documents.

PCO/Work Orders.

Changes also may be made pursuant to a PCO/Work Order, which shall direct a change in the Work and state a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. A PCO/Work Order shall be used in the absence of total agreement on the terms of a Change Order, or when time does not permit processing of a Change Order prior to implementation of the change. Work completed under a PCO/Work Order not yet converted to a Change Order may be billed on progress billings only to an amount that does not cause the total billing to exceed eighty-five percent (85%) of contract value as modified by approved change orders.

Upon receipt of a PCO/Work Order, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager within five (5) calendar days of the Contractor's agreement or disagreement with the method, if any, provided in the PCO/Work Order for determining the proposed adjustment in the Contract Sum or Contract Time.

Failure to respond to and return a PCO/Work Order to the County within five (5) days indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

Costs mean an itemized breakdown of all labor (by crafts), materials, sales taxes, large equipment rentals, etc., for each portion of the Work which comprises the change order including any subcontractor's itemized breakdown.

The Contractor's combined overhead and profit for work performed by its own forces shall be fifteen percent (15%) of the costs. If the changed work is performed by a Subcontractor, then the Subcontractor shall also be entitled to an allowance of fifteen percent (15%) of its labor costs for overhead and profit, and fifteen percent (15%) of its material costs. The Contractor shall be allowed to mark-up the Subcontractor's price five percent (5%) for its overhead and profit. Cumulative total markup for all tiers of contractors and subcontractors shall not exceed twenty percent (20%).

The cost or credit to the County resulting from a change in the Work shall be determined in one or more of the following ways:

- .1 by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 by unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 by the method provided in Subparagraph 12.1.3.1 and 12.1.3.2.
- .5 A "cost plus" adjustment subject to the following limitations:

- 12.1.2.5.1 Record Keeping. In the event that the pricing method selected is the "cost plus" method described above, then the Contractor shall keep and present daily, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data of the labor, materials, and equipment used during that day. All labor shall be recorded on separate time sheets clearly identified with the PCO/WO number and scope of extra work involved. These time sheets shall be signed daily by the Inspector or the Construction Manager. No costs will be allowed for time not recorded and signed the same day the work takes place. The Contractor and the Construction Manager shall discuss and attempt to resolve

any disputes concerning the Contractor's daily records at the time the report is submitted.

- 12.1.2.5.2 Reconciliation. The Contractor shall on a monthly basis accompanying the progress payment request submit a reconciliation for all work performed under a cost plus PCO during the period of the progress payment. A final reconciliation shall be submitted within 30 days after the work of the PCO is completed. The reconciliation shall recap all costs and appropriate markups for the period. No costs will be allowed for work not included in a reconciliation within the time periods specified.
- 12.1.3 If none of the methods set forth in Clauses 12.1.2.1, 12.1.2.2, or 12.1.2.3 are agreed upon, then the Contractor, provided that a written order signed by the County is received, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Construction Manager, on the basis of reasonable expenditures or savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit as specified below. In such case, and also under Clause 12.1.2.3 above, the Contractor shall keep and present, in such form as the County or the Construction Manager may prescribe, an itemized accounting of actual cost together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor including social security, Medicare and unemployment insurance and fringe benefits required pursuant to Section 15.9; workers' or workmen's compensation insurance; rental value of equipment and machinery exclusive of small tools, whether rented from the Contractor or others; and the additional costs of supervision as follows:
- 12.1.3.1 Costs of first line supervision labor, including labor burden as described in 12.1.3. "First Line Supervision" shall mean a working foreman or lead craft worker other than the Project Superintendent;
- 12.1.3.2 Actual cost of the Project Superintendent associated with any period of compensable delay caused by issuance of the change order. In the absence of a compensable delay, all of the Project Superintendent's time is considered to have been paid for as part of the overhead;

Upon determination of cost by the Construction Manager, payments to the Contractor may be made based on the Construction Manager's approval of a Project Certificate for Payment. If the Contractor disputes the Construction Manager's cost determination, then the Contractor may initiate a claim per the claims and disputes resolution provisions of Paragraph 7.4.

"Overhead" shall include the following: Preparation of all paperwork related to changes in the Work, including field review, estimating and cost breakdown; coordination and supervision, both office and field, including the Project Superintendent; vehicles including gas and maintenance; small tools, incidentals and consumables; engineering, detailing, and revisions to shop drawings and as-built drawings; general office expense; extended and unabsorbed home office overhead; warranty; costs of bonds, liability insurance, and all taxes; and all other expenses not specifically included in Section 12.1.3 above.

The amount or credit to be allowed by the Contractor or subcontractor to the County, as confirmed by the Construction Manager, for any deletion or change that results in a decrease in the Contract Sum will be the amount of the actual net cost plus five percent (5%) for overhead and profit. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase or decrease, if any, with respect to that change.

- 12.1.4 Variation in Estimated Quantities. If unit prices are stated in the Contract Documents or

subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order, that application of the agreed unit prices to the quantities of Work proposed will cause substantial inequity to the County or the Contractor, then the applicable unit prices shall be equitably adjusted.

Effect on Sureties.

All changes authorized by the Contract Documents may be made without notice to or consent of the sureties on the Contract bonds and shall not reduce the sureties' liability on the bonds.

The County reserves the right to require additional payment or performance bonds to secure a change order.

12.2 CONCEALED CONDITIONS

12.2.1 If this Contract requires the digging of trenches or other excavations that extend deeper than four feet below the existing surface, then the following provision shall apply to those trenches or excavations:

12.2.1.1 In the event that any of the following described conditions is suspected to exist in the trench or excavation, then the Contractor shall promptly, and before the condition is disturbed, notify the Construction Manager, in writing, of any:

- a. Material that the Contractor believes may be material that is 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.
- b. Subsurface or latent physical conditions at the Site differing materially from those indicated.
- c. Unknown physical conditions at the Site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

12.2.1.2 Upon receipt of notice from the Contractor, the Construction Manager, the County and the Project Consultant shall promptly investigate the conditions, and if it is determined that the conditions do materially so differ or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, shall issue a Change Order or PCO/Work Order under the procedures described in 12.3.

12.2.1.3 In the event that a dispute arises between the County and the Contractor as to 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, then the Contractor shall not be excused from any scheduled completion date provided for by the Contract Documents, but shall proceed with all work to be performed under the Contract Documents. The Contractor shall retain any and all rights provided either by the Contract Documents or by law which pertain to the resolution of disputes and protests between the contracting parties.

12.3 REQUEST FOR EQUITABLE ADJUSTMENT

12.3.1 If the Contractor considers a Request for Equitable Adjustment is justified for an increase in the Contract Sum or Contract Time, then the Contractor shall promptly, upon first observance of the

condition giving rise to the request, provide the Construction Manager and County written notice of such condition and circumstance. This notice shall be given by the Contractor before proceeding to execute the Work, except in emergency endangering life or property in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such request shall be valid unless so made. Any change in the Contract Sum or Contract Time resulting from such request for equitable adjustment shall be authorized by Change Order.

12.3.2 If the Contractor requests that additional cost or time is involved because of, but not limited to, (1) any written interpretation pursuant to Subparagraph 2.2.8, (2) any order by the County to stop the Work pursuant to Paragraph 3.3 where the Contractor was not at fault, or any such order by the Construction Manager as the County's agent, (3) any written order for a minor change in the Work issued pursuant to Paragraph 12.4, then the Contractor shall make such request for equitable adjustment as provided in Subparagraph 12.3.1.

12.4 **MINOR CHANGES IN THE WORK**

12.4.1 The Construction Manager will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be enacted by written order issued through the Construction Manager and shall be binding on the County and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 13 **UNCOVERING AND CORRECTION OF WORK**

13.1 **UNCOVERING OF WORK**

13.1.1 If any portion of the Work should be covered contrary to the request of the Construction Manager or to requirements specifically expressed in the Contract Documents, then it must, if required in writing by the Construction Manager, be uncovered for their observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Construction Manager has not specifically requested to observe prior to it being covered, then the Construction Manager may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, then the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the County. If such Work be found not in accordance with the Contract Documents, then the Contractor shall pay such costs unless it be found that this condition was caused by the County, or a separate contractor as provided in Article 6 in which event the County shall be responsible for the payment of such costs.

13.2 **CORRECTION OF WORK**

The County shall have the right to reject materials and workmanship which are determined by the Construction Manager, the Project Consultant, or the Inspector to be defective or fail to comply with the Contract Documents. Rejected workmanship shall be corrected satisfactorily and rejected materials shall be removed from the premises and replaced, all without cost to the County.

13.2.1 The Contractor shall correct, within seven (7) days, all Work rejected by the Construction Manager as defective or as failing to conform to the Contract Documents whether observed before or after Completion of the Work and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Construction Manager's additional services made necessary thereby.

- 13.2.2 If, within three (3) years after the recordation of the Notice of Completion of the Work or designated portion thereof, or within three (3) years after acceptance by the County of designated equipment, or within such longer period of time as may be prescribed by the terms of any applicable special warranty required by the Contract Documents, any of the Work to be found to be defective or not in accordance with the Contract Documents, then the Contractor shall correct it promptly after receipt of a written notice from the County to do so unless the County has previously given the Contractor a written acceptance of such condition. This obligation shall survive both final payment for the Work or designated portion thereof and termination of the Contract. The County shall give such notice promptly after discovery of the condition.
- 13.2.3 The Contractor shall, at its sole expense, remove from the Site all portions of the Work, which are defective or nonconforming and which have not been corrected under Subparagraphs 4.5.1, 13.2.1 and 13.2.2, unless removal is waived by the County.
- 13.2.4 If the Contractor fails to correct defective or nonconforming Work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, then the County may correct it in accordance with Paragraph 3.4.
- 13.2.5 If the Contractor does not proceed with the correction of such defective or nonconforming Work within a reasonable time fixed by written notice from the Construction Manager, then the County may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, then the County may, upon ten (10) additional days' written notice, sell such Work at auction or at private sale and shall account for the proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Construction Manager, Project Consultant or other Professional's additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, then the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, then the Contractor shall pay the difference to the County.
- 13.2.6 The Contractor shall bear the cost of making good all work of the County or separate contractors destroyed or damaged by such correction or removal.
- 13.2.7 Nothing contained within Paragraph 13.2 (Correction of Work) shall be construed to establish a period of limitation with respect to any other obligation, which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time periods noted in Subparagraph 13.2.2, or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.
- 13.3 **ACCEPTANCE OF DEFECTIVE OR NONCONFORMING WORK**
- 13.3.1 If the County prefers to accept defective or nonconforming Work, then the County may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be affected whether or not final payment has been made.

ARTICLE 14
TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the Work is stopped for a period of sixty (60) days under an order of any court or other public authority having jurisdiction, or as a result of an act of government such as a declaration of a national emergency making materials unavailable, through no act or fault of Contractor or a Subcontractor or any agents or employees or any other persons performing any of the Work under a contract with the Contractor, then the Contractor may, upon thirty (30) additional days' written notice to the County and the Project Consultant, terminate the Contract and recover from the County payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery.

14.2 TERMINATION BY THE COUNTY

14.2.1 Termination by the County for Cause.

If the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of the Contractor's insolvency, or stop notices are served upon the County, or if the Contractor persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or fails to make prompt payment to Subcontractors for materials or labor, or the Contractor or a subcontractor persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or persistently disregards instructions of the Construction Manager, Project Consultant or County, or otherwise is guilty or a subcontractor is guilty of a substantial violation of a provision of the Contract Documents, or the Contractor fails to provide and keep in full force and effect all insurance required by Article 11, or fails to cause all subcontractors to so comply, and fails after written notice to commence and continue correction of such default, neglect or violation with diligence and promptness, then the County upon certification by the Construction Manager that sufficient cause exists to justify such action, may, after an additional written notice and without prejudice to any other remedy the County may have, terminate the Contract.

Procedure for Termination for Cause.

Unless within seven (7) days of the delivery of such notice, the Contractor shall cease such violation and make satisfactory arrangements for a correction thereof, which arrangements are set forth in a written agreement signed by the Contractor and the Construction Manager, the Contractor's right to complete the Work shall cease and terminate.

In the event of any such termination, then the County shall immediately give written notice thereof to the surety and to the Contractor and the surety shall have the rights and obligations set forth in the performance bond. If the County is forced to take over the Work, then it may prosecute the same to completion by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor, and the Contractor and its sureties shall be liable to the County for any excess costs, including management, supervision, and design support, occasioned thereby. In such event, the County may, without liability take possession of and utilize in completing the Work, the Contractor's materials, equipment, tools, construction equipment and machinery whether stored at the Site or elsewhere, thereon owned by the Contractor and may finish the Work by whatever methods the County may deem expedient. Whenever the Contractor's right to proceed is terminated, then the Contractor shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds all direct and indirect costs of finishing the Work, including compensation for the Construction Manager's additional services made

necessary thereby, then Contractor will only be paid for its actual unpaid costs from such excess. If such costs exceed the unpaid balance, then the Contractor shall pay the difference to the County. The amount to be paid to the Contractor or to the County, as the case may be, shall be certified by the Construction Manager, upon application, in the manner provided in Paragraph 9.4 and this obligation for payment shall survive the termination of the Contract.

14.2.3 Suspension of Performance.

Independent of any right to terminate the Agreement, the authorized representative of County for which Contractor's services are to be performed, may immediately suspend performance by Contractor, in whole or in part, in response to health, safety or financial emergency, or a failure or refusal by Contractor to comply with the provisions of the Agreement, until such time as the cause for suspension is resolved, or a notice of termination becomes effective.

14.2.4 Termination by County Without Cause.

County will have the right to terminate the Agreement without cause by giving thirty (30) days prior written notice of intention to terminate pursuant to this provision, specifying the date of termination. County will pay to the Contractor the compensation earned for conforming, non-defective, work performed and not previously paid for to the date of termination. County will not pay Contractor for lost anticipated profits or other economic loss. The payment of such compensation is subject to the restrictions on payment of compensation otherwise provided in the Agreement and is conditioned upon receipt from Contractor of any and all plans, specifications, records, photographs, logs, and estimates, and other documents pertaining to the Project.

No sanctions will be imposed for termination without cause.

In connection with any termination for without cause, Contractor shall allow County, Construction Manager, or any authorized representative(s) to inspect, audit, or reproduce any records to the extent necessary for County or Construction Manager to evaluate and verify the costs incurred by Contractor in performing the Work, including direct and indirect costs such as overhead allocations. Contractor will make this material available upon forty-eight (48) hours written notice from County or Construction Manager. County and Construction Manager may inspect and copy, from time to time and at reasonable times and places, any and all information, materials and data of every kind and character (hard copy, as well as computer readable data if it exists), including without limitation, books, papers, documents, subscriptions, recordings, estimates, price quotations, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, daily diaries, Project Superintendent reports, drawings, receipts, vouchers, monthly, quarterly, yearly or other financial statements, and any and all other information or documentation that may, in the judgment of County or Construction Manager, have any bearing on or pertain to any matters, rights, duties, or obligations under or covered by the Contract Documents. Such records shall include but not be limited to, the following: accounting records, payroll records, job cost reports, job cost history, margin analysis, written policies and procedures, subcontract files (contracts, correspondence, change order files, including documentation covering negotiated settlements), backcharge logs and supporting documentation, general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends, and any other documents customarily maintained by contractors performing work on public works projects or that County or Construction Manager otherwise deem necessary to substantiate charges related to a Termination.

If this Contract is terminated for default under Article 14 and if it is later determined that the default was wrongful, then such default termination automatically shall be converted to and treated as a termination for convenience under this Section. In such event, Contractor shall be entitled to receive only the amounts payable under this Section, and Contractor specifically waives any claim for any other amounts or damages, including any claim for consequential

damages or lost profits.

ARTICLE 15
ADDITIONAL INSTRUCTIONS

15.1 SUBSTITUTION OF MATERIALS

15.1.1 When a specific manufacturer, trade name or material is specified or indicated, it is to establish a standard of quality and shall not be constructed as limiting competition. Materials, products, processes, or articles indicated are specified by the name brand of the manufacturer or by patent or proprietary names, shall be deemed to be followed by the words "or equal". If the Contractor desires to use material other than that specified then it shall request approval of such substitution, in writing to the County's Representative. Requests for substitutions shall be in the hands of the County's Representative no later than fourteen (14) calendar days prior to the date in which addenda will be issued for pre-bid requests per section 00100 Instructions to bidders. Materials found acceptable will be approved by a duly authorized Addendum. Also, per section 00100, if a bidder submits non-approved material substitutions, bidder assumes the risk that said substitution may not be approved. Approval of non-approved material substitutions will be made post-bid through the due diligence process. For post-bid substitutions requests, data substantiating the request may be submitted up to thirty-five (35) days following the Notice of Award. Materials found acceptable will be approved by a duly authorized Change Order. It is the intent of this article to comply with Public Contracts Code Section 3400.

If the Contractor desires to use material other than that specified, then it shall request approval of such substitution, in writing, to the Construction Manager. Such application constitutes a certification that the Contractor:

- A. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
- B. Will provide the same warranty for equal as for specified product.
- C. Will coordinate installation and make other changes which may be required for work to be complete in all respects.
- D. Waives claims for additional costs which may subsequently become apparent.

The Project Consultant then will determine whether or not the proposed material is equal in quality and utility to the material specified, and its decision shall be final.

Requests for equal materials will only be considered when offered by the Contractor as required by this article.

Requests for substitutions shall be in the hands of the Construction Manager no later than seven (7) calendar days prior to the date on which a decision is needed. Data substantiating the request may be submitted up to fifteen (15) days following the Notice of Award. Materials found acceptable will be approved by a duly authorized Addendum or Change Order.

15.1.2 Submittals for approval of substitute materials shall contain sufficient information, descriptive brochures, drawings, samples, or other data as is necessary to provide direct comparison to the specified materials. Each submittal shall be well marked and identified as to types and kind of the items being submitted for approval. It is the sole responsibility of the Contractor to submit complete descriptive and technical information so the Project Consultant can make proper appraisal. Lack of proper information will be sufficient cause for rejection. Reference to catalogs

that the Project Consultant may or may not have will not be acceptable.

15.1.3 The Project Consultant's review for approval is for quality of visual appearance. It is the Contractor's responsibility to confirm and correlate all quantities and dimensions and coordinate with all trades whose work may be affected by the requested substitution.

15.1.4 Substitutions.

Unless otherwise provided in the technical specifications, the Contractor may make proposals for substitutions to materials and/or processes shown or specified only under one or more of the following conditions:

- A. Unavailability: If the specified product or an equal is no longer available in the marketplace.
- B. Delay: If obtaining the specified product or an equal will delay completion of the Work through no fault of the Contractor.
- C. Better material system or process: If a better material system or process is available at no additional cost.
- D. Savings: If a material which meets all the performance requirements of the specified material is available at a savings to the County.

A proposal for substitution shall include all information required by the Project Consultant to evaluate the substitute material or process. All substitutions shall be submitted for approval. Such proposal constitutes a certification that the Contractor:

- A. Has investigated the proposed product and determined that it meets or exceeds the performance requirements of the specified product.
- B. Will provide the same or better warranty for substitution as for specified product.
- C. Will coordinate installation and make other changes, including work of other Contractors, which may be required for the work to be complete in all respects at no additional cost to the County.

Effect of Approval of Substitution.

If the substitution is approved, then the Contractor shall be solely and directly responsible for setting approved substituted materials and/or equipment into the available space, and for the proper operation of the substituted equipment with all other equipment with which it may be associated, all in a manner acceptable to the County.

No time extensions shall be granted on account of a substitution. The Contract Sum shall be adjusted by the price difference between the approved substitution and the originally specified item.

Time for Proposing Substitution; Decision.

Substitution proposals will not be considered prior to bidding. All requests for substitutions shall be made within the same time requirement for initial submittals. Failure to timely submit a substitution request shall constitute a waiver by the Contractor and an acceptance of the specified materials. Late submittals may be considered only when the Construction Manager consents in writing, and the County's best interests so require.

The Construction Manager and the Project Consultant shall evaluate a timely substitution request, and shall approve, deny, approve with conditions, or initiate the procedure for a change order in

response to the Contractor's request. This decision shall be final. If the proposed substitution is rejected, then the Contractor shall provide the material originally specified. No time extensions will be granted in connection with substitution requests.

Failure by the Contractor to identify all deviations from the Contract Documents in its request for substitution shall render any County action taken thereon null and void. The Contractor shall bear all costs resulting from any error in the request for substitution.

Only one request for substitution will be considered for each product. When substitution is not accepted, specified product shall be provided.

Samples and Testing of Proposed Substitutions: Costs of Adapting to Work.

When the Construction Manager or Project Consultant determines that samples and testing are required to evaluate a request for a substitution, the Construction Manager shall so advise the Contractor, and specify the materials or work to be sampled. The Contractor shall, at no cost to the County, provide samples as required by Article 7 dealing with samples and testing, or the Technical Specifications.

The Contractor shall bear all costs of sampling and testing required to decide a request for substitution, and if a substitution is accepted, the Contractor shall bear all costs associated therewith, including the cost of the Construction Manager's, Project Consultant's and/or Project Consultant's services required to adapt the substitution to the design to the complete satisfaction of the County, and all costs of mechanical, electrical, structural, or other changes needed to adapt the substitution to the Work.

15.2 REFERENCE TO STANDARDS

15.2.1 Reference to known standards shall mean and intend the latest edition or amendment, in effect on the date of the Bid, unless specifically indicated otherwise, and to such portions of it that relate and apply directly to the material or installation called for on the Project.

15.2.2 Where material is specified solely by reference to standard specifications, the Contractor shall, if requested by the Construction Manager, submit to the Construction Manager for its approval, data on all such material proposed to be incorporated into the Work of the Contractor listing the name and address of the vendor, the manufacturer or producer, and the trade or brand names of such materials.

The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in these specifications. These standards are not furnished to the bidder because the manufacturers and trades involved are assumed to be familiar with their requirements.

1. Where Federal Specifications are referred to as a measure of quality and standard, they refer to Federal Specifications established by the Procurement Division of the United States Government and are available from the Superintendent of Documents, U.S. Government Printing Office.
2. Where Federal Specification numbers are used, they refer to the latest edition including amendments thereto.
3. Where Commercial Standards (CS) or Product Standards (PS) are referred to as a measure of quality, standard, and method of fabrication, they refer to Commercial Standards and Product Standards issued by the U.S. Department of Commerce.
4. Where ASTM serial numbers are used, they refer to the latest tentative specifications,

standard specifications, standard method, or standard methods of testing, issued by the ASTM, unless specifically noted.

15.3 SPECIFICATIONS

- 15.3.1 The Specifications are organized into Divisions, Sections, and Trade headings based on the Construction Specifications Institute's 48-Division format and the Master format numbering system. This organization shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of the Work to be performed by any trade. The Contractor shall be responsible for examining all sections of the Specifications for inter-related items of the Work, and for furnishing each item identified or specified.
- 15.3.2 No responsibility will be assumed by the County or the Construction Manager for omissions or duplications by the Contractor in the completion of the Contract due to any alleged error in the arrangement of the material in these Specifications nor shall any such segregation of work and materials operate to make the Construction Manager an arbiter in defining the limits to the agreements between the Contractor and its subcontractors or suppliers.
- 15.3.3 The misplacement, addition or omission of any letter, word or punctuation mark shall in no way damage the true spirit, intent or meaning of these Specifications.
- 15.3.4 The words "shown", "indicated", "noted", "scheduled" or words to that effect shall be understood to mean that reference is made to the Drawings accompanying these Specifications.
- 15.3.5 Where reference herein is made to colors or finishes "as selected", the reference is to the Construction Manager with concurrence by the County.

15.4 APPROVED APPLICATORS

- 15.4.1 Where specific instruction in these Specifications require that a particular product and/or materials be installed and/or applied by an "approved applicator" of the manufacturer, it shall be the Contractor's responsibility to ensure that any subcontractors used for such work be approved applicators.

15.5 DELIVERY AND STORAGE OF MATERIALS

- 15.5.1 Deliver all manufactured materials in the original packages, containers, or bundles (with the seals intact) bearing the name or identification mark of all manufacturers.
- 15.5.2 Deliver fabrications in as large assemblies as practicable and where specified to be shop-primed or shop-finished; they shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.
- 15.5.3 Store all materials in such manner as necessary to properly protect same from damage, as materials or equipment damage by handling, weather, dirt or from any other cause will not be acceptable.
- 15.5.4 Store materials off sidewalks, roadways, and underground services to cause no obstructions. The Contractor shall be responsible for protecting all material and equipment furnished under the Contract.

15.6 **WORKMANSHIP**

- 15.6.1 Where not more specifically described in any of the various Sections of these Specifications, workmanship shall conform to all the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction, or installation regularly furnished or required for completion (including any finish), and for successful operation as intended.
- 15.6.2 All work shall be executed by mechanics skilled in their respective lines of work.
- 15.6.3 When completed, all parts shall have been durably and substantially built and shall present a neat, workmanlike appearance.

15.7 **FINAL GUARANTEE**

- 15.7.1 The Contractor shall be held responsible for, and must make good any defects through faulty, improper, or inferior workmanship or materials, arising or discovered in any part of its work or structure, piping, and appurtenances, within one (1) year after the filing of the Notice of Completion. The Performance Bond, furnished by the Contractor, shall cover such defects, and protect the County against them. The Contractor shall fulfill all warranty requests. Furthermore, the Contractor shall send a representative to review all warranty claims and the County shall not be required to sign any additional agreement, addendum, invoice, or document for a representative of Contractor to come to the Site and review warranty work. If a warranty request is determined to not fall within the warranty requirements, then the County will determine how and whom the County will have perform the repair, at its sole expense. The County shall not be required to provide additional funds to review any warranty request.

15.8 **HOURS OF WORK**

- 15.8.1 Eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated that no worker employed at any time by the Contractor, or by a 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 forty (40) hours in any one (1) calendar week, except as provided in Section 1810-1815 inclusive, of the Labor Code of the State of California, all the provisions whereof are deemed to be incorporated herein as if fully set out; and it is further expressly stipulated that for each and every violation of said last named stipulation, said contractor shall forfeit, as a penalty to the County, twenty-five dollars (\$25.00) for each worker employed by the Contractor in the execution of this Contract, for each calendar day during which said worker is required or permitted to labor more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week in violation of the provisions of said section of the Labor Code.
- 15.8.2 The Contractor and each subcontractor shall also keep or cause to be kept, an accurate record showing the names and actual hours worked each calendar day and each calendar week by each worker employed by it in connection with the Work contemplated by the Agreement, which record shall be open at all reasonable hours to the inspection of the County or its officer or agents, and to the Division of Labor Law Enforcement of the Department of Industrial Relations, its deputies and agents.
- 15.8.3 Notwithstanding the above stipulations, pursuant to Section 1815 of the Labor Code, work performed by employees of contractors in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon the Project upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1 1/2) times the basic rate of pay.

15.8.4 Whenever the Contractor arranges to work at night or any time when work is conducted other than the normal forty (40) hour week, or to vary the period during which work is carried on each day, then it shall give the Construction Manager a minimum of forty-eight (48) hours' notice so that inspection may be provided. Additional inspection costs incurred because of overtime or shift work shall be paid by the County. If this overtime work is necessitated by the Contractor's error or failure to perform, then the cost of inspection will be borne by the Contractor.

15.9 WAGE RATES

15.9.1 Pursuant to Section 1770-1780 of the Labor Code of the State of California, the Department of Industrial Relations has determined the general prevailing rate of per diem wages and rates for legal holidays and overtime in the locality in which this Work is to be performed, for each craft or type of worker or mechanic needed to execute the Contract. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Tulare County General Services Agency, 2637 W. Burrel Avenue Suite 200, Visalia, CA and will be made available to any interested person upon request. They may also be obtained on the internet at <https://www.dir.ca.gov/opri/dprevagedetermination.htm> These prevailing wage rates hereby are incorporated in the Agreement and made a part hereof.

15.9.2 It shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under it to pay not less than the said specified rates to all laborers, worker, and mechanics employed by them in the execution of the Contract, and to pay all laborers, workers, and mechanics not less often than once weekly. The Contractor to whom the Contract is awarded shall post a copy of the determination of prevailing wages at the job site. The Contractor shall require all subcontractors to comply with Sections 1770-1780 of the Labor Code of the State of California and shall insert into every subcontract the requirements contained therein. The Contractor shall be responsible for compliance by each subcontractor with Labor Code Section 1776.

15.9.3 It is hereby further agreed that the Contractor shall forfeit to the County, as a penalty, fifty dollars (\$50.00) for each laborer, worker, or mechanic employed for each calendar day or portion thereof, who is paid less than the said stipulated rates for any work done under the Contract, by it or by any subcontractor under it. The difference between said stipulated rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than said stipulated rate shall be paid to each worker by the Contractor. The Contractor, and each subcontractor, shall keep or cause to be kept an accurate record showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by it or her in connection with the public work. The records shall be open at all reasonable hours to the inspection of the County, to its officers and agents, and to the Division of Labor Law Enforcement of the State Department of Industrial Relations, its deputies, and agents.

15.9.4 In case it becomes necessary for the Contractor or any subcontractor to employ on the work under this Contract any person in a trade or occupation (except executive, supervisory, administrative, clerical or other non-manual workers as such) for which no minimum wage rate is specified, the Contractor shall immediately notify the County who will promptly, after consultation with the DIR, determine the prevailing rate for such additional trade or occupation from the time of the initial employment of the person affected and during the continuance of such employment. The Contractor and all subcontractors shall pay each worker engaged in the specified work not less than those rates. Pending such determination, the wages may be assumed to be those in the applicable collective bargaining agreement, but no adjustment in the Contract Price shall be made if such assumption is incorrect.

- 15.9.5. As of January 1, 2015, no contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code § 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code § 1771.1(a)]. No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code § 1725.5. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

According to sections 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages in the locality for each craft or type of worker needed to execute the Contract.

The Contractor to whom the Contract is awarded and any subcontractor under it will pay all workers employed on the work at least the rates determined by the Director of the Department of Industrial Relations. Copies of the prevailing rate of per diem wages are on file with the Department of Industrial Relations, Division of Apprenticeship Standards, 455 Golden Gate Avenue 10th Floor, San Francisco, California 94102, and at the Tulare County General Services Agency, 2637 W. Burrel Avenue Suite 200, Visalia, CA, and are available to any interested party on request.

According to Labor Code § 1775, the Contractor will, as a penalty to the Owner, forfeit not more than two hundred dollars (\$200.00) for each calendar day or portion of a day, for each worker paid less than the prevailing rates as determined by the director for the work or craft in which the worker is employed. The amount of this penalty will be determined by the California State Labor Commissioner and will be based on the consideration of the Contractor's failure to pay the correct rate as a good faith mistake, penalties assessed against the Contractor within the previous three years for failing to meet its prevailing wage obligations, or the Contractor's willful failure to pay the correct rates of prevailing wages.

According to Public Contract Code § 6109, with respect to subcontractors which are ineligible to perform work on public works projects according to Labor Code § 1777.1 or 1777.7:

1. The Contractor must not allow any such subcontractor to work on this Project.
2. The Contractor must repay to the County any money paid to any such subcontractor allowed to work on this Project.
3. The Contractor will pay the wages of the workers of any such subcontractor allowed to work on this Project.

According to Labor Code § 1776, the Contractor and each subcontractor are required to keep or cause to be kept an accurate record showing the names and occupations of all laborers, workers and mechanics employed by it in connection with the execution of this Contract or any subcontracts, and showing also the actual per diem wage paid to each of such workers, which records will be open at all reasonable hours to inspection by the Owner, its officers and agents and to representatives of the Division of Labor Standards Enforcement of the State Department of Industrial Relations. The certified payroll records are required to be on forms provided by the Division of Labor Standards Enforcement or will contain the same information as the forms provided by the division.

15.10 APPLICATION OF HIGHEST STANDARDS AND REQUIREMENTS

- 15.10.1 Whenever two or more standards or requirements appear in these General Conditions or in any

other part of the Contract Documents that form the Contract, then the highest standard or requirement shall be applied and followed in the performance under this Contract.

15.11 NONDISCRIMINATION IN EMPLOYMENT

- 15.11.1 Federal and State Laws prohibit discrimination in employment. The California Fair Employment Practices Act (Labor Code sections 1410 - 1433) prohibits discrimination in employment on the basis of race, religion, color, sex, physical handicap, medical condition, marital status, age, national origin or ancestry, and applies to all employers, employment agencies and labor organizations.
- 15.11.2 Title VII of the Federal 1964 Civil Rights Act (42 U.S.C. sections 2000e - 2000e - 17) prohibits employment discrimination on the basis of race, color, sex, religion, or national origin, and applies to all employers that employ at least fifteen (15) workers during each working day in each of twenty (20) or more calendar weeks in the current or preceding year.
- 15.11.3 In addition to these two laws of general application, there are other Federal and State laws that prohibit employment discrimination in particular cases.
- 15.11.4 The County of Tulare is an Affirmative Action Employer and expects all its contractors and suppliers to familiarize themselves with, and comply with, all applicable laws relating to employment discrimination.
- 15.11.5 To the extent required by law, the Contractor shall meet all requirements of law relating to the participation of minority, women, and disabled veteran business enterprise contracting goals, and shall comply with Public Contract Code section 10115 et seq. and all applicable regulations. Contractor further agrees that, when required, Contractor will ensure compliance by all subcontractors and will complete all forms required by all agencies exercising jurisdiction over the Project.

15.12 APPRENTICES

- 15.12.1 Pursuant to Sections 1770-1780 of the Labor Code of the State of California, the Department of Industrial Relations has determined the general prevailing rate of per diem wages in the locality for each craft or type of worker needed to execute the Work. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Tulare County General Services Agency, 2637 W. Burrell Avenue Suite 200, Visalia, California, and will be made available to any interested person on request.
- 15.12.2 Pursuant to Section 1775 of the Labor Code of the State of California, nothing in this chapter shall prevent the employment of properly registered apprentices upon public works.
- 15.12.3 Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which it is employed and shall be employed only at the work of the craft or trade to which it is registered.
- 15.12.4 Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at Section 3070), Division 3, of the Labor Code, are eligible to be employed on public works. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which it is training.

15.13 **PROVISIONS REQUIRED BY LAW DEEMED INSERTED**

15.13.1 Every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted, and this Contract shall be read and enforced as though it were included, and if through mistake or otherwise any provision is not inserted or is not correctly inserted, upon application of either party the Contract shall be amended to make the insertion or correction.

15.14 Conflict of Interest.

No official of the County who is authorized on behalf of the County to negotiate, make, accept, or approve, any consulting, inspection, construction, or materials supply contract, or any subcontract in connection with the construction of the Project, or any land acquisition in connection with the Project, shall become directly or indirectly interested personally in this Contract or in any part thereof.

No officer, employee, attorney, Consultant, or inspector of or for the County who is authorized on behalf of the County to exercise any executive, supervisory, or other similar function in connection with the construction of the Project shall become directly or indirectly interested personally in this Contract or any part thereof.

15.15 No Verbal Agreements.

No verbal agreement or conversation with any officer, agent, or employee of the County, either before, during, or after the execution of the Contract Documents shall affect or modify any term or condition contained in the Contract Documents, nor shall such verbal agreement or conversation entitle the Contractor to any additional payment or time to perform whatsoever under the terms of this Agreement.

15.16 Anti-Trust Assignment.

By execution of the Contract Documents, or any subcontract awarded by the Contractor, the Contractor or any subcontractor offers and agrees to assign and hereby does assign to the County all rights, title, and interest in and to all causes of action the Contractor or subcontractor may have under Section 4 of the Clayton Act (15 USC Section 15) or under the Cartwright Act (Chapter 2 of Part 2 of Division 7 of the Business and Professions Code, commencing with Section 16700), arising from purchases of goods, services, or materials pursuant to this public works contract or subcontract. This assignment shall be made and shall become effective upon execution of the Contract.

15.17 Contractor Not Agent, Nor Employee.

Neither the Contractor nor any subcontractor, or any officer, agent, or employee of either, is, nor shall they represent themselves to be, an officer, agent, or employee of the County for any purpose whatsoever.

No person employed by the Contractor, or by any subcontractors, is, nor shall they be construed to be in any manner or for any purpose whatsoever, employee(s) of the County.

ARTICLE 16
GUARANTEE

16.1 Contractor guarantees that all materials and workmanship shall conform to the Contract Documents and agrees to replace, at its sole cost and expense, and in conformity with the Contract Documents, any defective material and any and all work defectively or improperly performed or installed within a period of **One (1) year** after final acceptance in accordance with paragraph 9.8 of the General Conditions. The Contractor shall, in no case longer than fifteen (15) days after receipt of written notice thereof, commence to repair and/or replace any defect in materials or workmanship which may develop during said **One (1) -year** period, and

any damage to adjacent materials resulting from the repairing or replacing of such defects, at its own expense and without cost to County. The Contractor shall fulfill all warranty requests. Furthermore, the Contractor shall send a representative to review all warranty claims and the County shall not be required to sign any additional agreement, addendum, invoice, or document for a representative of Contractor to come to the Site and review warranty work. If a warranty request is determined to not fall within the warranty requirements, then the County will determine how and whom the County will have perform the repair, at its sole expense. The County shall not be required to provide additional funds to review any warranty request. In the event Contractor fails to remedy any such defect within fifteen (15) days after receipt of such written notice (unless Contractor has commenced the repair and is diligently pursuing the repair to completion), then County may proceed to have such defects remedied at Contractor's expense and Contractor shall pay the costs and charges incurred thereby. Emergency repairs, including but not limited to power, water, sewer, fire, and life safety, shall have a forty-eight (48) hour response time. The cost and repair of any supplementary damage caused by construction defects will be the sole responsibility of the Contractor. Neither acceptance nor payment nor any provision in these documents shall be deemed to be a waiver by County to relieve Contractor of any responsibility under this Contract. The Contractor shall submit a written guarantee on the form that follows.

GUARANTEE

Guarantee for _____ County of Tulare _____. We hereby guarantee that the **Sheriff Morgue at 1185 South O Street, Tulare, CA 93274** which we have installed in **Tulare, California**, has been installed in accordance with the drawings and specifications, and that the Work as installed will fulfill the requirements included in the specifications. The undersigned agrees to repair or replace any or all so such Work, together with any other adjacent work which may be displaced in connection with such replacement, that may prove to be defective in workmanship or material within a period of **One (1) year**, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of the undersigned’s failure to comply with the above-mentioned conditions within a reasonable period of time, as determined by the County, but not later than ten (10) days after being notified in writing by the County, then the undersigned authorizes the County to proceed to have said defects repaired and made good at the expense of the undersigned, which will pay the costs and charges therefore upon demand. The Contractor shall fulfill all warranty requests. Furthermore, the Contractor shall send a representative to review all warranty claims and the County shall not be required to sign any additional agreement, addendum, invoice, or document for a representative of Contractor to come to the Site and review warranty work. If a warranty request is determined to not fall within the warranty requirements, then the County will determine how and whom the County will have perform the repair, at its sole expense. The County shall not be required to provide additional funds to review any warranty request.

Countersigned

(Proper name)
Date of signature: _____

(Proper name)
Date of signature: _____

(Printed name)
By: _____

(Printed name)
By: _____

(Signature of Subcontractor or
General Contractor)

(Signature of General Contractor if for
Subcontractor)

Representatives to be contacted for services;

Name: _____

Address: _____

Telephone Number: _____

END OF SECTION 00700

SECTION 01000: SPECIAL CONDITIONS

PART 1: GENERAL

1.01 DESCRIPTION

- A. Work Included in this Section shall include, but not be limited to the listed items of special functions necessary to execute the contract and preserve all essential related services.
- B. General Conditions, Supplementary General Conditions, Special Conditions and all Sections of Division 1 are applicable to all other subdivisions of these Specifications.

1.02 INCORPORATED DOCUMENTS

- A. Codes and Standards:

Applicable portions of the following codes and standards shall govern the materials and installation on the project. Where two codes are at variance, the more restrictive requirement shall apply.

- 1. Reference to codes, ordinances, regulations and standard specifications refer to editions in effect as of date of proposals. Abbreviations are used for agencies issuing standard specifications as follows:

Agency

U.S. Government Federal Specification	FS
California Building Code,	CBC
California Mechanical Code	CMC
California Plumbing Code	CPC
California Electrical Code	CEC
California Administrative Code, Title 24	CAC
American Society for Testing and Materials	ASTM
American National Standards Institute	ANSI
Underwriters Laboratories	UL
National Fire Protection Association	NFPA

- 2. Where reference is made to the standard specifications of the American Society for Testing and Materials or other standards, the serial designation does not always give the year of the latest revision; however, it shall be understood to refer to that specification of the latest revision.

1.03 PUBLIC UTILITIES

- A. The Contractor shall comply with all laws and ordinances, and with all the rules of the operating utility company, in any removal, relocation, protection, or disconnection from, any public utility line or service which shall be necessary or convenient in the performance of the contract. "Operating utility company", as used in this paragraph, shall mean and include, but shall not necessarily be limited to, sewer pipeline, water

pipeline, storm or drainage pipeline, overhead and underground electrical transmission lines and other electrical facilities (including street lighting, traffic signals and signs), telephone, cable TV lines, and all equipment and facilities installed or used in connection therewith.

1.04 COORDINATION AND PRIORITIES

- A. The building(s) for this project has been designated to integrate all finishes and services into the total concept to satisfy the Owner's requirements. To achieve this end, all disciplines must be coordinated and certain trades or divisions of work shall take precedence over others when conflicts occur.
- B. In general, structural requirements shall take precedence over all other divisions of work; followed by architectural design and finishes as shown, scheduled, or specified.
 - 1. In the event that any trade fails to properly coordinate and pre-plan with the other trades involved in installing his work, the Architect shall instruct that contractor to move, alter or otherwise resolve the conflict at no cost to the Owner.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protection:
 - 1. Deliver and store packaged products in original containers or bundles with seals unbroken, labels and tags intact until time of use, providing proper facilities for storage off the ground, ventilated and fully protected from weather.
 - 2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and stored separately to prevent its inadvertent use.
 - 3. Damaged or otherwise non-complying material shall not be stored on the site nor be installed in the project work.
 - 4. Use all means necessary to protect the installed work and materials of all other trades.

1.06 SURFACE CONDITIONS

- A. Inspection: Prior to beginning of the work of each Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where subsequent installation may properly commence in accordance with design and referenced standards.
- B. Discrepancies: In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

1.07 PROJECT CLOSEOUT PROCEDURES

- A. In addition to all items covered under Section 01700, and those Section of Divisions 2 through 16 inclusive the Contractor shall comply with the requirements stated herein. When the Contractor(s) request a final inspection it shall be understood that the work has been carefully inspected by the Contractor to determine degree of completeness and compliance with all requirements set forth. Under no circumstances shall the Contractor(s) ask the Architect or his representative to make these determinations for him.
- B. The Architect or his representative will, when requested by the Contractor(s), make the final inspection, except under the following conditions:
 - 1. After inspecting one room or area and finding large quantities of work incomplete or not in compliance the inspection shall cease, and the Architect will notify the Contractor of the broad area of work to be done.
 - 2. If the Contractor(s) has assured the Architect of the completeness and/or accuracy of the work and the inspection does not bear out this contention.
- C. To prevent the Architect or his consultants from being required to act as a supervisory agent of the Contractor(s) by being asked to determine the degree of completion the above conditions will be adhered to rigidly. If the Contractor(s) asks for additional inspections which are unwarranted he shall reimburse the Architect or his consultants for all time and expenses incurred, by means of a back charge by the Owner to the Contractor.

1.08 RECORD DRAWINGS

- A. The Contractor shall be provided one set of physical prints for the project, upon which a record of all changes in the plans shall be made. As the work progresses, the Contractor shall maintain a record of all deviations in work from that indicated on the Drawings. The Contractor, when requested by the Architect, shall be required to show proof that the Record drawings are currently updated prior to, and as a condition of, each progress payment.

End Of Section 01000

SECTION 01010 - SUMMARY OF WORK

PART 1: GENERAL

1.01 DESCRIPTION

- A. The Project consists of the following: Site improvements and new construction to create a new Coroner Office and Morgue, as shown on Contract Documents prepared by Chas. Rhoads, Architect, with cover sheets dated 11/16/23 and labeled as "Permit Set".
- B. The Work includes, but is not limited to, the following:
 - 1. Demolition, grading, site improvements, concrete, masonry, rough carpentry, storefront system, glazing, hollow metal doors and frames, membrane roofing, metal roofing, sealants, finishes, equipment, plumbing, mechanical and electrical systems. Total area of approximately 6,800 square feet.

1.02 CONTRACTOR USE OF PREMISES

- A. General: Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times, unless shown otherwise on Drawings. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

1.03 LIMITATIONS FOR USE OF SITE:

- A. General: In addition to site utilization limitations and requirements shown on drawings, and indicated by other contract documents, administer allocation of available space equitably among entities needing access and space, so as to produce best overall efficiency in performance of total work of project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site. Do not interfere in any way with Owner's continued use of site and existing buildings outside of phased work limits for this project.

Protection required during the performance of this Work includes, but is not necessarily limited to:

- 1. Landscaping: Protect all trees, shrubs, lawns and landscape work from damage, providing guards and covering. Any damaged landscaping shall be repaired or replaced at the Contractor's expense.

2. Streets, Curbs and Walks: Protect all streets, curbs, walks and other street improvements and make all necessary repairs for damage occurring thereto during the course of the Work at the Contractor's expense.
3. Private Roads and Walks: Protect all private roads, walks and other on-site improvements and maintain them during the course of the Work. Repair all damage at the Contractor's expense.
4. Weather Protection: At all times provide protection against weather--rain, winds, storms, frost or heat--so as to maintain all work, materials, apparatus and fixtures free from injury or damage. At the end of the day's work, all new work likely to be damaged shall be covered.
 - a. Water protection: At all times protect the excavations, trenches and/or the building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water. The Contractor shall provide pumps and equipment and enclosure necessary to provide this protection.
 - b. Drainage: Construct and maintain all necessary temporary drainage and do all pumping necessary to keep all excavations free of water.
 - c. Cold weather: During cold weather, protect all work from damage. If low temperatures make it impossible to continue operations safely in spite of cold weather precautions, the Contractor shall cease work and shall so notify the Architect.
 - d. Snow and ice: Remove all snow and ice as may be required for the proper protection and/or prosecution of the Work.
5. Adjacent Property: Provide all necessary protection for adjacent property and the lateral support thereof in conformance with the latest adoption edition of the California Building Code.
6. Personal Protection:
 - a. Provide installation and maintenance of the necessary precautions, to protect all persons on the site, including members of the general public, from injury or harm, including but not limited to:
 - (1) Posting of appropriate warning signs in hazardous areas.
 - (2) Providing guard rails, covered walkways and/or barricades of adequate heights, together with

warning lights, around obstructions, pits, trenches or similar areas or under areas of overhead work in onsite or adjacent streets, roads, sidewalks, or on the site or structure itself.

- b. Comply with all applicable codes and safety ordinances, including but not limited to "OCCUPATIONAL SAFETY AND HEALTH STANDARDS" required by the Federal Department of Labor, as enforced by the State of California, Department of Industrial Relations.
7. Existing Utilities and Services: Maintain in operation during durations of Contract water, sprinklers and other utility services. Reroute any of the above as necessary for the proper executing of the Work. Cap or remove abandoned systems as directed.
8. Existing Structures and Improvements: The Contractor shall be responsible for all existing structures, and improvements within the work area, and shall provide adequate protection therefore, either by covering or by temporary removal. Any existing structures and improvements damaged during construction shall be repaired or replaced with materials, fixtures, or equipment of the same kind, quality and size. Any materials, and/or equipment temporarily removed for protection and not damaged, shall be reinstalled.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01010

SECTION 01040 - PROJECT COORDINATION

PART 1: GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Coordination.
 - 2. Administrative and supervisory personnel.
 - 3. General installation provisions.
 - 4. Cleaning and protection.
- B. Progress meetings, coordination meetings and pre-installation conferences are included in Section "Project Meetings".
 - 1. Requirements for the Contractor's Construction Schedule are included in Section "Submittals".

1.02 COORDINATION

- A. Coordination: Coordinate construction activities included under various sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

Make adequate provisions to accommodate items scheduled for later installation.

Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

Prepare similar memoranda for the Architect and separate Contractors where coordination of their Work is required.

- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project Close-out activities.

1.03 SUBMITTALS

Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

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

PART 2: PRODUCTS (Not Applicable).

PART 3: EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- I. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- J. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.02 CLEANING AND PROTECTION

During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Limiting Exposures: Supervise construction activities 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.

END OF SECTION 01040

SECTION 01045: CUTTING AND PATCHING

PART 1: GENERAL

1.01 DESCRIPTION OF WORK:

- A. Contractor shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

1.02 SUBMITTALS:

- A. Submit a written request to the Architect well in advance of executing any cutting or alteration which affects:
 - 1. The work of the Owner or any separate contractor.
 - 2. The structural value or integrity of any element of the Project.
 - 3. The integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. The efficiency, operational life, maintenance or safety of operational elements.
 - 5. The visual quantities of sight-exposed elements.
- B. The Request Shall Include:
 - 1. Identification of the Project.
 - 2. Description of the affected work.
 - 3. The necessity for cutting, alteration or excavation.

4. The effect on the work of the Owner or any separate contractor, or on the structural or weatherproof integrity of the Project.
 5. Description of the proposed work:
 - a. The scope of cutting, patching, alteration, or excavation.
 - b. The trades who will execute the work.
 - c. Products proposed to be used.
 - d. The extent of refinishing to be done.
 6. Alternatives to cutting and patching.
 7. Cost proposal, when applicable.
 8. Written permission of any separate contractor whose work will be affected.
- C. Should conditions of the work or the schedule indicate a change of products from the original installation, Contractor shall submit a request for substitution as provided for in the Contract Documents.
- D. Submit a written notice to the Architect designating the date and the time the work will be uncovered.

PART 2: PRODUCTS

2.01 MATERIALS:

- A. Comply with specifications and standards for each specific product involved.

PART 3: EXECUTION

3.01 INSPECTION:

- A. Inspect existing conditions of the Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect the conditions affecting the installation of Products, or performance of the Work.
- C. Report unsatisfactory or questionable conditions to the Architect in writing; do not proceed with the work until the Architect has provided further instructions.

3.02 PREPARATION:

- A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work.
- B. Provide devices and methods to protect other portions of the project from damage.
- C. Provide protection from the elements for that portion of the project which may be exposed by cutting and patching work, and maintain excavations free from water.

3.03 PERFORMANCE:

- A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Employ the original Installer or Fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.
 - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- E. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of Contract Documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish the entire unit.

End Of Section 01045

SECTION 01050 – STORM WATER POLLUTION CONTROL

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Contractor shall prepare and implement a Storm Water Pollution Prevention Program that complies with the Construction General Permit (CGP), Waste Discharge Requirements Order No. 2009-0009 DWQ (National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000002 prior to commencement of construction activities. The document is available from the State Water Resources Control Board website at:

<http://www.swrcb.ca.gov/water>

- B. Discharge of pollutants (any substance, material, or waste other than clear, uncontaminated storm water) from the project into the storm drain system is strictly prohibited by the Central Valley Regional Water Quality Control Board's (RWQCB) Water Quality Control Plan (Basin Plan).
- C. The Storm Water Pollution Prevention Plan shall be prepared by a Qualified Storm Water Pollution Prevention Plan (SWPPP) Developer (QSD). The SVVPPP shall be submitted to the Owner for approval following SUBMITTALS Section.
- D. Contractor shall provide all material, labor, equipment for installation, implementation, and maintenance of all surface-water pollution prevention measures. This work includes the following:
1. Provide, place, and install effective measures for preventing runoff of soil, silts, gravel, hazardous chemicals or other materials prohibited by the Central Valley RWQCB from entering the storm water drainage system.
 2. Management of on-site construction materials in such a manner as to prevent said materials from contacting storm water or wash water and running off into the storm drain system.
 3. Complying with applicable standards and regulations specified herein.
 4. Maintain the most current revised Storm Water Pollution Prevention Plan (SWPPP) at the Contractor's work site in hard copy. An electronic copy of the original and each revision shall be forwarded to the Owner.
 5. Installation of Post-Construction Best Management Practices (BMPs), if applicable, in accordance with California Stormwater Quality Association's (CASQA's) *New Development and Redevelopment Stormwater Best Management Practice Handbook* and *Municipal Stormwater Best Management*

Practice Handbook.

- E. Contractor shall have storm water pollution prevention measures in place and conduct inspections year-round. It is the responsibility of the Contractor to be prepared for a rain event in the non-rainy season, and to be aware of weather predictions.
- F. Contractor shall have a certified Qualified SWPPP Practitioner (QSP) oversee all BMP installations and monitoring as required by the CGP.

1.02 SUBMITTALS

- A. Initial Permit Registration Documents (PRDs):
 - 1. Notice of Intent (NOI).
 - 2. Risk Assessment (Construction Site Sediment and Receiving Water Risk Determination): The Contractor shall comply with additional permit requirements which are based on the outcome of the construction project risk determination. These requirements are outlined in the CGP.
 - 3. Site Map.
 - 4. SWPPP including a Construction Site Monitoring Program (CSMP) shall be certified by a Qualified SWPPP Developer (QSD) and shall meet the minimum criteria using the SWPPP template in Section 2, Appendix B of the CASQA Construction BMP Handbook Portal available at <http://www.casqa.org/>. The SWPPP must contain all required elements specified in the CGP.
 - 5. The Owner will secure the Annual Permit Fee which is payable to the SWRCB.
- B. Additional PRD Requirements:
 - 1. The Annual Report is due by August 15th of each year. The reporting period is July 1st to June 30th.
 - a. Submittal of the report is completed by filling out the Annual Report form in the State Water Resources Control Board's Storm Water Multi-Application Report Tracking System (SMARTS) on-line reporting system.
 - b. Records of all inspections and training shall be submitted to the County with the Annual Report.
 - 2. Notice of Termination (NOT) required within 90 days of when construction is complete. The NOT shall include the following documentation.
 - a. Photos showing final site stabilization.

- b. Annual Report for the final reporting period up to the point of when construction was completed.
 - c. Post-Construction Water Balance Calculation. The Contractor shall perform a post- construction assessment using the SMARTS CGP post-construction calculator for all non-LUP projects which increase the area impervious surface from pre-project conditions. The NOT shall only be submitted if the post-project Runoff Volume minus Volume Credits are equal or less than the Pre-Project.
- C. Site work shall not commence until the initial Permit Registration Documents (PRDs) have been electronically submitted to SMARTS and a WDID number has been issued to confirm coverage under the CGP. PRDs will be reviewed and certified by the Owner.

PART 2: PRODUCTS

2.01 MATERIAL

- A. General: Provide materials as required for execution of the work.

PART 3: EXECUTION

3.01 GENERAL

- A. The Contractor shall ensure that the SWPPP is current. Any change to schedule or BMPs shall be updated in SMARTS within 30 days.

3.02 SWPPP TOPICS

- A. The Contractor shall be responsible for the implementation of the SWPPP in accordance with the CGP until an NOT has been filed.
- B. Inspections shall be performed weekly, pre-storm, post-storm and at least once each 24-hour period during qualifying storm events by the QSP or a trained representative of the QSP. Non-storm water discharge observations shall be performed quarterly. A qualifying storm event has a 50 percent or greater probability of precipitation. Repairs and design changes to BMPs shall be implemented within 72 hours of identification.
- C. Installation of all post-construction BMPs (if applicable) shall be in accordance with CASQA's *New Development and Redevelopment Stormwater Best Management Practice Handbook* and *Municipal Stormwater Best Management Practice Handbook*.
- D. Retention of Records - All required storm water records must be maintained by the discharger for 3 years from the date the NOT was

approved by the RWQCB. Contractor shall provide copies of storm water documents, inspections and reports to the Owner at project completion.

3.03 ENVIRONMENTAL ENFORCEMENT

- A. The Central Valley RWQCB has authority to enforce, through codified regulations, any portions of this Section that may violate applicable regulations. Agency enforcement may include but is not limited to: citations, orders to abate, bills for cleanup costs and administration, civil suits, and criminal charges. Contract compliance action by the Owner shall not be construed to void or suspend any enforcement actions by these or other regulatory agencies.
- B. Contractor shall notify the Owner within 24 hours after issuance of any citation(s) issued by any regulatory agency and shall be responsible for all fines and costs necessary to correct the conditions listed in the citation(s), which shall include all legal fees and Owner expenses.

END OF SECTION 01050

SECTION 01075 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1: GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging non-hazardous demolition and construction waste.
 - 2. Recycling non-hazardous demolition and construction waste.
 - 3. Disposing of non-hazardous demolition and construction waste.

1.02 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling in accordance with State of California requirements. Facilitate recycling and salvage of materials in accordance with State of California requirements.

1.04 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice of Award.

1.05 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following

information:

1. Material category.
 2. Generation point of waste.
 3. Total quantity of waste in tons.
 4. Quantity of waste salvaged, both estimated and actual in tons.
 5. Quantity of waste recycled, both estimated and actual in tons.
 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. 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.
- G. Qualification Data: For waste management coordinator.

1.06 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: LEED-Accredited Professional, certified by USGBC.
- B. Waste Management Conference: Conduct conference at Project site.

1.07 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste

identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and/or construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2: PRODUCTS (Not Used)

PART 3: EXECUTION

3.01 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. Waste Management Coordinator: Engage a waste management

coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 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.
- D. 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, recycled, reused, donated, and sold.
 - 2. Comply with TEMPORARY FACILITIES AND CONTROLS Section for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for sale or donation shall not be permitted on Project site.
- C. Salvaged Items for Owner's Use:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of

- containers.
- 3. Store items in a secure area until delivery to Owner.
- 4. Transport items to storage area designated by Owner].
- 5. Protect items from damage during transport and storage.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Receivers and Processors: The plan shall identify local recycling receivers and processors of recyclable materials.
- C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.
- 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 they are 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.

3.04 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Grind asphalt to maximum 1-1/2-inch size.
- B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 1-1/2-inch size.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 1-1/2-inch size.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- F. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- K. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- L. Carpet Tile: Remove debris, trash, and adhesive.
 - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

N. Conduit: Reduce conduit to straight lengths and store by type and size.

3.05 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.06 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, 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: Remove waste materials and dispose of at designated spoil areas on Owner's property.
- D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01075

SECTION 01090: DEFINITIONS AND STANDARDS

PART 1: GENERAL

1.01 SUMMARY

- A. This Section specifies administrative requirements for compliance with governing regulations, codes and standards.
- B. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.
- C. Refer to General and Special Conditions for requirements for compliance with governing regulations.

1.02 DEFINITIONS

- A. General: Definitions contained in this Article are not necessarily complete, but are general to the extent that they are not defined more explicitly elsewhere in the Contract Documents.
- B. Indicated refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.
- C. Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the Architect", "requested by the Architect", and similar phrases. However, no implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
- D. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is, limited to the responsibilities and duties of the Architect stated in General and Supplementary Conditions. Such approval shall not release the Contractor from responsibility to fulfill Contract Document requirements, unless otherwise provided in the Contract Documents.
- E. Regulation: The term "Regulations" includes laws, statutes, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work, whether they are lawfully imposed by authorities having jurisdiction or not.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and

similar operations.”

- G. Install: The term “install” is used to describe operations at project site including the actual “unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.”
- H. Provide: The term “provide” means “to furnish and install, complete and ready for the intended use.”
- I. Installer: An “Installer” is an entity engaged by the Contractor, either as an employee, subcontractor or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

The term “experienced,” when used with the term “Installer” means having a minimum of 5 previous Projects similar in size and scope to this Project, and familiar with the precautions required, and has complied with requirements of the authority having jurisdiction.

- J. Project Site is the space available to the Contractor for performance of the Work. The extent of which is shown on the Drawings.
- K. Testing Laboratories: A “testing laboratory” is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests.

1.03 SPECIFICATION FORMAT AND CONTENT

This Article is provided to help the user of these Specifications understand the format, language, implied requirements, and similar conventions. None of the explanations shall be interpreted to modify the substance of Contract requirements.

- A. Specification Format: These Specifications are organized into Divisions, Sections or Trade Headings based on the 1995 version of the Construction Specifications Institute’s 16-Division format and numbering system. This organization conforms generally to recognized construction industry practice.
 - a. Each section of specifications has been subdivided into 3 (or fewer) “parts” for uniformity and convenience (Part 1: General, Part 2: Products, and Part 3: Execution). These titles do not limit the meaning of and are not an integral part of the text which specifies requirements.
- B. Specification Content: This Specification has been produced employing conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

- a. Language used in the Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
 - b. Imperative Language is used generally in the Specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - c. Section Numbering: Used to facilitate cross-references in contract documents. Sections are placed in Project Manual in numeric sequence; however, numbering sequence is not complete, and listing of sections at beginning of Project Manual must be consulted to determine numbers and names of specification sections in contract documents.
 - d. Page Numbering: Numbered independently for each section. Section number is shown with page number at bottom of each page, to facilitate location of text in Project Manual.
- C. Assignment of Specialists: The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and the assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
- a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
 - b. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

1.04 DRAWING SYMBOLS

- A. Graphic symbols used on the Drawings are those recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., CD-ROM version 3.0.

- B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical Drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, they are supplemented by more specific symbols recommended by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

1.05 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual Sections indicate which codes and standards the Contractor must keep available at the Project Site for reference.
 - a. Referenced standards take precedence over standards that are not referenced but recognized in the construction industry as applicable. Where two codes are at variance, the more restrictive requirement shall apply. Abbreviations are used for agencies issuing standard specifications as follows:

Agency

U.S. Government Federal Specification	FS
California Building Code,	CBC
California Mechanical Code	CMC
California Plumbing Code	CPC
California Electrical Code	CEC
California Administrative Code, Title 24	CAC
American Society for Testing and Materials	ASTM
American National Standards Institute	ANSI
Underwriters Laboratories	UL
National Fire Protection Association	NFPA

- 1. Where reference is made to the standard specifications of the American Society for Testing and Materials or other standards, the serial designation does not always give the year of the latest revision; however, it shall be understood to refer to that specification of the latest revision.
- b. Non-referenced Standards: Except as otherwise limited by the Contract Documents, standards not referenced but recognized in the industry as applicable will be enforced for performance of the Work. The Architect will decide whether a code or standard is applicable, or which of several are applicable.
- c. Publication Dates: Where compliance with an industry standard is required, comply with standard in effect as of date of Contract Documents.

- B. Conflicting Requirements: Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding.
- C. Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to the Architect for decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entities' construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - a. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
 - b. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

1.06 GOVERNING REGULATIONS/AUTHORITIES

The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for the preparation of Contract Documents; that information may or may not be of significance to the Contractor. It shall be the Contractor's responsibility to contact authorities having jurisdiction directly for information and decisions having a bearing on the Contractor's Work.

1.07 SUBMITTALS

Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2: PRODUCTS (Not Applicable)

PART 3: EXECUTION (Not Applicable)

END OF SECTION 01090

SECTION 01100: ALTERNATE BID ITEMS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section identifies each Alternate bid by number, and describes the basic changes to be incorporated into the Work, only when the Alternate is made a part of the Work by specific provisions in the Owner/Contractor Agreement.
- B. Related Requirements in Other Parts of the Project Manual:
 - 1. Incorporation of Alternates into the Work: Owner/Contractor Agreement.
- C. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each Alternate, and to provide the complete construction required by Contract Documents.

1.02 DESCRIPTION OF ALTERNATES

- A. Additive Alternate Bid No. 1

Provision and installation of emergency generator and related accessories per Electrical Drawings and Specifications. Related concrete work and chain link enclosure shall also be part of this Alternate Bid.

End Of Section 01100

SECTION 01200: PROJECT MEETINGS

PART 1: GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Bid Conference And Walk-Through.
 - 2. Pre-Construction Conference.
 - 3. Coordination/Progress Meetings.
- B. Construction schedules are specified in another Division-1 Section.

1.02 PRE-BID CONFERENCE AND WALK-THROUGH

- A. Schedule: The pre-bid conference and walk-through, if required by the Owner, shall take place at the date, time and location stipulated in the Notice To Contractors.
- B. Attendees: The Owner, Architect and any Contractor wishing to submit a bid for this Project. It is strongly suggested that major subcontractors also attend.
- C. Agenda: Review scope and nature of the Work. Discuss items of significance that could affect the schedule of the Work including such topics as:
 - 1. Wage Requirements.
 - 2. Working hours.
 - 3. Approach to the Work.
 - 4. Critical Work sequencing.
 - 5. Use of the premises.
 - 6. Phasing of the Work.
 - 7. Schedule for completing the Work.

1.03 PRE-CONSTRUCTION CONFERENCE

- A. Schedule: The Contractor shall be responsible to schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities.

Conduct the meeting to review procedures, responsibilities and personnel assignments.

- B. Attendees: The Owner, the Architect, the Contractor and its major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
 - 1. Tentative construction schedule.
 - 2. Critical Work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of Shop Drawings, Product Data and Samples.
 - 8. Preparation of record documents.
 - 9. Use of the premises.
 - 10. Office, Work and storage areas.
 - 11. Equipment deliveries and priorities.
 - 12. Safety procedures.
 - 13. First aid.
 - 14. Security.
 - 15. Housekeeping.
 - 16. Working hours.

1.04 COORDINATION/PROGRESS MEETINGS

- A. The Contractor will conduct weekly Project coordination/progress meetings at regularly scheduled times convenient for all parties involved. Project coordination/progress meetings are in addition to specific meetings held for other purposes, such as special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved

in coordination or planning for the construction activities involved. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

- C. No later than 5 days after each coordination/progress meeting date, the Contractor will distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- D. The Contractor will revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized.

PART 2: PRODUCTS (Not Applicable)

PART 3: EXECUTION (Not Applicable)

END OF SECTION 01200

SECTION 01300: SUBMITTALS

PART 1: GENERAL

1.01 DESCRIPTION

- A. Work Included in This Section: Requirement standards for project samples, shop drawings, material lists, manufacturer's literature, brochures, catalog cuts, test reports, certificates, verifications, maintenance manuals, color and texture samples.
- B. Related Work Specified Elsewhere: Reference to required submittals are included in specific sections, including Special Conditions.

1.02 MATERIAL LISTS

Material lists shall be submitted with name of project, Architect's project number, supplier or subcontractor's name, contract Specifications Section number, generic name of item, manufacturer's name, brand name and model or industry standard number. Other data required to clearly identify the item as that which is specified shall also be included.

1.03 SHOP DRAWINGS

Shop drawings shall facilitate integration, coordination and progress of the work and are not considered Contract Documents.

- A. Scope of the Drawings: Shop drawings shall be prepared to indicate accurately job conditions and dimensions and to conform to drawing indications, specification requirements, and applicable supplementary details and instructions; they shall indicate complete methods of connection, jointing, support anchorage, reinforcement and other features of construction, together with easements and necessary clearances in the work of others, and relation of work so detailed to finished surfaces of abutting work; material and finishes of work so detailed shall be indicated thereon and size of drawings shall not exceed size of Contract Drawings.
- B. Review: The Architect will review shop drawings for general design requirements only. The Contractor's responsibility shall encompass review necessary to coordinate work of all trades affected by the shop drawings; Contractor's stamp of review and/or approval shall be placed, signed and dated prior to submittal to the Architect, and all requested verifications required by field conditions noted thereon. Carefully note the provisions of Article 3.03.
- C. Deviations from Contract Documents so minor as to involve no change in Contract amount may be accepted if acceptance is in the Owner's interest. Do not construe the Architect's review as allowing following:

1. Variation from Contract Documents except as specifically authorized by the Architect.
2. Relieving the Contractor of responsibility for errors in details or dimensions.
3. Relieving the Contractor of responsibility for deviations or omissions from the Contract Documents.
4. Departures from additional details or instructions previously furnished by the Architect.
5. Relieving the Contractor of responsibility for integrating and coordinating various trades and separate contracts.
6. Variation from Local, State or Federal laws, nor regulations or requirements of Boards, Commissions or Departments having jurisdiction, nor approval of conditions which may involve infringements of patents.

1.04 SAMPLES

Review of samples shall permit the Architect to physically verify conformance of materials, products, fixtures or devices with Contract Documents either by inspection or testing, and to select textures, colors or other characteristics as stipulated in the Contract Documents.

- A. All samples related to color, finish, or texture shall be actual, physical samples. No printed or scanned samples, or reference to samples embedded within a website, will be accepted.
- B. Review of samples will be only for characteristics or uses named in such review and shall not be taken to change or modify any contract requirement except as specifically authorized or requested by the Architect.
- C. Samples shall set standards for items or characteristics of which samples are representative and after sample has been reviewed, no further change in brand, make or quality will be permitted.

1.05 CERTIFICATES

Certificates shall certify compliance with published specifications of trade, industry or governmental organizations or specifications of the Architect and shall attest to the Contractor's compliance with such specifications.

- A. Where these specifications set standards by referencing published specifications, submittal of certifications may not be required; however, if inspection or performance at the job site after delivery and until the Owner's final acceptance creates doubt regarding compliance, the Architect reserves the right to receive such certification or in event

compliance cannot be certified, demand removal of questionable work and its replacement with certifiable materials.

1.06 SUBSTITUTIONS

Where the specifications use a specific manufacturer's name in conjunction with materials, products or systems, they are cited as standards, but implies no right upon the part of the Contractor to substitute other materials, products or systems without written approval of the Architect.

- A. Where the phrase "or approved equal" or "or equal as approved by the Architect" occurs in the Contract Documents, do not assume that material, equipment, or methods not specified are equal unless the item has been specifically approved for this Work by the Architect.
- B. Requests for substitutions shall be submitted to the Architect as indicated below. No request submitted to the Architect's consultants or to Code Authorities shall be considered valid.
 - 1. Requests for substitutions shall be submitted within forty (40) days after the signing of the Contract, and in no event less than three weeks prior to the date which the Contractor sets for firm action by his forces (placing of an order, installation, etc., as the case may be). Such requests may be submitted in conjunction with material lists in accordance with Article 3.01.
 - 2. All requests for substitution shall be in writing and shall indicate all information required thereon including difference in size, difference in color, etc. The request for substitution shall be accompanied by cuts, product literature, performance data, specifications, drawings, samples or other means as may be required for proper evaluation by the Architect.
 - 3. By making a request for substitution, the Contractor is stipulating that the substitute material, equipment or methods will integrate into the specified Work without further modification. Any cost associated with modifying the specified Work to accommodate the substitute material, equipment or methods shall be the sole responsibility of the Contractor.
 - 4. All proposed substitutions shall be a standard product of the firm under current manufacture and be a catalog item at time of bid.
 - 5. All requests for substitutions shall be in accordance with all other requirements of this Section and these Specifications.
 - 6. The Architect shall be the sole judge of whether the Contractor's proposed substitution is equal to the specified item and approved for use on the project.

7. Acceptance of substitutions shall not relieve the Contractor from responsibility for complying with requirements of the Contract Documents. The Contractor shall be responsible for changes in other parts occasioned by his substitutions and shall bear their expense.

PART 2: PRODUCTS - Not Applicable

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Unless otherwise directed by the Architect, the Contractor shall provide digital copies of all submittals of material lists, cut sheets, shop drawings and requests for substitutions. All submittals shall be directed to the Owner's Project Manager, who will forward them to the Architect.
- B. Submittals shall be submitted to the Owner's Project Manager within forty (40) calendar days after award of the contract, or in no event less than 21 days prior to installation of material.
- C. The Architect shall be allowed fourteen (14) calendar days after submission of any shop drawings, certificates, samples, material lists, manufacturer's literature, etc., to review and return to Contractor except as provided in Paragraph 3.07 for those items involving a color selection.

3.02 SAMPLES

When required, samples shall be submitted in ample time for Architect's review prior to quantity fabrication, or in the case of manufactured items, prior to placement of purchase orders.

- A. Label samples with name of project, the Architect's project number, supplier's name, subcontractor's name, generic name of item, manufacturer's name, brand name and model number.
- B. Accompany Sample shipments with transmittal letter referencing name of project, the Architect's project number, drawing sheet and detail, specification section and paragraph number, and same information with which sample itself is labeled.
- C. Return of Samples: Upon Contractor's request, Architect may return certain reviewed samples for installation provided they are installed in good condition and are marked for identification as sample.
- D. Color and Texture Samples: Phase submittals for color and texture of all finish materials to be selected by the Architect as follows:

1. Submit manufacturer's standard samples with shop drawings or material lists.
2. Refer to Paragraph 3.07 for timing of Architect's selection of colors and textures.

3.03 SHOP DRAWINGS

When required by other sections of these Specifications, submit copies of rough-in, fabrications and installation drawings in ample time to permit reviews, verifications of compliance, coordination with other trades prior to performing work required; no work indicated on any shop drawing shall commence until reviewed.

- A. Unless otherwise provided in various specification sections, shop drawings within a trade which are interrelated with other work within the trade for which shop drawings are required and shop drawings which require coordination and checking with shop drawings of another trade, shall be submitted together to facilitate proper checking and coordination.
- B. Identification: Mark drawings with name of project or the Architect's project number, specification section number, drawing detail and sheet number reference where subject of shop drawing is described and shown, and date shop drawing was prepared and/or revised.
 1. Where coordination requirements necessitate scope of shop drawing to include more than one item, label shop drawing with specification section number of dominant trade involved. "Dominant" shall be defined as greatest quantity, greatest cost, or principal detail subject of drawing, whichever is appropriate.

3.04 MATERIAL LIST

When required by other sections of these Specifications, submit material lists in accordance with Article 3.01.

- A. Where material or product is specified with several acceptable manufacturers, the material list shall identify which manufacturer's product will be used.
- B. Where material or product is specified by only one manufacturer the material list may simply state "as specified".
- C. Where material or product is specified without naming a manufacturer, the material list shall identify the manufacturer for the product to be used.

3.05 CERTIFICATES

Each required certificate shall be identified with project number specification section numbers and applicable industry or governmental standard.

- A. Certificates for materials shall be submitted with material lists or shop drawings in accordance with Article 3.01.
- B. Certificates for installation or application of materials or products shall be submitted after completion of the work and prior to final acceptance.

3.06 MANUALS

Equipment maintenance manuals shall contain manufacturer's catalog cuts, schedules, be identified as to item and number specified and be bound into hard-faced durable binders.

3.07 LIST OF SUBMITTALS

The following is a list of items that need to be transmitted to the Architect for the Architect's review during the course of construction. Verify exact requirements with Specifications.

SPEC. SECTION	ITEM
01050:	STORM WATER POLLUTION CONTROL Pollution Control Plan (For reference only)
01075:	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL Waste Management Plan (For reference only)
01935:	EXTRA FINISH MATERIALS Acoustical Tile Resilient Flooring Paint
02050:	CLEARING AND DEMOLITION Evidence of Permit
02281:	TERMITE CONTROL Termite Certification
02810:	IRRIGATION SYSTEM List of Materials/Manufacturers Shop Drawings
02830:	CHAIN LINK FENCING List of Materials/Manufacturers Shop Drawings
02870	SITE FURNISHINGS List of Materials/Manufacturers Color Samples
02900:	LANDSCAPE WORK List of Plant Material Fertilizer/Amendments Data

- 03300: CAST-IN-PLACE CONCRETE
 Reinforcing Steel Shop Drawings
 Mix Designs
 List of Materials/Manufacturers
- 04321: REINFORCED UNIT MASONRY
 Reinforcing Steel Shop Drawings
 Unit Masonry Shop Drawings
 Unit Masonry Samples
- 05200: STRUCTURAL STEEL FRAMING
 List of Materials/Manufacturers
 Shop Drawings
 Qualifications Data
 Welding Certificates
 Compliance Affidavit
- 05700: MISCELLANEOUS METAL WORK
 List of Materials/Manufacturers
 Shop Drawings
- 06100: ROUGH CARPENTRY
 List of Materials/Manufacturers
- 06200: FINISH CARPENTRY AND MILLWORK
 List of Materials/Manufacturers
- 06400: ARCHITECTURAL WOODWORK
 List of Materials/Manufacturers
 Shop Drawings
 ** Laminated Plastic Samples
 ** Solid Surfacing Samples
- 07200: BUILDING AND ACOUSTICAL INSULATION
 List of Materials/Manufacturers
- 07250: WEATHER BARRIERS
 List of Materials/Manufacturers
- 07542: PVC ROOFING SYSTEM
 List of Materials/Manufacturers
 Warranty
- 07600: FLASHING AND SHEET METAL
 List of Materials/Manufacturers
 Shop Drawings
- 07610: METAL ROOF PANELS
 List of Materials/Manufacturers
 Shop Drawings
 Color Samples

- 07713: PREFABRICATED GUTTERS AND DOWNSPOUTS
List of Materials/Manufacturers
Shop Drawings
** Color Samples
- 07720: ROOF ACCESSORIES
List of Materials/Manufacturers
Shop Drawings
- 07900: SEALANTS AND CAULKING
List of Materials/Manufacturers
- 08100: METAL DOORS AND FRAMES
List of Materials/Manufacturers
Shop Drawings
- 08110: STAINLESS STEEL DOORS AND FRAMES
List of Materials/Manufacturers
Shop Drawings
- 08220: PLASTIC LAMINATE FACED DOORS
List of Materials/Manufacturers
Shop Drawings
** Laminated Plastic Samples
- 08305: ACCESS DOORS
Catalog Cuts
- 08331: OVERHEAD COILING DOORS
List of Materials/Manufacturers
Shop Drawings
- 08400: STOREFRONT SYSTEMS
List of Materials/Manufacturers
Shop Drawings
Finish Hardware Schedule
- 08625: TUBULAR DAYLIGHTING DEVICES
List of Materials/Manufacturers
Shop Drawings
- 08710: FINISH HARDWARE
Hardware Schedule
Cut Sheets
- 08800: GLASS AND GLAZING
List of Materials/Manufacturers
- 09200: LATH AND PLASTER
List of Materials/Manufacturer

- ** Acrylic Finish Color Chart
 - ** Acrylic Finish Texture Sample
- 09252: GYPSUM WALLBOARD AND CEMENT BOARD
 - List of Materials/Manufacturers
 - Texture Sample Panel
- 09500: ACOUSTICAL CEILING TREATMENT
 - List of Materials/Manufacturers
- 09660: RESILIENT FLOORING
 - List of Materials/Manufacturers
 - ** Color Samples
- 09672: RESINOUS FLOORING
 - List of Materials/Manufacturers
 - ** Color Samples
- 09851: EPOXY CHEMICAL RESISTANT WALL COATING
 - List of Materials/Manufacturers
 - ** Color Samples
- 09900: PAINTING
 - List of Materials/Manufacturers
 - ** Color/Finish Range Samples
 - Brush-Outs
- 09986: PREFINISHED WALL PANELS
 - List of Materials/Manufacturers
 - ** Color Samples
- 10050: MISCELLANEOUS SPECIALTIES
 - List of Materials/Manufacturers
- 10426: SIGNAGE AND GRAPHICS
 - Shop Drawings
 - ** Color Samples
- 10500: PHENOLIC LOCKERS AND BENCHES
 - Shop Drawings
 - ** Color Samples
- 10520: FIRE FIGHTING DEVICES
 - Catalog Cuts
- 10800: TOILET AND BATH ACCESSORIES
 - Catalog Cuts
- 11110: LAUNDRY EQUIPMENT
 - Catalog Cuts
- 11450: RESIDENTIAL EQUIPMENT

Catalog Cuts

- 11490: CLEANING EQUIPMENT
Catalog Cuts
Shop Drawings
- 11780: MORGUE EQUIPMENT
Catalog Cuts
Shop Drawings
Warranties
- 15400: PLUMBING
Plumbing Shop Drawings
Fixture Cuts
Plumbing Record Drawings
Certificate of Purity
- 15650: HEATING, VENTILATING AND AIR CONDITIONING
Mechanical Shop Drawings
Operation and Maintenance Book
Mechanical Record Drawings
Warranties
- 16400: ELECTRICAL
Electrical Product Data
Electrical Shop Drawing
**
Fixture Cuts
Personnel Training for Controls
Operation and Maintenance Book
CCTV Product Data
CCTV Shop Drawings

NOTE: All items marked with ** shall be submitted as soon as possible to facilitate Architect's selection and preparation of finish color boards. Architect will not begin to prepare color boards or make color selections until all items so marked have been received from the Contractor.

Contractor shall be responsible to submit samples and literature promptly so as to meet minimum ordering dates for items with the longest delivery times. Allow Architect 2-weeks to make color selections and prepare color boards.

End Of Section 01300

SECTION 01430: TESTS AND INSPECTIONS

PART 1: GENERAL

1.01 DESCRIPTION

A. Work Included in This Section:

This section is intended to clarify the extent of and establish the basis for the laboratory conducted tests and inspections required by these specifications.

B. Related Work Specified Elsewhere:

1. EARTHWORK Section
2. CAST-IN-PLACE CONCRETE Section
3. REINFORCED UNIT MASONRY Section

1.02 TESTING PROCEDURES

- A. The Contractor shall not make any tests upon portions of the work already completed except with the written consent and under the direction of the Architect or Owner. The Contractor shall repair all damage caused by the taking of any test or the making of any inspection hereunder at no additional cost to the Owner.
- B. The Contractor shall cooperate with and provide the inspectors and the representatives of the testing laboratory(s) opportunity and assistance in taking samples, making field tests and making inspections, and he shall schedule and coordinate his work to hold the costs of tests and inspections to a reasonable minimum.
- C. The Owner may provide one or more full-time inspectors for the duration of the Contract, as required. The basic PLUMBING and ELECTRICAL inspections shall be called for in the normal manner from the governing Inspection Department.
- D. Whenever tests or inspections are required by the Specifications or by the Architect to be performed by a testing laboratory or testing agency, they shall be performed by a testing laboratory or agency selected by the Owner.
- E. The testing laboratory or inspection agency shall keep a record of all tests and inspections made. Copies of test and inspection reports shall be issued as follows:
1. Two (2) copies to the Contractor.
 2. One (1) copy to the Architect.

3. One (1) copy to the Owner.
- F. The cost of all tests and inspections shall be paid for by the Owner, unless otherwise expressly provided.
 - G. When re-tests or re-inspections are required because of the failure of any specified test or inspection, the cost thereof shall be borne by the Contractor.
 - H. When any test or inspection is called for at such time or in such a manner as to require the payment of any overtime or premium therefore, the excess cost shall be deducted from the Contract price.
 - I. When, because of the manner or sequence in which the Contractor performs the work, the Architect is of the opinion that tests or inspections other than those specified, or in a quantity not normally expected, are required, the cost of such additional tests and inspections shall be deducted from the Contract price.

1.03 REQUIRED TESTS AND INSPECTIONS

- A. Testing required shall be as set forth in the Testing and Inspection Schedule, Article 1.04. Tests shall be performed on the listed material or services and all other portions of the work as required by local Code Authorities and those provisions of the applicable California Administrative Codes.
 1. The Architect and the City, County, State and Federal departments having legally constituted authority, shall have access to the job site at all times for the purpose of making inspection of the work and/or premises, whenever it is necessary to secure compliance with, or prevent violation of any provisions of the Specifications, legal building regulations or governing standards applicable to the work or its performance under this Contract.
- B. The Contractor shall obtain inspection and approval for all work, for which a permit is required, from authorized employees of the governing Inspection Department. In addition to inspections called for by permit, special inspection shall be provided from when required by the Code Authority.

1.04 TESTING AND INSPECTIONS SCHEDULE

The following listed materials shall be sampled, inspected and tested in order to comply with the requirements of the Contract and the various Code authorities having jurisdiction over the project.

- A. Soils:
 1. Fill material, acceptance tests.

2. Fill material, continuous compaction tests.
- B. Reinforcing Steel: Bar sample and test for all bars #5 and larger. (Proper identification and mill certificates are acceptable.)
- C. Paving: Compaction tests for aggregate base course.
- D. Concrete:
1. Review of Contractor's mix designs.
 2. Concrete strength, compression tests.
 3. Vapor Transmission tests.
- E. Masonry:
1. Special inspection of new masonry walls.

End Of Section 01430

SECTION 01500: TEMPORARY FACILITIES AND CONTROLS

PART 1: GENERAL

1.01 DESCRIPTION

- A. Work Included in This Section: Provision of temporary facilities and controls including, but not necessarily limited to:
 - 1. Protections such as tarpaulins, barricades and canopies.
 - 2. Sanitary Facilities.
 - 3. Temporary Water, Electricity and Telephone.
- B. Related Work Specified Elsewhere:
 - 1. Sub-Contractor Equipment in DIVISIONS 2 through 16: Equipment furnished by sub-contractors shall comply with all requirements of pertinent safety regulations, the ladders, hoists, planks, and similar items normally furnished by individual trades in execution of their own portions of the Work are not part of this Section of these Specifications.

1.02 INCORPORATED DOCUMENTS

In addition to the Codes and Standards indicated in Section 01000, the published specifications, standards, tests or recommended methods of the industry, apply to the work of this Section. All work and equipment shall comply with the safety regulation of CAC Title 24, Division T8, Industrial Safety Orders.

PART 2: PRODUCTS

2.01 TEMPORARY UTILITIES

- A. General: All costs for water and electricity required for the performance of the work will be paid by the Contractor.
- B. Furnish and install all necessary tanks and connections required for temporary water.
- C. Temporary Electricity:
 - 1. Furnish and install all necessary wiring and connections required for temporary electricity.
 - 2. Furnish and install area distribution boxes so located that the individual trades may use their own construction-type extension cords to obtain adequate power and artificial lighting at all points where required for progress of the Work and safety.

2.02 FIELD OFFICES AND JOB TELEPHONE

- A. Contractor's Field Office: Contractor shall furnish and install a field office building adequate in size and accommodations for all Contractor's offices, superintendent's office, supply and tool room. Furnish and install job telephone service.

2.03 SANITARY FACILITIES

Furnish and install all required temporary toilet buildings with sanitary toilets for use of all workmen; comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain in a sanitary condition at all times.

2.04 ENCLOSURES

Furnish, install and maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, and other temporary construction necessary for proper completion of the Work in compliance with all pertinent safety and other regulations.

2.05 FENCING OF THE CONSTRUCTION AREA

- A. Furnish and install temporary fencing as required for the protection of the public.
- B. The temporary fence shall consist of woven chain-link mesh not less than six feet in height, complete with metal posts and all required bracing, and with truck and pedestrian gates as required.

PART 3: EXECUTION

3.01 REMOVAL

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work; remove all such temporary facilities and controls as rapidly as progress of the Work will permit or as directed by the Architect.

End Of Section 01500

SECTION 01700: PROJECT CLOSEOUT

PART 1: GENERAL

1.01 DESCRIPTION

- A. Work included in this Section shall consist of, but not be specifically limited to, the following items:
1. Project cleanup and coordination of all cleaning required of other trades.
 2. Start-up of all mechanical, electrical, and miscellaneous equipment items; and adjustments required for the performance specified.
 3. Repair and touch-up work on all items damaged during the construction and handling processes.
 4. Collection of and processing for delivery to the Architect of all as-built drawings and maintenance and operations manuals required under various Sections of the Specifications.
- B. It shall be the responsibility of the Contractor to provide all labor and materials necessary to achieve completion of the items may be specified under the work of other trades. Periodic removal of debris, and cleaning, repair, and testing of items in various areas of the construction site shall be carried out under the direction of the Contractor.
- C. Related work specified elsewhere shall include, but not be limited to, the provisions set forth in all detail specifications of Sections 2 through 16, inclusive.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

Safety, Fire and Environmental Protection, and Insurance standards shall be strictly adhered to in all phases of the construction work. It shall be the responsibility of the Contractor to determine the standards applicable to this project as set forth in all codes, regulations, and ordinances having jurisdiction, and as set forth elsewhere in the Specifications.

PART 2: PRODUCTS

2.01 CLEANING MATERIALS

Use only those specific materials or types of materials recommended and approved by the manufacturer of the item to be cleaned.

2.02 TOUCH-UP MATERIALS

Use only those materials by or as recommended and approved by the manufacturer of the item to be touched up. Colors and finish characteristics shall

exactly match the base material, and extra materials, labor, and services required to achieve this result shall be provided by the Contractor.

2.03 REPLACEMENT MATERIALS

Materials that are damaged and not repairable, or materials that are destroyed shall be replaced with equal and identical materials of the same manufacture and shall function in conjunction with the remaining portions of that material. Items no longer manufactured or available shall be replaced with comparable materials as approved by the Architect and at no additional cost to the Owner.

PART 3: EXECUTION

3.01 CLEANUP WORK

A. During Construction:

1. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish.
2. Sprinkle dusty debris with water.
3. At reasonable intervals during progress of work, clean up site and access and dispose of waste materials, rubbish, and debris.
4. Provide suitable containers and locate on site for collection of waste materials, rubbish, and debris.
5. Do not allow waste materials, rubbish, and debris to accumulate and become an unsightly or hazardous condition.
6. Remove waste materials, rubbish, and debris from the site and legally dispose of at public or private dumping areas off the Owner's property.
7. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance or occupancy.
8. Lower waste materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
9. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

B. Final Cleaning:

1. Use experienced professional cleaners for final cleaning.

2. At completion of construction and just prior to acceptance or occupancy, conduct a final inspection of exposed interior and exterior surfaces.
3. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces.
4. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
5. Broom clean paved surfaces; rake clean other surfaces of grounds.
6. Maintain cleaning until the building, or portion thereof, is accepted by the Owner.

3.02 STARTUP WORK

- A. During Construction and as each piece of equipment is installed, provide the following tests:
 1. Verify that all external service connections have been properly completed, that piping and/or wiring is properly sized, and contain all necessary safety devices.
 2. Verify that the equipment is free of shipping materials, tie downs, or other internal obstructions.
 3. Conduct tests employing the manufacturer's operating instructions as a sequential guide.
 4. Verify that all portions of the equipment function properly and that the total performance criteria is satisfied.
 5. Make adjustments, replacements, or repairs necessary to achieve full operational capability and repeat tests until performance is achieved and approval obtained.
- B. Prior to acceptance verify that all conditions specified in above have been satisfied and that equipment is ready for continuous use. Provide the following services preparatory to acceptance:
 1. Clean or replace all strainers.
 2. Replace air conditioning filters in existing units, if units were operated during construction.
 3. Clean ducts, blowers, and coils in existing units, if air conditioning units were operated during construction.

3.03 REPAIR AND TOUCH-UP WORK

All damaged items shall be repaired or replaced as directed using proper materials and craftsmen skilled in that particular trade. Materials shall be as follows.

- A. All repair or replacement parts shall be of the same quality and manufacture as the item being repaired.
- B. All touch-up paint shall be as provided by the item manufacturer for that purpose and shall exactly match the original color and finish.

3.04 AS-BUILT DRAWING

Various Sections of the detailed specifications require as-built drawings to be prepared by the Contractor(s). These drawings shall be collected by the Contractor, checked for conformance to the specific requirements, compiling all information on the one record set of prints in accordance with Section 01000, Article 1.08.

3.05 MAINTENANCE AND OPERATING MANUALS

The Contractor shall also be responsible for collecting bound operating and maintenance manuals required of all trades supplying equipment, and for delivering them to the Architect.

3.06 EXTRA MATERIALS

Carefully examine the requirements of Section 01935 and the provisions of the applicable Sections of Division 9 and deliver the materials required to the Owner.

3.07 FINAL INSPECTIONS

See Section 01000, Article 1.07 for procedures and basic responsibilities to be satisfied prior to requesting a final inspection or punch list for a "completed" project.

End Of Section 01700

SECTION 01935: EXTRA FINISH MATERIALS

PART 1: GENERAL

1.01 DESCRIPTION

- A. Work Included: Provide all extra materials as herein scheduled packaged, labeled, and delivered to the Owner for future repair and replacement work. Note that this Section covers all material for which extra quantities shall be required, but only if that material is specified in a detailed Specification Section.
- B. Related Work Specified Elsewhere: The applicable Sections under Division 9 wherein the materials scheduled in this section are specified.

1.02 PRODUCT DELIVERY HANDLING AND STORAGE

- A. Deliver the required materials, in the quantities scheduled, in the original containers or packages showing clearly the make, style, catalog numbers, etc. as required to identify the materials.
- B. Provide special labeling for bulk materials identifying the material and the quantity contained in each package.
- C. Each carton or package of material shall be delivered to the Owner open for inspection as to the quantity, condition, and compliance with the schedule. After inspection, approved material packages shall be sealed in the presence of the Owner or his representative and delivery accepted. Materials which are rejected as being unsound or not of matching finishes shall be removed and replaced with new materials acceptable to both the Owner and the Architect.
- D. All materials shall match the manufacturing lot of that installed in the work.

PART 2: PRODUCTS

2.01 GENERAL

Refer to Article 3.02 Schedule and the related Sections of Division 9.

PART 3: EXECUTION

3.01 GENERAL

For each type of material listed, which is specified elsewhere, provide the quantities scheduled based upon the gross area of that material required for the work as shown and specified.

3.02 SCHEDULE

<u>Material</u>	<u>Extra Quantity</u>
A. Acoustical Tile/Board (each type and pattern)	
1. up to 1000 square feet	5% or minimum of one standard carton
2. 1000-2500 square feet	3%
3. over 2500 square feet	2%
B. Resilient Flooring	
1. 5% of each pattern in each color or a minimum of one standard carton.	
C. Paint	
1. (each type and sheen required)10% of each material in each color or a minimum of one quart.	

End Of Section 01935

SECTION 02050: CLEARING AND DEMOLITION

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of demolishing, cutting and removing existing construction as designated or required to provide for new work, including but is not necessarily limited to:
1. Removal of all existing construction, vegetation, etc., unless indicated on Drawings to remain.
 2. Protection of existing improvements, utilities, etc. indicated to remain.
 3. Secure required permits from local agencies, including San Joaquin Valley Air Quality Board.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. American National Standards Institute, Inc.'s "American National Standard Safety Requirements for Demolition" (ANSI A10.6-1969).

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section of these Specifications and shall include the following:

- A. Evidence of permit obtained from San Joaquin Valley Air Quality Board.

1.04 JOB CONDITIONS

- A. Existing Conditions: Carefully protect adjacent structures with approved barricades and enclosures as required. Protect all bench marks, and survey control references.
- B. Protection:
1. Erect and maintain temporary bracing, shoring, lights, enclosures, (except construction barricades for subsequent new construction), warning signs, and guards necessary to protect public, and

improvements to remain and adjoining property from damage, in accordance with applicable regulations.

2. Wet down area affected by this work as required to prevent dust and dirt rising.

PART 2: PRODUCTS

2.01 MATERIALS

Provide all materials incidental and required to construct safety barricades, enclosures, temporary bracing, and weatherproof enclosures, including but not necessarily limited to:

- A. Wood: Meet requirements of prevailing Codes.
- B. Moisture Barrier: Polyethylene film, minimum six mils thick, conforming to ASTM D2103.
- C. Miscellaneous: Rough hardware, nails, wire, clips, staples, tape, paint, etc.

PART 3: EXECUTION

3.01 INSPECTION

- A. Examine areas affected by work of this Section and verify that:
 1. Utilities have been disconnected.
 2. Utilities serving occupied portions of adjacent buildings will not be disturbed, or that acceptable temporary services are fully operable.
- B. Where existing conditions conflict with representations of the plans, notify the Architect and obtain clarification. Do not start work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

Mark trees and shrubs noted to remain or to be removed and verify correct identification with the Architect prior to removal.

3.03 CLEARING

Clear total area required for initial construction phase within contract boundary, as shown.

- A. Remove vegetation residue to sub-grade level. Take precautions to prevent injury to persons, adjacent properties, structures, trees, plants, shrubs and improvements to remain.

3.05 DEMOLITION

- A. Perform work in accordance with ANSI A10.6-1969 unless otherwise noted.
- B. Any existing walks, curbs, slabs, foundations, paving and aggregate base, and similar construction within the site area shall be completely removed as required.
- C. Sewer, water, gas and electrical lines and similar obstructions which have been disconnected and abandoned shall be removed in their entirety.

3.06 REMOVALS

- A. Remove from job site salvage materials and debris as they accumulate.
- B. Do not permit the presence of debris to delay progress of related work.
- C. Do not store, sell, burn or otherwise dispose of materials resulting from this work on job site.

End Of Section 02050

SECTION 02220: EARTHWORK

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Work Included in this Section: Provisions of excavating, trenching, filling and grading required for the work as described on the Drawings, including but not necessarily limited to:
1. Excavating for footings and foundations.
 2. Filling and backfilling, including structural fill and compaction.
 3. Trenching and trench backfilling including compaction.
 4. Rough and finish grading of the site to attain indicated grades.
 5. Stripping
- B. Contractor shall adhere to all recommendations listed in the "Soils Investigation – New Morgue Building At 1225 South 'O' Street, Tulare, CA" dated March 3, 2023, as prepared by DC Inspections, as well as Supplemental Documents dated March 29, 2023, as prepared by DC Inspections, all of which are on file in the Owner's office.
- C. Related Work Specified Elsewhere:
1. TESTING AND INSPECTION Section.
 2. CLEARING AND DEMOLITION Section.
 3. Provisions of trenching and backfill for utilities under DIVISIONS 15 and 16.

1.03 JOB CONDITIONS

- A. Protection
1. Use all means necessary to protect all materials of this Section before, during, and after installation and to protect all objects designated to remain.

- B. Dust Control:
 - 1. Use all means necessary to control dust on and near the Work and on and near all off site borrow areas if such dust is caused by the Contractor's operations during performance of the Work or if resulting from the condition in which the Contractor leaves the site. Control of fugitive dust emissions shall be as required by local governing agencies.
 - 2. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the Owner, public, neighbors, and concurrent performance of other work on the site.

PART 2: PRODUCTS

2.01 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Fill material is subject to standards established in the Soils Investigation referenced in 1.02.B.

2.02 OTHER MATERIALS

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

PART 3: EXECUTION

3.01 SURFACE CONDITIONS:

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

3.02 FINISH ELEVATIONS AND LINES

- A. Utilities:

1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Owner.
 2. If active utility line are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Architect and secure his instructions.
 5. Do not proceed with permanent relocation of utilities until written instructions are received from the Architect.
- B. Protection of persons and property:
1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
 2. Operate warning lights during hours from dusk to dawn each day and as otherwise requires.
 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
- C. Dewatering:
1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
 2. Keep trenches and site construction area free from water.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to adjacent areas at all times.

3.04 TRENCHING

- A. Comply with the provisions of this Section.

- B. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel.
 - 1. Prior to backfilling, remove all sheeting.
 - 2. Do not permit sheeting to remain in the trench except when, in the opinion of the Soils Engineer, field conditions or the type of sheeting or methods of construction such as use of concrete bedding are such as to make removal of sheeting impracticable. In such cases, the Soils Engineer may permit portions of sheeting to be cut off and remain in the trench.

- C. Open cut:
 - 1. Excavate for utilities by open cut.
 - 2. If conditions at the site prevent such open cut, and if approved by the Soils Engineer, trenching may be used.
 - 3. Short section of a trench may be tunneled if, in the opinion of the Soils Engineer, the conductor can be installed safely and backfill can be compacted properly into such tunnel.
 - 4. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects as directed by the Soils Engineer.
 - 5. When the void is below the subgrade for the utility bedding, use suitable earth materials and compact to the relative density directed by the Soils Engineer, but in no case to a relative density of less than 90%.
 - 6. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or consolidated as approved by the Soils Engineer, but in no case to a relative density less than 90%.
 - 7. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the Owner.
 - 8. Excavating for appurtenances:
 - a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
 - b. Overdepth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Soils Engineer, and at no additional cost to the Owner.

- D. Trench to the minimum width necessary for proper installation of the utility, with sides as nearly vertical as possible. Accurately grade the bottom to provide uniform bearing for the utility.
- E. Depressions:
1. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.
 2. Except where rock is encountered, do not excavate below the depth indicated or specified.
 3. Where rock is encountered, excavate rock to a minimum overdepth of 4" below the trench depth indicated or specified.
- F. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, over, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.
- G. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.
- H. Cover:
1. Provide minimum trench depth indicated below to maintain a minimum cover over the top of the installed item below the finish grade or subgrade: Verify local jurisdiction standards and install that which is most stringent.
 - a. Areas subject to vehicular traffic:

(1)	Sanitary sewers:	48";
(2)	Storm drains:	36".
 - b. Areas not subject to vehicular traffic:

(1)	Sanitary sewers:	
(2)	Storm drains:	18".
 - c. All areas:

(1)	Water lines:	30";
(2)	Natural gas lines:	24";
(3)	Electrical cables:	42";
(4)	Electrical ducts:	36".
 - d. Concrete encased:

(1)	Pipe sleeves for water and gas lines:	24";
(2)	Sanitary sewers and storm drains:	12";
(3)	Electrical ducts:	24".

2. Where utilities are under a concrete structure slab or pavement, the minimum depth need only be sufficient to completely encase the conduit or pipe sleeve, and electrical long-radius rigid metal conduit riser, provided it will not interfere with the structural integrity of the slab or pavement.
3. Where the minimum cover is not provided, encase the pipes in concrete. Provide concrete with a minimum 28 day compressive strength of 2500 psi.

3.05 BEDDING

- A. Provide bedding as indicated on the Drawings, or as required to meet codes and standards.

3.06 BACKFILLING

- A. General:
 1. Do not completely backfill trenches until required pressure and leakage tests have been performed, and until the utilities systems as installed conform to the requirements specified in the pertinent Sections of the Specifications.
 2. Except as otherwise specified or directed for special conditions, backfill trenches to the ground surface with selected material that conforms to the Geotechnical Report specified under 1.02.B..
 3. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Civil Engineer or Soils Engineer.
 4. Do not allow or cause any-of the Work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, tests, and approvals.
 5. Should any of the Work be so enclosed or covered up before it has been approved, uncover all such Work and, after approvals have been made, refill and compact as specified, all at no additional cost to the owner.
- B. Lower portion of trench:
 1. Deposit approved backfill and bedding material in layers of 6" maximum thickness, and compact with suitable tampers to the density of the adjacent soil, or grade as specified herein, until there is a cover of not less than 24" over sewers and 12" over other utility lines.

2. Take special care in backfilling and bedding operations to not damage pipe and pipe coatings.
- C. Remainder of trench:
1. Except for special materials for pavements, backfill the remainder of the trench with material free from stones larger than 6" or 1/2 the layered thickness, whichever is smaller, in any dimension.
 2. Deposit backfill material in layers not exceeding the thickness specified; and compact each layer to the minimum density directed by the Geotechnical Report, or minimum as required by codes and standards.
- D. Adjacent to buildings: Mechanically compact backfill within ten feet of buildings.
- E. Consolidation of backfill by jetting with water may be permitted, when specifically approved by the Soils Engineer, in areas other than building and pavement areas.

3.07 TEST FOR DISPLACEMENT OF SEWERS AND STORMDRAINS

- A. Check sewers and storm drains to determine whether displacement has occurred after the trench has been backfilled to above the pipe and has been compacted as specified.
- B. Flash a light between manholes or, if the manholes have not yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror.
- C. If the illuminated interior of the pipeline shows poor alignment, displaced pipes, or any other defects, correct the defects to the specified conditions and at no additional cost to the Owner.

3.08 PIPE JACKING

- A. The Contractor may, at his option, install steel pipe casings, tongue-and-groove reinforced concrete pipes, and steel pipes under existing roads or pavements by jacking into place using procedures approved by the governmental agencies having jurisdiction.

3.09 TUNNELING OPERATIONS

- A. The Contractor may, at his option, tunnel pipes into position using procedures approved by the Soils Engineer and the governmental agencies having jurisdiction.

3.10 FIELD QUALITY CONTROL

- A. The Contractor shall be responsible to arrange for all required tests and inspections required by the local governmental agencies having jurisdiction. The Contractor shall also ensure that the following items are completed before installation of utilities:
1. Assure that trenches are not backfilled until all tests have been completed;
 2. Check backfilling for proper layer thickness and compaction;
 3. Verify that results conform to the specified requirements, and that sufficient tests are performed;
 4. Assure that defective work is removed and property replaced.

End Of Section 02220

SECTION 02281: TERMITE CONTROL

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work Included in This Section: Provision of pre-construction soil treatment as scheduled hereinafter, throughout the project, unless otherwise noted.

B. Related Work Specified Elsewhere:

1. CAST-IN-PLACE CONCRETE Section

1.03 SUBMITTALS

Provide certificate in accordance with Article 3.03.

1.04 JOB CONDITIONS

Schedule work and provide protection measures to ensure no damage to persons, property or plantings.

1.05 GUARANTEE

Furnish guarantee for five-year period for Work of this section.

PART 2: PRODUCTS

2.01 MATERIALS

A. Termite Control: "Wisdom TC" (7.9% Bifenthrin) as manufactured by AMVAC. Other insecticides may be substituted provided the in-service effectiveness is approved as equal by Architect. Material used shall comply with applicable E.P.A. and local requirements and directives.

2.02 MIXES

Mix in strict accordance with approved manufacturer's printed instructions and recommendations unless otherwise noted.

PART 3: EXECUTION

3.01 INSPECTION

- A. Examine and verify that substrate to receive treatment has been compacted and adjacent areas protected.
- B. Do not apply material until unsatisfactory conditions have been corrected.

3.02 APPLICATION

Apply treatment materials at a time, rate, and pressures recommended by approved manufacturer unless otherwise noted.

3.03 APPLICATION SCHEDULE

- A. Termite Control: Where wood framing is used in contact with concrete foundations or slabs on grade all under building areas shall be treated to provide termite protection.
 - 1. Application: Apply approved material in maximum percentage concentration recommended by the manufacturer and approved by all governing agencies, and at the maximum rate recommended by the manufacturer. Treatment shall not be made when the soil or fill is excessively wet or immediately after heavy rains, to avoid surface flow of the toxicant from application site. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact with the treated soil. Under all slabs extend coverage a minimum of 3'-0" outside of slab perimeter, including walks, porches, carports or other slabs adjoining the building slab.
 - 2. Precautionary Measures: The nozzle shall be held at a height and angle which minimizes spray drift. Material shall be used in a water solution to prevent damage to trees, shrubs or plants growing in or near the areas scheduled for treatment.
 - 3. Certification: Upon completion of the soil treatment and as a condition for its final acceptance, the Contractor shall furnish to the Owner, with a copy to the Architect, a certificate affirming that the toxicant, the concentration thereof and the application procedures comply with the requirements specified herein.

End Of Section 02281

SECTION 02500: PAVING AND SURFACING

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of asphalt concrete paving including accessory work as required for the work indicated on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. Provisions of EARTHWORK Section.
 - 2. Provisions of CAST-IN-PLACE CONCRETE Section.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards, tests or recommended methods of trade and governmental organizations cited below apply to work of this Section.

- A. Asphalt Institute Standards.
- B. State of California, Business and Transportation Agency, Department of Transportation "Standard Specification" (CSS), latest edition.
- C. Local standards which govern public and private improvements.

1.03 QUALITY ASSURANCE

- A. Design Criteria: Asphaltic concrete shall show no evidence of cracking, uneven settlement, improper drainage, or untoward junctions with adjoining or existing surfaces. Correct work displaying such conditions under the Contractor's guarantee of all work.
- B. Allowable Tolerances: Finish surface shall be true to established elevations within 1/4" in ten feet and slope to drain.

1.04 SUBMITTALS

- A. Material list including certification of compliance with standards specified in accordance with Section 01300.
- B. Certification of herbicide application.

PART 2: PRODUCTS

2.01 HERBACIDE

- A. Herbicide shall conform to the State of California Standard Specifications.

2.02 AGGREGATE BASE

- A. Aggregate for subbases and bases shall be clean from vegetable matter and other deleterious substances, and shall be of such nature that it can be readily compacted under watering and rolling to form a firm, stable base.
- B. Aggregate subbase shall conform to Section 25 of the State of California Standard Specifications.
- C. Aggregate base shall be Class 2 and shall conform to the provisions in Section 26 of the State of California Standard Specifications. The gradation of the Class 2 aggregate base shall be as specified for three-quarters of one inch (3/4") maximum aggregate.

2.03 ASPHALT CONCRETE

Asphalt concrete shall be Type B and shall conform to the provisions of Section 39 of the State of California Standard Specifications. The asphalt binder shall be steam refined paving asphalt classified as PG 64-10 in accordance with Section 92 of the State of California Standard Specifications.

2.04 BINDER

Paint binder shall be furnished and applied in accordance with the provisions in Section 94, "Asphaltic Emulsions," of the State of California Standard Specifications, and shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, to a pavement to be surfaced, and to other surfaces designated by the Engineer. The rate of application of the paint binder shall be five hundredths of one gallon per square yard (0.05gal/yd²) of surface covered. Full compensation for furnishing and applying the paint binder shall be included in the price bid for items requiring its application and no additional payment will be made therefore.

2.05 PRIME COAT

Prime coat shall be as specified in the State of California Standard Specifications.

2.06 PORTLAND CEMENT CONCRETE

Engineered mix to provide minimum 4,000 p.s.i. compressive strength at 28 days. Aggregate, admixtures, and curing compound shall be as specified in the State of California Standard Specifications.

2.07 BAR REINFORCEMENT

Bar reinforcement shall be as specified in the State of California Standard Specifications.

2.08 PAVEMENT MARKING PAINT

All pavement markings shall be installed with waterborne traffic line paint as specified in the State of California Standard Specifications.

PART 3: CONSTRUCTION AND INSTALLATION

3.01 PREPARATION

- A. Treat entire area to be paved with approved herbicide in accordance with manufacturer's application instructions.

3.02 GRADING

- A. Aggregate subbase or base shall not be placed until the subgrade has been finished to a condition satisfactory to the Architect and when placed, shall be accurately graded and compacted to proper profile and cross-section and at elevations which will result in the proper final grades when the specified thickness of paving has been applied and shall not vary from the planned grade by five hundredths of one foot (0.05') at any point for aggregate subbase and five hundredths of one foot (0.05') for aggregate base.
- B. Placing of the aggregate subbase or base shall conform to the requirements of Sections 251.04 and 26-1.04 respectively of the State of California Standard Specifications except that use of a motor grader will be permitted.

3.03 COMPACTION

The relative compaction of each layer of compacted aggregate subbase material shall not be less than ninety percent (95%) and each layer of aggregate base shall be not less than ninety-five percent (95%) as determined by Test Method California No. 216. Compaction testing shall be provided as specified in Section 01430 of these Standard Specifications.

3.04 SPREADING, LAYING AND COMPACTING

- A. Spreading and laying operations shall conform to the requirements of Sections 39-5 and 39-6 of the State of California Standard Specifications. Where the total depth of paving exceeds two-tenths of one foot (0.20'), the top layer of asphalt concrete shall not exceed two-tenths of one foot (0.20') in compacted thickness. The aggregate for this layer and all lower layers shall be three-fourths of one inch (3/4") maximum aggregate (medium). The next lower layer shall not exceed twenty-five hundredths of one foot (0.25') in compacted thickness. Any lower layers shall not exceed twenty-five hundredths of one foot (0.25') in compacted thickness.
- B. No asphalt concrete paving shall be placed when the atmospheric temperature is below fifty degrees Fahrenheit (50° F) and at the discretion of the Architect. Compaction operations shall conform to the requirements of Section 39-6.03 of the State of California Standard Specifications.

3.05 PRIME COAT

Prime coat shall be applied as specified in the State of California Standard Specifications.

3.06 CONCRETE PAVING

Concrete paving shall be applied as specified in the State of California Standard Specifications.

3.07 SEALING

- A. Before sealing, flood test pavement in presence of Architect. Thoroughly flood paved area with water and if water ponds to depth of more than 1/8" in 6', fill and correct to provide drainage. Smooth the edges of all corrected work until repairs are invisible.
- B. Apply seal coat according to manufacturer's instructions to create a finish seal which dries to a uniformly smooth, black, surface. Protect sealed area from traffic until sealer has cured and is safe for traffic.

3.08 PAVEMENT MARKINGS

Pavement markings shall be in accordance with the Drawings and as specified in the State of California Standard Specifications.

End Of Section 02500

SECTION 02810: IRRIGATION SYSTEM

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide and install irrigation materials as required to provide full and even water coverage over the specific zones identified on the Drawings and as specified herein .
- B. Provide all related materials, equipment, and labor required to complete the work specified.
- C. Related Work Specified Elsewhere:
 - 1. LANDSCAPE WORK Section

1.02 QUALITY STANDARDS

- A. Provide experienced, well-trained workers competent to complete the work as specified.
- B. Unless approved by the Architect, provide all related products and accessories from one manufacturer.
- C. Use materials from manufacturer and suppliers specified or approved by the Architect.
- D. All work shall comply with governing building and safety codes.
- E. The irrigation system shall fully comply with the California Model Water Efficient Landscape Ordinance (MWELO), as well as any local conservation requirements.

1.03 SUBMITTALS

- A. Refer to Section 01300.
- B. Submit product information showing compliance with the Contract Documents.
- C. Installing contractor shall prepare Shop Drawings showing the full design of the proposed irrigation system. This system design shall be submitted to the Architect for review.
 - 1. Contractor shall verify the available water pressure and adjust the system design accordingly.
 - 2. Break irrigation system down into zones as shown on the Drawings.

3. Design of irrigation system shall comply with all State and local water conservation regulations. The Shop Drawings shall be noted as to their compliance with MWELD.
4. Unless specifically forbidden by MWELD or local water conservation regulations, surface irrigation shall be provided through the use of drip devices as listed on the Drawings.

1.04 MATERIALS HANDLING

- A. Provide all materials required to complete the work as shown on the Drawings and specified herein.
- B. Deliver, store, and transport materials to avoid damage to the product or to any other work and return any products or materials delivered in an unsatisfactory condition.
- C. Materials and products delivered will be certified by the manufacturer to be as specified.
- D. Store materials in a safe, secure location, protected from weather.

1.05 EXPLANATION OF DRAWINGS

- A. The intent of the Drawings and Specifications is to outline and specify a complete and efficient automatic irrigation system. The Contractor shall be responsible for the final design and installation of a complete automatic irrigation system that is ready for use in accordance with manufacturer's recommendations, and all applicable local codes and ordinances.
- B. All plot dimensions are approximate. Before proceeding with the final system design, the Contractor shall carefully check and verify all dimensions.
- C. The Contractor shall carefully investigate the structural and finished conditions affecting all his work, and plan his work accordingly.
- D. The Contractor shall verify the correctness of all finish grades within the work area.

PART 2: MATERIALS

2.01 PIPING MATERIALS

- A. Piping:
 1. Pressure pipe/upstream of control valve:

- a. 2 ½ " and larger: Solvent weld bell end PVC 1120 Class 315 high impact pipe (ASTM D2241-83 & ASTM D1785-83).
 - b. 2" and smaller: Solvent weld bell end PVC 1120 Schedule 40 high impact pipe (ASTM D1785-83 & ASTM D2241-83).
2. Lateral line/downstream of control valve:
 - a. Solvent weld bell end PVC 1120 Schedule 40 high impact pipe (ASTM D2241-83 & ASTM D1785-83).
 3. Sleeving under paving:
 - a. Solvent weld bell end PVC 1120 Schedule 40 high impact pipe (ASTM D2241-83 & ASTM D1785-83).
 4. All pipe shall be continuously and permanently marked and conform with the following information:

Manufacturer's name or trademark, nominal pipe size, schedule and type of pipe, pressure rating in PSI and (NSF) seal of approval. Pipe shall be of improved white rigid polyvinyl chloride (PVC) compound manufactured by Lasco Industries or approved equal.

B. Fittings:

1. For PVC plastic pipe: white rigid polyvinyl chloride (PVC) Schedule 40 type I and II grade 1, solvent weld socket fittings ASTM D2466-78 for all lateral line and Schedule 80 type I and II grade 1 solvent weld socket fittings ASTM D2464-76 for all mainline fittings. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable (IPS) schedule, and (NSF) seal of approval.

All plastic fittings and connectors shall be injection molded of an improved polyvinyl chloride compound featuring high tensile strength, high chemical resistance and high impact strength in terms of current ASTM standards for such fittings and as manufactured by Lasco Industries or approved equal. Where threads are required in plastic fittings, these shall be injection molded also.

2. For connections between main lines and electric control valves: Schedule 80 PVC ASTM D2464-76, threaded both ends.

C. Galvanized pipe and fittings:

1. Galvanized Pipe shall be hot dip galvanized continuous welded, seamless steel pipe SCH 40 conforming to applicable current (ASTM) standards.
2. Galvanized Fittings shall be galvanized malleable iron ground joint SCH 40 conforming to applicable current (ASTM) standards.

D. Solvent Weld Adhesive:

1. All socket type connections shall be joined with primer and PVC solvent cement which shall meet the requirements of ASTM F656 for primer and ASTM D2564-80, "Standard Specification for Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings." Solvent cement joints for plastic pipe and fittings will be made as prescribed by manufacturer. The high chemical resistance of the pipe and fitting compounds specified in the foregoing sections makes it mandatory that an aggressive colored primer, which is a true solvent for (PVC) be used in conjunction with a solvent cement designed for the fit of pipe and fittings of each size range specified. A medium bodied solvent cement to be used on pipe joints with interference fits only and not with Schedule 80 fittings. A heavy bodied solvent cement can be used for all classes and schedules of pipe and fittings.

E. Pipe Thread Sealant:

1. A non-hardening all purpose sealant and lubricant similar to Permatex #51 or Lasco blue pipe thread sealant which is certified by the manufacturer to be harmless to PVC pipe and fittings. Apply sealant to clean male threads, brushing into grooves and to the first three threads of the female threads. A good quality grade of teflon tape recommended by the manufacturer for use with plastics may also be used. Minimum width of tape to be used is 3/4". A minimum of two wraps and a maximum of three wraps to be used.

2.02 VALVES

- A. Electric Control Valves: Globe valves operated by low-power solenoid, normally closed, manual flow adjustment. Sizes and types as shown on drawings. Because of Owner's requirement to maintain a standardized system throughout all of their facilities, no substitutions are allowed.
- B. Control Wire: Single Solid Copper, AWG-UF type UL approved for direct burial, minimum size #14-1. Common wire to be white, control wire red, spare control wire black, spare common wire blue. Wire shall be no smaller than AWG No. 14.
- C. Control Wire Connectors: 3M DBY Direct Bury splice kit, and Scotchlok 'Y' connectors or equivalent.
- D. Control Wire Marking: Brady Nylon Clip wire marker or equivalent.
- E. Mainline and Quick Coupler valve boxes: Carson 910 with lockable green plastic covers or equivalent.
- F. Mainline valve: AVK F-619RW cast iron resilient wedge with operating nut. Conforming to AWWA C509 Standards.
- G. Quick Coupling Valve: Two piece quick coupling valve as shown on plan.

- H. Control valve box marking: Heat imprinting on top of lid with 2" high letters showing controller letter and station number.

2.03 CONTROLLER

- A. Solid state microcomputer controller, completely automatic in operation, which shall electrically start the irrigation cycle and program and time the individual stations. Controller shall have attached instruction booklet, integral 24V transformer, clock indicating time of day and day of week, 24V master valve circuit and terminal connection strip. Controller shall be equipped with remote capabilities as indicated on the Drawings. Because of Owner's requirement to maintain a standardized system throughout all of their facilities, no substitutions are allowed.

2.04 IRRIGATION OUTPUT

- A. Drip Emitter System: Equip with pressure regulators, filters, air relief valves and flush end assemblies as indicated on the Drawings and recommended by the emitter manufacturer.
 - 1. Specific emitter output rate shall be established by the Contractor as part of the required Shop Drawings based on available water pressure.

2.05 BACKFLOW PREVENTOR

- A. Reduced pressure type with resilient seated shut off valves as shown on plans. Backflow preventor shall be approved by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research.

2.06 OTHER MATERIALS

- A. Materials not specifically indicated but necessary for proper execution of this work shall be of first quality as selected by the Contractor subject to the acceptance of the Architect.
- B. All materials appearing in the legend and details of the irrigation drawings are part of this job. Contractor is responsible for installation according to plans and details. The system shall efficiently and uniformly irrigate all areas and perform as required by these plans and specifications.

PART 3: EXECUTION

3.01 INSTRUCTIONS:

Workers shall be knowledgeable in regards to the performance, operation, installation procedures, and handling of the materials and equipment they will be working with. All

mechanical equipment operators shall be reminded of the hazards and safety precautions in regards to the equipment they will be using. The installation procedures shall be discussed and explained.

3.02 PIPING INSTALLATION

A. General:

1. Any equipment installed by the Contractor shall be readily accessible and quickly operable.
2. The Contractor shall be responsible for layout of proposed facilities and any minor adjustments required due to differences between site and drawings. The Owner will indicate the proposed precise location of the control panels. Emitter spacing on drawings is diagrammatic. Emitter spacing and patterns shall be adjusted to provide complete and adequate coverage. Where emitter spacing is not noted, Contractor is to install emitters to provide even watering. Flush all lines prior to installation of emitters.
3. Support piping without strain on joints or fittings and allow for piping expansion and contraction. "Snake" pipe into trench in accordance to manufacturer's recommendations to allow for expansion. Lay on solid sub-base, at uniform depth.

B. The Contractor shall examine all other portions of the work and plan trenching and pipe lays so that no conflict will arise between irrigation and any other work.

C. Excavations:

1. Excavations shall be open vertical construction, sufficiently wide to provide free working space around the work installed and to provide ample space for backfilling and tamping.
2. Trenches for pipe and equipment shall be cut to required grade lines, and compacted to provide an accurate grade and uniform bearing for the full length of the line.
3. When two pipes are to be placed in the same trench, it is required to maintain a minimum four inch (4") horizontal separation between pipes.
4. Depth of trenches shall be sufficient to provide a minimum cover above the top of the pipe as follows:
 - a. 24-inch over main lines.
 - b. 18-inch minimum over non-pressure lateral lines.

- c. 24-inch minimum over lines located out in road surface area of paved streets.
- 5. Maximum cover above the top of the pipe shall not exceed twelve
- D. Assemblies
 - 1. Install all assemblies specified herein according to the respective detail drawings or specifications pertaining to specific items required to complete the work. Perform work according to best standard practice, with prior approval.
 - 2. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.
 - 3. All threaded fittings shall be assembled using an approved teflon tape, or equivalent, applied to the male threads only. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved teflon tape will be required.
 - 4. No elbows, tees or valves are to be located closer than five (5') feet of each other without prior approval of the Architect.
- E. Line Clearance
 - 1. All lines shall have a minimum clearance of four inches (4") from each other, and six inches (6") from lines of other trades. Parallel lines shall not be installed directly over one another.
- F. Plastic to Steel Connections
 - 1. Connections shall always be plastic into steel, never steel into plastic.
 - 2. A non-hardening sealant and lubricant similar to Permatex #51 or LASCO blue pipe sealant may be used in lieu of teflon tape. Apply sealant to clean male threads brushing into grooves and to the first three threads of the female threads.
- G. Plastic Pipe
 - 1. The Contractor shall exercise care in handling, loading, unloading, and storing plastic pipe and fittings.
 - a. All lumber, rubbish, rubble, concrete and rocks shall be removed from the trenches by the Contractor. Pipe shall have a firm uniform bearing for the entire length of each pipe line to prevent uneven settlement. Pad trenches with soil as necessary to provide uniform bearing surfaces.
 - b. Where extensive lengths of pipe are installed, snake pipe in trench from side to side to allow for expansion and contraction. One additional foot per one hundred (100) feet of pipe is the minimum allowance for snaking. Never lay pipe when there is

water in the trench or when the temperature is 32 degrees F or below.

- c. All changes in direction of pipe shall be made with fittings, not by bending.
- d. Make solvent weld joints with a non-synthetic bristle brush in the following sequence:
 - 1) Make sure pipe is cut square and all rough edges and burrs are removed. All connecting surfaces are properly cleaned and dry prior to application of pipe primer.
 - 2) Apply an even coat of colored primer to pipe and fitting prior to application of solvent.
 - 3) Apply an even coat of solvent to the outside of the pipe, making sure that the coated area is equal to the depth of the fitting socket.
 - 4) Apply an even light coat of solvent to the inside of the fitting.
 - 5) Apply a second coat of solvent to the pipe.
 - 6) Insert the pipe quickly into the fitting and turn pipe approximately one-eighth to one-quarter turn to distribute the solvent and remove air bubbles. Hold the joint for approximately fifteen seconds so the fittings do not push off the pipe.
 - 7) Using a clean rag, make sure to wipe off all excess solvent to prevent weakening at joint.
 - 8) Exercise care in going to the next joint so that pipe is not twisted, thereby disturbing the last completed joint.
 - 9) Allow at least fifteen minutes setup time for each welded joint before moving.
 - 10) Repairing plastic pipe when damaged shall be done by replacing the damaged portion of pipe.

3.03 DRIP SYSTEM INSTALLATION

- A. Emitter spacing on drawings is diagrammatic. Emitter spacing and patterns shall be adjusted to provide complete and adequate coverage. Flush all lines prior to installation of emitters.

- B. Upon completion of the installation, the Contractor shall adjust emitters to properly distribute water flow and shall place entire irrigation system in first-class operating condition.
- C. Install drip system in accordance with details on plans.

3.04 PIPE DEPTH AND BACKFILL

- A. Backfill material shall be approved soil. Unsuitable material, such as pipe remnants and wire including clods and rocks over two inches (2") in size, shall be removed. Backfill for first six inches (6") around mainline pipe and control wires shall be native soil.
- B. All backfilling shall be done carefully and shall be properly tamped. All soil shall be tamped and puddled to eliminate any voids.
- C. Surplus earth remaining after backfilling shall be disposed of as directed by the Owner.

3.05 CONTROL WIRE

- A. Protect wire by running along side of mainline piping. Bundle wires together and tape at intervals of ten (10) feet. Do not tape wire together when encased in sleeve. Minimum cover shall be 24 inches. Crimp wires together at valve manifold with Scotchlok connector. Seal splice with 3M DBY splice kit. Tag all control wire splices and at control valve and controller with approved control wire markers.
- B. Wire size shall be determined by the number of valves operating on a given wire and the distance from the controller to the farthest valve, as specified by the charts furnished by the remote control valve manufacturer. Hot wire to be red. Common ground wire must be white. Spare control wires to be black and spare common wires blue. Splices are not encouraged but allowed. All splice connections must be provided in a valve box.

3.06 ELECTRIC CONTROL VALVES

- A. Electric control valves shall be adjusted so the most remote heads operate at the pressure recommended by the head manufacturer. Electric control valves shall be adjusted so a uniform distribution of water is applied by the heads to the planting areas for each individual valve system. The Contractor shall make all necessary connections for operation. Where pressure regulating electric control valves are called for the Contractor shall adjust the valve so a uniform distribution of water is applied.
- B. Valve boxes and lids shall be set to finished grade or as indicated on the Construction Plans. Heat imprint electric control valve identification numbers on top of valve box with two inch (2") high letters. Not more than one electric control valve may be installed in each box.
- C. Electric control valves shall be connected and aligned to provide the most efficient flow of water to the irrigation heads. Each valve is to be enclosed

in the specified valve box. The valve box shall be secured on firm soil clear of valves and wiring connections. Backfill carefully to prevent settlement and subsequent damage.

- D. A valve box must be provided at all underground irrigation control wire splice connections.

3.07 AUTOMATIC CONTROLLER

- A. Install controller, pedestal, and accessories per manufacturer's approved details, construction plans and contract requirements.
- B. Install automatic controller chart in laminated or watertight plastic envelope inside controller cover showing which valves are connected to which stations on controller.

3.08 ELECTRICAL SERVICE

- A. Electrical service shall be provided to control panel, as indicated on the plans. All work shall be in conformance to all local ordinances, codes, regulations and utility company requirements. All cost for the electrical service is to be the responsibility of the Contractor.

3.09 TESTING

- A. General: Unless otherwise directed, tests shall be witnessed by the Owner's representative. Work to be concealed shall not be covered until prescribed tests are made. Should any work be covered before such tests, the Contractor shall, at his expense, uncover, test and repair his work and that of other contractors to original conditions. Leaks and defects shown by tests shall be repaired and entire work re-tested. Tests may be made in sections, however, all connections between sections previously tested and new section must be included in the test.

3.10 INSPECTION

- A. Inspection of Work:
 - 1. Installation and operations must be approved by the Architect.
 - 2. In no event shall the Contractor cover up or otherwise remove from view any work under this contract without prior approval of the Architect. Any work covered prior to inspection shall be opened to view by the Contractor at his expense.
- B. Coverage Test: When the irrigation system is completed, the Contractor in the presence of the Architect shall perform a coverage test of water afforded in the planting and turf areas. The Contractor shall furnish all materials and labor required to correct any inadequacies of coverage disclosed.

- D. Completion: Should it become necessary, due to developed conditions, to occupy any portion of the work before the contract is fully completed, such occupancy shall not constitute acceptance. The Contractor will not be responsible for any damage caused by the Owner's work forces.

3.11 MAINTENANCE

Irrigation system shall be maintained and adjusted as required to provide proper coverage throughout the maintenance period. Irrigation system maintenance shall commence upon general inspection following irrigation installation, planting operations and general clean-up. Maintenance shall be continued until 90 days following written Notice of Completion.

3.12 GUARANTEE

- A. The entire irrigation system shall be guaranteed by the Contractor to give satisfactory service and to the quality of materials equipment and workmanship including settling of backfilled areas below finish grade for a period of one (1) year following the date of the final acceptance of all the work by the Owner. If, within one year from the date of completion and final acceptance of all of the work, any trouble develops resulting from inferior or faulty materials or workmanship or settlement occurs and adjustments in pipes, valves, and heads, sod, or paving to the proper level of the permanent grades, the Contractor, as part of the work under is contract, shall make all adjustments and corrections without extra cost to the Owner, including the complete restoration of all damaged planting, paving, or other improvements of any kind.
- B. The Owner reserves the right to make temporary repairs as necessary to keep the irrigation system equipment in operating condition. The exercise of this right by the Owner shall not relieve the Contractor of his responsibilities under the terms of the guarantee as herein specified.

End Of Section 02810

SECTION 02830: CHAIN LINK FENCING

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of all chain link fencing, including modifications to existing fencing and existing gate controller.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

1.03 QUALITY ASSURANCE

- A. All workers shall be fully experienced in the erection of chain link fencing and the installation of related equipment.
- B. All materials and fabrication shall conform to "Chain Link Fence Manufacturer's Institute Product Manual" (latest edition).

1.04 SUBMITTALS

Submittals shall be in accordance with SUBMITTAL Section of these Specifications and shall include the following:

- A. Shop Drawings showing all material locations, markings, qualities, materials, sizes, and shapes and indicate all methods of connecting anchoring, fastening, bracing, and attaching to the work of other trades.
- B. Product literature describing manufactured products to be furnished and installed under this Section of the Work.

PART 2: PRODUCTS

2.01 MATERIALS

All materials shall be new, free of rust, mill scale, dirt, oil or other substances which will affect fabrication or appearance.

- A. Fence Type and Manufacturer: Galvanized, commercial-grade chain link fencing manufactured by Master Halco, Inc., Builders Fence Co., or approved equal. All members except fittings shall be steel, hot-dipped galvanized after fabrication. Fittings shall be malleable iron, wrought iron, or pressed steel, hot-dipped galvanized after fabrication.

- B. Fence Fabric: No. 9 gauge, chain link steel wire woven into 2-inch diamond mesh, hot-dipped galvanized, conforming to ASTM A392-66T. Top and bottom salvage of all fabric shall be knuckled. Coating of fabric shall be Class I, 1.20 oz. of hot-dip zinc galvanizing per square foot of uncoated wire surface, applied after weaving.
- C. Posts: Intermediate fence posts shall be 2-3/8" dia. standard weight pipe, weighing not less than 3.65 lbs. per lineal foot. End and corner posts shall conform to ASTM A120-68 and shall be 2-7/8" dia. standard weight pipe, weighing not less than 5.79 lbs. per lineal foot. Gate posts shall be as indicated on the Drawings.
- D. Top Rails: Top rails shall be 1-1/4" dia. standard weight pipe conforming to ASTM A120-68, weighing not less than 2.27 lbs. per lineal foot.
- E. Post Caps: Standard malleable iron, wrought iron, or pressed steel. Galvanized.
- F. Braces: Where required, braces shall be 1-1/4" dia. standard weight pipe conforming to ASTM A120-68, weighing not less than 2.27 lbs. per lineal foot.
- G. Barbed Wire and Razor Ribbon: To match existing fence.
- H. Vinyl Privacy Slats: High Density Polyethylene (HDPE) with ultra violet inhibitors. Top locking. Color as selected by Architect from manufacturer's full range.

2.02 EXISTING VEHICULAR GATE MODIFICATIONS

- A. Operator
 - 1. Eliminate existing keypad. Install required conduit, wiring and new post-mounted control stand to accommodate new key card reader.
 - a. Card reader shall be HID Multiclass to meet County Standard. Submit data sheet for confirmation.
 - 2. Provide and install required add-on circuit board to enable existing controller to be operated by Owner's radio system. Coordinate with Owner's technical staff.

2.03 CONCRETE

Concrete footings for the fence shall be furnished and installed under this Section. Concrete for posts shall be a minimum 2,500 psi at 28 days, using 1-1/2" maximum size aggregate and 5 sacks of cement minimum per cubic yard, with a maximum slump of 5 inches. Concrete materials, placing, and curing shall conform to Section 03300, "Cast-In-Place Concrete".

PART 3: EXECUTION

3.01 FABRICATION

All chain link fencing shall be fabricated by the manufacturer in the shop as far as practicable. Installation of fencing shall be by the manufacturer or their authorized representative in accordance with the approved shop drawings and the manufacturer's detailed installation instructions and recommendations. All posts shall be plumb and rigid after installation. Rails shall be straight and tight. Chain link fabric shall be smooth and uniformly stretched tight and straight. All gates shall fully operate in a smooth and trouble free manner.

End Of Section 02830

SECTION 02870: SITE FURNISHINGS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work Included in This Section: Provision for and installation of site equipment and furnishings required for this Work as indicated on the Drawings.

1.03 SUBMITTALS

Before any specialty items are delivered to the job site, submit Shop Drawings and catalog cuts to the Architect in accordance with the provisions of the SUBMITTALS Section of these Specifications, showing all details of installation and assembly and all requirements for work by other trades, and showing all colors available from the selected manufacturer in the quality specified.

PART 2: PRODUCTS

A. BIKE RACK

Circular style with 2" o.d. tubular steel pipe and steel mounting flanges on opposite sides. T304 stainless steel with #4 satin finish. Concrete anchors per manufacturer. Two bicycle capacity. Model: "The Sol" as manufactured by Huntco, Portland, OR, or equal product of other manufacturer approved by the Architect.

B. BENCH

Waterfall style with 2" o.d. tubular steel pipe frame and legs. Back and seat fabricated from .188" steel sheet with round perforation pattern. Powder coat finish as selected by Architect from manufacturer's full offering. Concrete anchors per manufacturer. 72" length. Model: "Tumalo" as manufactured by Huntco, Portland, OR, or equal product of other manufacturer approved by the Architect.

PART 3: EXECUTION

3.01 INSTALLATION

Install all items where indicated on the Drawings and in full accordance with all pertinent regulations and the manufacturer's recommendations, anchoring all components firmly in place for long life under hard use.

3.02 INSPECTION AND ADJUSTMENT

Upon completion of the installation, and as a condition of its acceptance, visually inspect the entire work of this Section, adjust all components for proper alignment and use, and touch up all abrasions and scratches to make them completely invisible.

End Of Section 02870

SECTION 02900: LANDSCAPE WORK

PART 1: GENERAL

1.01 WORK

- A. Provide and install landscape materials as shown on the Drawings and specified herein .
- B. Provide all related materials, equipment, and labor required to complete the work specified.
- C. Related Work Specified Elsewhere:
 - 1. IRRIGATION SYSTEM Section

1.02 QUALITY STANDARDS

- A. Provide experienced, well-trained workers competent to complete the work as specified.
- B. Unless approved by the Architect, provide all related products and accessories from one manufacturer.
- C. Use materials from manufacturer and suppliers specified or approved by the Architect.
- D. All work shall comply with governing building and safety codes.
- E. Plant measurements shall be as follows: 24" box size caliper shall be at least one and one half inches (1-1/2") in diameter, measured six inches (6") from container soil level, 15 gallon size caliper shall be at least three quarters inch (3/4") in diameter measured six inches (6") from container soil level. Where not shown, plants shall be of uniform, standard size, neither overgrown and root bound, nor too recently canned so that the root system is not thoroughly established through can. Pruning shall not be done prior to delivery except by prior approval.
- F. Inspection:
 - 1. All landscape work and materials shall comply with applicable Federal, State, County and City regulations. All plant material shall conform to State of California Grading Code of Nursery Stock, No. 1 grade for quality and size and also ISA Standards. Use only nursery grown stock.
 - 2. All plant material shall be subject to inspection at the place of growth as well as upon delivery by the . Approval shall not limit the right of rejection during progress of the work for condition of the root ball, size, variety, latent defects or injuries. Rejected plants

shall be removed from the site and replaced immediately by the Landscape Contractor at no additional cost to the Owner.

G. Soil Fertility Analysis

1. The Contractor shall provide, and pay for, a fertility analysis of the existing soil on the project site after rough grading operations have been completed, but before any top soil is imported and placed on site. The samples shall be collected for the fertility analysis by collecting a minimum of 10 representative samples of the soil throughout the site. Each sample shall be a minimum of .25 cubic foot each, and shall be thoroughly mixed together to prepare a homogenous 2.5 cubic foot sample. A one cubic foot sample shall be submitted to the soil testing laboratory as a representative sample for fertility analysis. The Contractor shall submit to the Landscape Architect for review, the results of the soil testing investigations before proceeding with any soil improvement activities such as fertilizing, and/or adding of amendments.
2. Recommendations for improvement of the soil conditions for plant growth shall be made by the testing laboratory, and at a minimum, shall include the following:
 - a. A fertilizer and amendment application program (including macro and micro nutrients).
 - b. Treatments to improve soil PH for optimum plant growth.

H. Bidding Allowance

1. The Contractor shall prepare his bid for the project based upon the type and quantities of soil amendment and fertilizer specified herein. The Contractor's bid price shall also include a \$1,500.00 bidding allowance for additional work and amendments/fertilizer required by the Owner to be provided for the project after review of the fertility analysis.

1.03 SUBMITTALS

- A. Refer to Section 01300.
- B. Submit product information showing compliance with the Contract Documents.

1.04 MATERIALS HANDLING

- A. Provide all materials required to complete the work as shown on the Drawings and specified herein.
- B. Deliver, store, and transport materials to avoid damage to the product or to any other work and return any products or materials delivered in an unsatisfactory condition.

- C. Materials and products delivered will be certified by the manufacturer to be as specified.
- D. Store materials in a safe, secure location, protected from weather.

1.05 PRECONSTRUCTION AND PREPARATION

- A. Examine and verify that job conditions are satisfactory for speedy and acceptable work.
- B. Confirm there are no conflicts between this work and work of other trades, and that work of other trades that must precede this work has been completed.
- C. Notify Architect when work is scheduled to be started and completed.

PART 2: MATERIALS

2.01 TOPSOIL

- A. Provide new topsoil which is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2" in any dimension, and other extraneous or toxic matter harmful to plant growth.
- B. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4"; do not obtain from bogs or marshes.

2.02 SOIL AMENDMENTS

- A. Planting Areas: Organic compost conforming to the following:
 - 1. Derivative material - 100% greenwaste organic matter.
 - 2. Particle size - <3/8".
 - 3. PH Value - 5.9/6.9.
 - 4. Macro-nutrients - Minimum of 1.3% Nitrogen, 1.7% Phosphorus, .65% Potassium.
 - 5. Moisture holding capacity - 4 times by volume.
 - 6. Composted to provide carbon: nitrogen ratio - 11:1 to 13:1 maximum.
 - 7. Salinity / Cation Exchange - 13% / 541%.

- B. Planting Areas: Mined gypsum composed of no less than 75% pure CAS042H20 hydrated calcium sulfate or equivalent.
- C. Commercial Fertilizer For Trees and Shrubs: Provide fertilizer with not less than 20% total nitrogen, 10% available phosphoric acid and 5% soluble potash. Scotts Agriform 20-10-5, 21 gram tablets, or approved equal.
- D. Lawn Topper: 100% organic soil enriched with starter fertilizer. Kellogg "Topper", or approved equal.
- E. Mulch: As indicated on the Drawings.

2.03 PLANT MATERIALS

- A. Quality: Provide trees, shrubs, and other plants of size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".
 - 1. Plants shall be typical of their species and variety, shall have normal growth habits, well developed branches and be densely foliated, and shall have fibrous root systems. No substitutions will be allowed unless approved in writing by the Architect.
 - 2. Plants shall be free from defects and injuries including disease, insects, insect eggs and larvae and girdled roots.
 - 3. Plants shall not be pruned before planting.
 - 4. Plant material must be selected from nurseries that have been inspected by State or Federal Agencies.
 - 5. Plants shall be nursery grown and shall have been transplanted or root pruned at least once in the past three (3) years. Plants shall have been grown under climatic conditions similar to those in the locality of the project.
 - 6. Each bundle of plants shall be properly identified by weatherproof labels securely attached thereto before delivery to the project site. Label shall identify plant by name.
 - 7. Nomenclature shall be in accordance with Hortus III.
 - 8. No plants shall be delivered to the project site, except for required samples, until inspection has been made in the field or at the nursery, or unless specifically authorized in writing by the Architect.
 - 9. Collected plant material may be used only when approved. Approval shall not limit the right of rejection during work progress for conditions of the root ball, latent defects or injuries.

10. Where shown as "MULTI" provide trees with branching starting close to the ground in the manner of a shrub.
11. Plants are listed on the planting plan as the minimum acceptable sizes. The quantities listed are the Architect's estimate only. The Landscape Contractor is responsible for all material shown on the plan.

2.04 MISCELLANEOUS LANDSCAPE MATERIALS:

- A. Tree Grates: If indicated on the Drawings, shall be 60" round with a 16" round opening, cast from unfinished aluminum, with ½" maximum slot opening to comply with the Americans With Disabilities Act. Model #6091 "Bond Street" by Ironsmith, Palm Desert, CA, or equal product from other approved manufacturer. Install using manufacturer's steel perimeter frame with integral nelson studs for direct embedment into concrete. Perimeter frame shall have black dip finish.
- B. Tree Stakes: Shall be 2" in diameter 10' in length lodge pole treated with copper naphthenate.
- C. Tree Ties: Tree ties shall be V.I.T. Cinch Tie, 32" long, V.I.T. products, Inc. (619) 673-1760, or approved equal.
- D. Tree Trunk Protector:
 1. Arbor Guard polyethylene tree guard, (8" min. tall) or equivalent.
- E. Root Barrier
 1. Deep Root Corporation #UB 24 PANEL, (714) 898-0563 or equivalent.
- F. Other Materials:
 1. Materials not specifically indicated, but necessary for proper execution of the work, shall be of first quality as selected by the Contractor subject to approval of.
 2. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at the site.

PART 3: CONSTRUCTION AND INSTALLATION

3.01 PREPARATION

- A. Before commencement of any soil preparation, all existing grasses and weeds on the site shall be killed by application of a post-emergent

contact herbicide at manufacturer's approved rates. All dead vegetation shall be removed from the site and disposed of in a lawful manner. The Contractor shall use and apply all weed control chemicals in accordance with the manufacturer's recommendations and all local codes and ordinances. The chemicals shall be applied by a licensed applicator.

- B. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.
- C. Amend soil in turf and planting areas per the following:
 - 1. Apply organic compost at a rate of 6 cubic yards per 1,000 square feet. Incorporate into soil to a depth of 6" prior to finish grading.
 - 2. Apply gypsum at a rate of 200 pounds per 1,000 square feet. Incorporate into soil to depth of 6" prior to finish grading.
- D. Planting Pits: Prior to planting trees and shrubs mix 50% native soil and 50% organic compost as backfill mix.
- E. Planting Tablets: Agriform 21 gram Planting tablets shall be placed 6-8" deep at the side of root ball at the following rates:

3 gallon can plants	2 tablets
5 gallon can plants	3 tablets
15 gallon can plants	5 tablets
Plants in large tubs or boxes	7 tablets
- F. Preparation of Lawn and Ground Cover Areas: Till to a depth of not less than 6"; apply soil amendments and initial fertilizers as specified; remove high areas and fill in depressions; till soil to a homogeneous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.
- G. Fine grade lawn and ground cover areas to smooth even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after-grading.
- H. Moisten prepared lawn and ground cover areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.
- I. Layout individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Architect's acceptance before start of planting work. Make minor adjustments as may be requested.
- J. Restore lawn and ground cover areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.02 PLANTING

A. Planting Trees and Shrubs:

1. Installation:

- a. For planting, a hole as specified on plans, shall be dug for each plant. All material resulting from excavation of plant holes, other than the existing top-soil shall be placed in bottom of each hole to a growing depth at which the plant, when planted, will be 1" above normal growing depth. Backfill shall be added around root ball of plant until the backfill is half-way up the root ball then the hole shall be watered sufficiently to settle the backfill around the root ball. More backfill shall be firmed sufficiently to force air pockets from each hole.
- b. No boxed, balled or canned plants shall be planted if the ball is broken or cracked, whether before or after the process of planting. Any trees transplanted by the Contractor that die or have bark, branch or die-back injury shall be replaced with equal trees approved by the Owner's representative at the Contractor's expense.

2. Topdress: Provide not less than 2" thickness mulch over entire planting area and work into top of backfill and finish level with adjacent finish grades.

B. Turf:

1. Installation:

- a. Install turf plugs same day as delivery to prevent deterioration. Insure that plugs are well watered before planting.
- b. Auger holes in diameter and to depth as recommended by turf supplier, and in pattern as shown on the Drawings.
- c. Set plugs in holes as directed by turf supplier.
- d. Water in plugs thoroughly after planting.

2. Topdress: Provide 1/4" thickness lawn topper over entire turf area.

3.03 MAINTENANCE

- #### A. Begin maintenance immediately after planting.

- B. Maintain trees, shrubs turf and other plants until final acceptance and continue for a period of 90 days after written Notice of Substantial Completion of project.
- C. Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stakes and reset trees and shrubs to proper grades or vertical position as required. Spray as required to keep trees and shrubs free of insects and disease.
- D. Maintain turf areas by keeping plugs and soil moist for 21 days. Plugs may need to be watered daily depending on weather. Provide frequent light irrigations and avoid extremes that lead to drying out or boggy conditions. After this period slowly reduce the frequency of irrigation per turf supplier.
- E. Weed Control
 - 1. The Contractor shall treat all proposed turf and planting areas with a post-emergent contact herbicide per Paragraph 3.01A.
 - 2. Weed eradication shall be ongoing throughout the course of the landscape installation. The Contractor shall apply a post-emergent contact herbicide to eradicate all weeds that are existing or have germinated up to and throughout the 90 day maintenance period. At no time will weeds be allowed to become established. Contractor shall provide all weed control operations as directed by the Architect.
- F. Turf Mowing
 - 1. Initial mowing should be approximately 3 to 4 weeks after planting, once plugs have rooted in. NOTE- do not remove more than 1/3 of top growth. Clean mower blades completely prior to mowing to prevent transfer of foreign clippings.
 - 2. Delay subsequent mowing until directed by Architect.

3.04 CLEANUP AND PROTECTION:

- A. During landscape work, keep pavements clean and work area in an orderly condition.
- B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

3.05 INSPECTION AND ACCEPTANCE:

- A. When landscape work is completed, including maintenance, Architect will upon request, make an inspection to determine acceptability.
- B. Where inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by Architect and found to be acceptable. Remove rejected plants and materials promptly from project site.

End Of Section 02900

SECTION 03300: CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of all cast-in-place concrete unless otherwise noted, including reinforcing and formwork. Concrete construction shall include footings, foundations, slabs, curbs, gutters and walks.
- B. Related Work Specified Elsewhere: Provisions of furnishing and installation of embedded items including but not necessarily limited to sleeves, inserts, anchors, anchor frames, bolts, etc.
 - 1. EARTHWORK Section
 - 2. REINFORCED UNIT MASONRY Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01000, as well as standards shown on the drawings, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

Curbs, Gutters, Side Walls and Concrete Paving

- A. Caltrans Standard Specifications, Section 90

All other concrete

- B. American Concrete Institute (ACI)
- C. Concrete Reinforcing Steel Institute (CRSI)

1.03 QUALITY ASSURANCE

- A. Requirements of ACI 301 and 302 shall govern work, materials and equipment related to this Section. Specifications herein set minimum standards for results, guides and references to procedures.
- B. Contractor shall be responsible for quality and surface appearance of concrete placed and shall bear burden of proof that concrete as cast meets minimum strength requirements.

1.04 SUBMITTALS

- A. Mix designs in accordance with Article 2.03.
- B. Record of placing concrete when requested by the Architect.
- C. Shop Drawings: Shop Drawings for reinforcing shall include bending and placing details, size and location of reinforcing, including diagrammatic wall elevations to scale, position and erection marks of bars, marginal bars around openings, dowels, splices, etc.
- D. Product literature for proposed curing compound, if used.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken until time of use and insure storage facilities are weathertight and dry.
- B. Use sacked cement in chronological order of delivery.

PART 2: PRODUCTS

2.01 CONCRETE CLASSES

See structural drawings for concrete strengths required in various types of construction.

- A. Schedules of Values:
 - 1. Strength: All concrete footings and slabs shall have minimum 3,000 psi compressive strength after 28 days when tested in accordance with ASTM C39.
 - 2. Aggregate: Graded as shown in design mix for each class of concrete, 1-1/2" maximum for footings, 1" maximum for floor slabs.
 - 3. Weight: Not less than 145 pounds per cubic foot.
 - 4. Slump: Maximum slump shall be 4 inches, unless otherwise noted on the Drawings
 - 5. Water/Cement Ratio: Not more than 0.45

2.02 CONCRETE MATERIALS

Cement and aggregates shall be from constant sources with proven history of successful use with one another and shall remain unchanged throughout the work unless otherwise approved. Deviations in properties of materials tested shall be cause for their rejection pending additional test results and redesign of mix by Contractor's Testing Laboratory.

- A. Ready Mix Concrete: ASTM C94
- B. Cements: ASTM C150, Type II, unless noted otherwise on Drawings.
- C. Aggregates: ASTM C33, for Coarse and Fine sand-gravel. ASTM C330 for expanded shale type for lightweight concrete. ASTM C33 for pumped concrete, except 15% to 30% shall pass the #50 sieve and 5% to 10% shall pass the #100 sieve. Provide aggregates from a single source for exposed concrete.
- D. Water: Clean, potable, free of impurities detrimental to concrete, and clear when used.
- E. Fly Ash: ASTM C618. Not to be substituted for cement in mix design.
- F. Air entraining admixture as per ASTM C 260 and manufacturer's instructions. Water reducing, retarding, accelerating admixtures as per: ASTM C 494 and manufacturer's instructions. Bonding agent: Polymer resin. Non-shrink grout: Non-metallic mineral aggregate, cement, water reducing materials as per ASTM C 494 and as per manufacturer's instructions.

Note: Admixtures other than those for air entraining may be used only with prior approval of the Architect and only if listed in the approved mix design.

- G. Curing Materials: Water by fog-spray nozzle and waterproof paper, ASTM C171, Type 1, regular; or sheet plastic, polyethylene, 6 mils thick, fungus resistant.
 - 1. Curing Compound:
 - a. May be used provided that the material does not impair bonding of other materials shown or specified to be applied over the concrete surfaces.
 - b. Must conform with the requirements of ACI 305--Hot Weather Concreting, ACI 306--Cold Weather Concreting, ACI 308--Standard Practice for Curing Concrete.
- H. Moisture Barrier: All interior concrete floor slabs on grade shall be placed over a continuous and unbroken 15-mil moisture barrier per ASTM E 1745, Class A. Joint sealant shall be barrier manufacturer's tape minimum 8 mils thick and 3-3/4" wide. All exterior slabs shall be placed over a 10-mil non-woven geotextile fabric.

2.03 MIXES

The Contractor shall employ a testing laboratory and instruct that laboratory to base mix designs using materials approved by the Architect. Mix designs shall produce concrete of minimum strengths specified and of uniform density.

- A. General Requirements: Design mixes shall be based on one cubic yard; mixes shall be modified as required to provide specified strengths and workability without changing cement content.
- B. Mix designs shall be subject to review by Architect and Owner's testing agency.
- C. Admixtures will not be permitted unless Architect approves, the testing laboratory modifies mix design accordingly, and the modification is accepted by Owner's testing agency.
- D. Miscellaneous patching mortars, non-shrink grout, etc., as approved shall be mixed in accordance with the manufacturer's instructions, and applied in conformance with published specifications.

2.04 MIXING

Concrete mixing shall comply with referenced standards and in a manner to insure all components are thoroughly mixed to exact proportions stated in the approved mix designs.

- A. Measure fine and coarse aggregates separately to provide accurate control, and adjust only to improve workability maintaining proportions, values or factors of approved mixes. Use automatic metering devices to introduce admixtures into mixes.
- B. Batch Plant Conditions: Equipment and plant shall afford all facilities and acceptable procedures to provide the specified mixes.

2.05 REINFORCING

- A. Materials:
 - 1. Reinforcing steel shall be intermediate deformed bars conforming to ASTM A 615/A 615M with a #4 or smaller bars grade 40 and #5 or larger grade 60. Splices in the reinforcing steel shall be lapped 40 bar diameters, minimum, unless noted otherwise, field welding or reinforcing steel will not be allowed. Separate bars 1-1/2 bar diameters clear with a minimum of 1-1/2" clear. Fabricating details shall conform to the ACI manual of standard practice. All reinforcing shall have a minimum concrete cover as follows, unless noted otherwise:

Surfaces poured against earth	3"
Formed surfaces exposed to ground or weather	2"
 - 2. Tie Wires: ASTM A82
 - 3. Welded Wire Fabric: ASTM A185
 - 4. Welding Electrodes: Low hydrogen E-70 rods complying with provisions of all applicable Codes.

5. Bar Supports: As required for assembling and supporting reinforcement in place using typically CRSI Class B pre-galvanized.
 - a. Exposed Conditions: CRSI Class C plastic-protected; or Class E stainless steel wire, Type 430.
 6. Anchor Bolts: ASTM A-307
- B. Fabrication:
1. Shop fabricate and comply with requirements of ACI 315 where specific details are not shown or where drawings and specification are not more demanding.
 2. Reinforcing shall not be permitted to rust when there is danger of staining exposed surfaces of concrete. Rust-stained concrete shall be replaced by the Contractor at his expense.
 3. Welders shall be qualified in accordance with AWS D1.1.
 4. Reinforcing shall be fabricated and placed within limits permitted by ACI 318 unless otherwise noted or approved by the Architect.

2.06 FORMWORK

- A. Forming Materials for Concealed Surfaces: Contractor's option.
- B. Wood Framing: WCLB standard grade or better Douglas Fir.
- C. Form Ties and Spreaders: Metal type acting as spreaders, leaving no metal within one inch of concrete face and no fractures, spalls, depressions or other disfigurements greater than 3/4" diameter.
- D. Expansion Joint Filler: Fiber Type, pre-moulded asphalt impregnated fiber conforming to ASTM D 1751, thickness as noted.
- E. Form Sealer: Non-staining, non-grain-raising, free of mineral oils or other nondrying ingredients and leaving no bond inhibiting residue on concrete; same as Grace "Formshield", or approved equal.
- F. All members supporting their own dead weight, or members exposed to wind, or other external loading shall be properly shored, braced, or restrained to prevent damage. Structural members shall be shored or braced as required for all imposed loads, the details for which shall be reviewed by the Architect prior to beginning any formwork.

PART 3: EXECUTION

3.01 INSPECTION

Examine units of work to be cast and verify that formwork is complete, reinforcement, inserts, embedded items are complete and in place, that lines, levels, and depressions are accurately set, and the Architect and/or project inspector has approved all preparations.

- A. Do not begin placement of concrete before unsatisfactory conditions have been corrected.

3.02 PREPARATION

Insure availability of sufficient labor, equipment and material, to complete the work scheduled. Protect finish surfaces adjacent to areas of placing or handling of concrete. Soak forms, except sealed plywood, moisten sand cushions and spray forms again immediately before casting. Notify Architect 48 hours before placing of concrete is scheduled and obtain approval before starting.

3.03 PLACING

- A. Formwork: Examine areas where formwork will be constructed and verify that excavations are sufficient to permit placement, inspection and removal of forms and that conditions are otherwise proper for formwork with items to be embedded in concrete and other related work.
 - 1. All concrete work shall be formed to the shapes, sizes, lines, and dimensions shown. Particular care shall be exercised in the construction so as to prevent the necessity for cutting or chipping of concrete after it is in place.
 - a. Apply form sealer to wood forms prior to placing reinforcing steel following approved manufacturer's directions.
 - 2. Forms shall be substantial and properly shored and braced to maintain position and shape. Boards or panels shall be sufficiently tight to prevent leakage of mortar. Protect formwork from undermining.
 - 3. No wood spreaders or wood of any description except nailing blocks will be permitted to remain inside the forms. All inserts, reglets, anchors and other embedded items shall be accurately set and securely attached to forms.
 - 4. Expansion Joints: Provide in exterior concrete slabs on grade at maximum 30-foot centers and at intersections with vertical surfaces, curbs or other penetrations unless otherwise noted. Install joint-filler strips at slab junctions with vertical surfaces.
 - a. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

- b. Terminate full-width joint-filler strips not less than 1/2" or more than 1" below finished concrete surface where joint sealants are indicated.
 - c. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
5. Control joints shall be provided as follows, unless otherwise specifically shown on the Drawings:

Concrete 4" thick or less: Maximum 20'-0" on center in any direction.

Concrete thicker than 4": Maximum 15'-0" on center in any direction.

Verify proposed control joint locations with the Architect prior to the placement of concrete. Control joints located at greater spacings than noted above can be considered sufficient grounds for rejecting the concrete work, which shall be replaced at no additional cost to the Owner.

- a. Control joints shall be saw cut into concrete work as soon as practical, but in no case longer than 12-hours following placement. Saw cutting taking place later than 12-hours following placement can be considered sufficient grounds for rejecting the concrete work, which shall be replaced at no additional cost to the Owner.
 - b. Control joints shall extend to a depth equal to 1/3 the depth of the concrete. Saw cuts not meeting this depth can be considered sufficient grounds for rejecting the concrete work, which shall be replaced at no additional cost to the Owner.
 - c. All saw cutting shall be performed using a walk-behind "Soff Cut" saw, or other similar walk-behind saw designed specifically for this use.
6. Embedded Items: Properly locate and place embedded items required by other trades prior to placing concrete, and provide for provisions of other trades affected by the concrete work.
7. Forms shall be kept wet before placement of concrete.
8. Where soil conditions will permit excavation to accurate sizes without bracing, side forms for footing may be omitted provided dimensions are increased 2" and approval is obtained from the Architect.

B. Reinforcing:

1. Place bars and insure placement will permit concrete protection meeting requirements of ACI 318, supporting and fastening bars securely with spacers, chairs or ties to permit their being walked upon without displacement before and during concrete placement.
 2. Wherever conduits, piping, inserts, sleeves, etc. interfere with placement of reinforcing, obtain Architect's approval of layout and method before placement of concrete.
 3. Splices, Laps and Hooks shall be made to meet minimum requirements of CRSI, Chapter 6, unless otherwise indicated on the Drawings.
 4. Maintain vertical and horizontal laps and splices including extensions and embedments at 40 diameters or 18" minimum, unless otherwise noted on the Drawings.
 5. Dowel vertical reinforcing to footings with bars of same size and spacing as vertical bars unless otherwise noted.
 6. Welding shall be done only where detailed, comply with AWS D12.1 and insure that equipment supplies proper current and voltage adjusted to suite arrangement and thickness of items welded. Protect welds against rust until time of concrete placement.
- C. Moisture Barrier: Install in accordance with approved manufacturer's recommendations unless specifically noted otherwise.
1. Membrane material shall be applied in the widest practicable widths. Side and end joints shall be lapped at least 1'-0" and shall be closely fitted around pipes, conduits, columns and other protrusions. Areas surrounding protrusions shall be made damp-proof by using small pieces of membrane and a liberal amount of mastic.
 2. Provide protection of moisture barriers from operations which might puncture or otherwise damage them.
- D. Standard Concrete: Place concrete in accordance with referenced standards, convey concrete as rapidly as possible, casting within one hour of adding water unless otherwise approved. Maintain Placing Record showing date and time of casting concrete in the units of the building.
1. Place concrete in cycles to permit integration, avoid free falls in excess of 8 feet and take precautions to avoid damage to underslab work inserts, and displacement of reinforcement and formwork.

2. Keep forms and reinforcing clean, remove laitance and when casting is interrupted longer than 45 minutes discontinue casting for remainder of day, cutting back concrete for provision of construction joints. Clean forms and reinforcing for subsequent concrete placement.
3. Hot Weather Concreting: Meet requirements of ACI 305.
4. Cold Weather Concreting: Meet requirements of ACI 306.
5. Consolidating: Mechanically vibrate all footings, walls and grade beams. At least two electrically or gas powered vibrators shall be on site at all times when concrete is being poured.
6. Construction Joints: Verify location and detail requirements. Provide elsewhere only where designated by the Architect and allow 24-hours to elapse per section.

3.04 FORMWORK REMOVAL

Do not remove formwork until concrete has hardened and attained sufficient strength to permit safe removal of forms, or as required by applicable codes and standards.

- A. Secure the Architect's approval for time of removal of all structural concrete formwork.
- B. Remove forms carefully to avoid damaging corners and edges of exposed concrete and seal immediately as scheduled, noted, or required.
- C. Reuse of forms is permitted provided they are in condition equal to new formwork, and have been cleaned, repaired and resealed.
- D. Care shall be exercised in the removal of forms to avoid damaging the concrete and to insure the complete safety of the structure.
- E. For exposed concrete all tie or metal spreader devices shall be broken back or removed to at least 1" from face. For concrete below grade or concrete covered by furring, the devices may be cut back flush with surfaces. Exposed surfaces of concrete shall be adequately protected at all times from damage due to temperature changes and action of the elements.

3.05 CURING

- A. Provide for curing of concrete as per ACI 308 for a minimum of seven days. Start curing procedures promptly after pour, to protect concrete from premature drying. Control curing methods, covers, and wetting, with special attention to weather conditions.

- B. During curing, protect concrete from heat or cold, to maintain temperature between 50 and 70 F. degrees. Protect concrete from inclement weather, running water, construction equipment, movement and load stress.

3.06 CLEANING, PATCHING AND DEFECTIVE WORK

- A. General: Clean immediately after stripping and patch defects with patching mortar. Replace unacceptable, under-strength, out-of-line, out-of-level or out-of-plumb concrete without cost to the Owner.
- B. Repair of Surface Defects:
 - 1. Repair all surface defects including tie holes, minor honeycombing and otherwise defective concrete with cement mortar. Cement mortar for patching shall be the same composition as that used in the concrete, except that for exposed surfaces part of the cement shall be white portland cement to provide a finish color matching the surrounding concrete. Patching shall be done as soon as the forms are removed. Clean thoroughly all areas to be patched.
 - 2. Minor honeycombed or otherwise defective areas shall be cut out to solid concrete to a depth of not less than one inch. The edges of the cut shall be perpendicular to the surface of the concrete. Saturate the area to be patched and at least 6 inches adjacent thereto with water before placing the mortar. Mix the mortar approximately one hour before placing and re-mix occasionally during this period with a trowel without the additional of water. A grout of cement and water mixed to the consistency of paint shall then be brushed onto the surfaces to which the mortar is to be bonded. The mortar shall be compacted into place and screeded slightly higher than the surrounding surface. Finish patches on exposed surfaces to match the adjoining surfaces. Cure patches as specified for the concrete.

3.07 CONCRETE FINISHES

- A. General:
 - 1. All concrete floor slabs shall be of monolithic construction and reinforced as shown on drawings. The finish shall be true to line and plane within a tolerance of 1/8" when tested with a 10 foot straight edge.
 - 2. Concrete walks shall have score lines at equally spaced intervals, approximately 8'-0" apart and expansion joints at maximum 30'-0" intervals or as shown on the drawings. All exposed edges to have 1/4" tooled radius.

3. The typical finishes listed herein may not all occur on this project. Consult Drawings and Finish Schedule for finishes required.

B. Interior Finishes:

Troweled Finish: Dense, smooth, hard steel-troweled surface, monolithic. After initial set, work with wood float followed by two steel trowelings. Use for all interior floor slabs scheduled for exposed clear sealer.

Trowel and Fine Broom Finish: Troweled to true surface required. Use a clean push broom to apply very fine broom texture. Use for all slabs scheduled for adhered carpet, resilient tile, resilient sheet, or thin-set ceramic tile coverings.

Light Broom Finish: Troweled to true surface required. Use a clean push broom to apply light broom texture. Use for all slabs scheduled to receive epoxy or polyurethane fluid applied coatings. Confirm with floor system manufacturer.

Scratch Finish: Screed to lines required, float to a smooth surface and as the final operation lightly rake the surface to provide a mechanical bond. Use for all slabs scheduled to receive mortar set tile.

C. Exterior Finishes:

Medium Broom Finish: Troweled to true surface required. Use a clean push broom to apply medium broom texture perpendicular to the length of the concrete. Final finish shall be slip-resistant. Use for typical exterior slabs and walks.

3.08 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling as long as possible and until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2" deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.09 VAPOR TRANSMISSION TESTING

- A. The Owner's testing laboratory shall provide testing to determine the vapor transmission rate for interior portions of the slab-on-grade.
 1. Vapor transmission testing shall be in accordance with ASTM F1869.

- B. Initial testing shall take place no sooner than 60 days following the placement of slab-on-grade concrete.
- C. If test results are greater than 4 lbs./1000 s.f., the testing laboratory shall determine appropriate interval(s) and then provide re-test(s) as required until such time as the test result shows the transmission rate to be 4 lbs./1000 s.f. or less.
- D. Provide written copies of all vapor transmission test results to the Architect within ten (10) days of testing.

End Of Section 03300

SECTION 04231 - REINFORCED UNIT MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Refer to Sheet A4 of the Drawings for the full extent of each type of masonry and related grout joint method used in the Project.
- B. Types of masonry work required include:
 - 1. Concrete unit masonry.
 - 2. Reinforcing
- C. Related work specified elsewhere:
 - 1. CAST-IN-PLACE CONCRETE Section
 - 2. EPOXY CHEMICAL RESISTANT WALL COATING Section.
 - 3. PAINTING Section.

1.03 REFERENCES AND QUALITY ASSURANCE

- A. Current standards by the following agencies as cited herein:
 - 1. American Standard Test Method International (ASTM).
- B. Codes: Comply with Latest Edition of California Building Code adopted by local authority.
- C. Coordination: Review installation procedures and coordinate with other work that must be integrated with masonry.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, reinforcing steel, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Shop Drawings:
 - 1. Submit drawings indicating layout of masonry units

indicating locations of specific block faces and joint types consistent with the Drawings.

2. Submit drawings for reinforcing steel.

B. Color Samples:

1. Submit block producer's samples of block color in Ground Face

and Precision Smooth Face as scheduled on the Drawings.

2. Submit grout producer's sample of grout color.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry materials to project in undamaged condition.

B. Storage and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

C. Store cementitious materials off the ground, under cover and in dry location.

D. Store aggregates where grading and other required characteristics can be maintained.

E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.06 PROJECT CONDITIONS

A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

C. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.

D. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

E. Protect sills, ledges and projections from droppings of mortar.

F. Cold Weather Protection:

1. Do not lay masonry units which are wet or frozen.

2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
3. Remove masonry damaged by freezing conditions.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Concrete Block: Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face and, under each form of block included, for weight classification.
- C. Hollow Load-bearing Block: ASTM C 90 and as follows:
 1. Weight Classification: Lightweight.
 2. Grade: N
 2. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thickness indicated.
 4. Type II: non-moisture-controlled units.
 5. Masonry face types and related grout joints as scheduled on Sheet A4 of the Drawings:
 - a. Exterior – exposed to view – clear paint finish: Ground Face with Tooled Joints.
 - b. Exterior – concealed from view: Precision Smooth Face with Tooled Joints.
 - c. Interior – exposed to view – clear paint finish: Ground Face with Tooled Joints.
 - d. Interior – exposed to view – opaque paint finish: Precision Smooth Face with Tooled Joints.
 - e. Interior – exposed to view – epoxy chemical resistant wall coating: Precision Smooth Face with Flush Joints.
 6. Masonry Color: Standard Basalite Color #D-389 (Dixon), or equal color as manufactured by others and approved by the Architect.

2.02 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type II

1. Color: Basalite #B720, or equal color as manufactured by others and approved by the Architect.
- B. Masonry Cement: ASTM C 91.
- C. Hydrated Lime: ASTM C 207, Type S
- D. Aggregate for Mortar: ASTM C 144 and U.B.C. Standard No. 24-21 except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C 33
- F. Water: Clean and potable.

2.03 MORTAR AND GROUT MIXES

- A. General: Do not add admixtures including coloring pigments, air entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
- B. Mixing: Combine and thoroughly mix cementitious, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated. Color to match block unless noted otherwise.
- D. Mortar shall consist of one part portland cement, 3-1/2 to 4 parts sand based on dry loose volume, and 1/4 to 1/2 part lime. Add lime after all other ingredients are mixed.
- E. Minimum compressive strength of mortar at 28 days shall be 1800 psi.
- F. Grout for Unit Masonry:
 1. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in both directions.
 2. Use "Coarse Grout" per ASTM C 476 for filling 4" spaces or larger in both directions.
 3. Minimum Compressive Strength of grout at 28 days shall be 2000 psi.
- G. Reinforcement Bars: Provide deformed bars of following grades:
 1. #5 bars and smaller to be ASTM A 615, Grade 40, deformed.
 2. #6 bars and larger to be ASTM A 615, Grade 60, deformed.

3. Shop-Fabricate reinforcing bars which are to be bent or hooked.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Do not wet concrete masonry units.
- B. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.

3.02 CONSTRUCTION TOLERANCES:

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10' or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, nor 1/2" in 40' or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10', 1/2" maximum.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.
- C. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

3.03 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- B. Lay-up Walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Pattern Bond: Lay exposed masonry in running bond with vertical joint in each course centered on units in courses above and below.

3.04 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters.

- B. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.
- C. Cut joints flush for masonry walls which are to be concealed or to be covered by wall coatings or other materials, unless otherwise indicated.
- D. At exposed masonry units not covered by wall coatings or other materials, tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated. At masonry units with a scored pattern, rake joints as required to match block score pattern.
- E. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners of jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.05 ANCHORING MASONRY WORK

General: Provide anchor devices of type indicated.

3.06 PLACING REINFORCEMENT

- A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross section due to excessive rusting or other causes.
- B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 1" (whichever is greater).
- C. Splice reinforcement bars where shown; do not splice at other points unless acceptable to the Architect. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.

3.07 GROUTING

- A. General: Grout all cells solid as indicated on the Drawings.
- B. Place vertical reinforcement before grouting. Place before or after laying masonry units, as required by job conditions. Tie vertical reinforcement to dowels at base of masonry where shown and thread Concrete Masonry Units over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 10'.
 - 1. Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing indicated.

- C. Place horizontal beam reinforcement as the masonry units are laid.
- D. Preparation of Grout Spaces: Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcing and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.
- E. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required before starting grouting operations.
- F. Place grout by pumping into grout spaces unless alternate methods are acceptable to the Architect.
- G. Limit grout pours to sections which can be completed in one working day with not more than one hour interruption of pouring operation. Place grout in lifts which do not exceed 6'. Allow not less than 30 minutes, nor more than one hour between lifts of a given pour. Rod or vibrate each grout lift during pouring operation.
- H. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 1-1/2" of top course of first pour. After grouted masonry is cured, lay masonry units and space reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

3.08 FIELD QUALITY CONTROL

Owner may employ separate testing laboratory to perform field quality control testing if reinforced unit masonry does not appear to conform to plans and specifications.

3.09 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

2. Clean concrete unit masonry to comply with masonry manufacturer's directions.
- D. Protection: Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion.

End Of Section 04231

SECTION 05500: METAL FABRICATIONS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of all structural and miscellaneous iron and steel items not specifically described in other Sections of these specifications but required for a complete and operable facility.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. American Institute of Steel Construction (AISC)
- B. American Welding Society (AWS)

1.03 QUALITY ASSURANCE

Welding procedures, welders and welding operations shall be qualified in accordance with AWS D1.1-2000 "Structural Welding Code – Steel" ..

1.04 SUBMITTALS

Submittals shall be in accordance with SUBMITTAL Section of these Specifications and shall include the following:

- A. Shop Drawings showing all material locations, markings, qualities, materials, sizes, and shapes and indicate all methods of connecting anchoring, fastening, bracing, and attaching to the work of other trades.
- B. Product literature describing manufactured products to be furnished and installed under this Section of the Work, when requested by the Architect.

PART 2: PRODUCTS

2.01 MATERIALS

All materials shall be new, free of rust, mill scale, dirt, oil or other substances which will affect fabrication or appearance.

- A. All steel plate and structural sections shall conform with the requirements of ASTM A36/A36M-19.

- B. Primer paint shall be Alkyd Red Oxide, conforming to FS TT-P-664 or approved proprietary brand standard with the fabricator.
- C. Electrodes: All arc welding electrodes used shall be compatible with the specific materials welded and as approved by the AWS.

2.02 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of miscellaneous metal, shall be new, free from rust, best quality of their respective kinds, and subject to the approval of the Architect.

PART 3: EXECUTION

3.01 FABRICATION

- A. Compliance: Fabricate all structural and miscellaneous metal in strict accordance with the approved Shop Drawings and the referenced standards.
- B. Prefabrication: Insofar as possible, shop prefabricate all items completely and deliver to the job site ready for installation.
- C. Welding and Fabrication:
 - 1. Unless otherwise indicated on the Drawings, weld all shop connections.
 - 2. Make all joints and intersections of metal tightly fitting and securely fastened. All exposed joints on finished visible fabrications shall be fully welded, ground smooth, and primed ready for finish material.
 - 3. Make all work square, plumb, straight, and true to lines as detailed.
- D. Holes: Drill or punch all holes required for the attachment of work of other trades and for bolted connections. Burned holes are not acceptable.

3.02 SHOP PAINTING

- A. Preparation:
 - 1. Thoroughly clean all metal as described in Section 09900 of these Specifications.
 - 2. Provide all required protection for metal to be encased in concrete to prevent an accumulation of foreign material, which would affect bonding to concrete.
- B. Painting: Shop prime all steel except portions to be encased in concrete, surfaces to be welded, contact surfaces to be high strength bolted and steel work which has been galvanized, unless otherwise noted.

3.03 ERECTION

- A. Erect and install all miscellaneous and structural metal in strict accordance with the Drawings, the approved Shop Drawings, and the referenced standards. Provide alignment straight, plumb, and level within a tolerance of one in 200.
- B. Touching Up: After the erection and installation are complete, touch-up all shop priming coats damaged during transportation and erection, using the priming paint specified for shop priming.

End Of Section 05500

SECTION 05700: MISCELLANEOUS METAL WORK

PART 1: GENERAL

1.01 INCORPORATED DOCUMENTS

All applicable provisions of General and Supplementary General Conditions, Special Conditions, and Description of Work form a part of this section of Specifications.

1.02 SCOPE

The extent of work shall be as shown on drawings and called for in the Description of Work. Performance shall meet the requirements of the Specifications. The work covered by this section of specifications consists of the following:

- A. Any ornamental and miscellaneous metal work items shown on plans or noted in the description of work and not installed or furnished under other sections of the specifications.

1.03 WORK NOT INCLUDED:

- A. Structural steel, reinforcing steel, open web steel joists, sheet metal work, metal doors and frames, and metal windows.
- B. Reinforcements, anchors, and hangers used in work under other sections of the Specifications.

PART 2: PRODUCTS

2.01 SHOP DRAWINGS

The Contractor shall submit for approval shop drawings, catalog cuts, or samples of the ornamental and miscellaneous metal items.

2.02 SUBMITTALS

- A. All ornamental and miscellaneous metal items shall comply with the Contractor's approved submittals.
- B. For installation the Contractor shall check the field dimensions and coordinate his submittals accordingly.

PART 3: EXECUTION

3.01 INSTALLATION

- A. The Contractor shall consult with various other contractors whose work adjoins his work, and he shall be responsible for working out all details necessary for proper installation of this work.
- B. The Contractor shall do all cutting, drilling, and fitting necessary to set his items in place. He shall provide all connecting members needed to

secure properly the ornamental and miscellaneous metal work to structural steel, masonry, or other parts of the structure as may be the case.

- C. All connecting members for ornamental and miscellaneous metal work which are to be inserted in masonry shall be installed as far as practicable as the work progresses.

End Of Section 05700

SECTION 06100: ROUGH CARPENTRY

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of rough carpentry items including but not necessarily limited to wood blocking, grounds, backing, stripping, nailers, structural framing, sheathing, rough hardware, and decay prevention.
 - 1. Backing and blocking required for the secure installation of cabinets, equipment or accessories shall be provided and installed even if not specifically noted or detailed on the Drawings.
- B. Related Work Specified Elsewhere: Provisions of temporary construction, header boards, stakes and specific items shown or required under other specification sections.
 - 1. METAL FABRICATIONS Section
 - 2. FINISH CARPENTRY AND MILLWORK Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards indicated in Section 01000, the published specifications, standards, tests or recommended methods of the industry, apply to the work of this Section where cited by abbreviations noted below:

- A. American Plywood Association (APA)
- B. Pacific Lumber Inspection Bureau (PLIB)
- C. Redwood Inspection Service (RIS)
- D. United States Product Standard (PS)
- E. West Coast Lumber Inspection Bureau (WCLB)

1.03 QUALITY ASSURANCE

Treated Lumber: Pressure treatment shall not adversely affect application, permanence or appearance of finish paint systems.

1.04 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include manufacturer's literature describing products and samples only when requested by the Architect.

1.05 JOB CONDITIONS

Coordinate details with other work supporting, adjoining or fastened to rough carpentry work.

- A. Environmental Requirements: All wood including forms, casual lumber, shavings and sawdust shall be removed from site area and shall not be buried or left on the site.

PART 2: PRODUCTS

2.01 MATERIALS

- A. Wood and wood products shall be graded per "Standard Grading Rules" (WCLB). All materials shall be new when incorporated into the Work.
- B. Redwood products shall be graded per "Standard Specifications for Grades of California Redwood Lumber" (RIS). All materials shall be new when incorporated into the Work.
- C. Wood and wood products grades shall be as follows:
 - 1. All 6X framing members shall be of #1 or better, unless noted otherwise, and graded MC-15 or KD-15.
 - 2. All 2X and 4X framing members shall be DF #2 or better, unless noted otherwise, and graded MC-15 or KD-15.
 - 3. All 2X wall studs shall be of stud grade or better, unless noted otherwise, and graded MC-15 or KD-15.
 - 4. All redwood timbers and lumber for exposed exterior structures shall be "Construction Heart", unless noted otherwise, and graded for maximum moisture content of 15%.
 - 5. Where framing is not exposed to view, contractor may substitute certified glue-laminated members such as Microllam, Parallam, or others, for any 4X and 6X framing members provided I.C.B.O. reports are submitted to the Architect for approval prior to fabrication. Contractor shall make all necessary adjustments in framing for differences in depth and width of glue-laminated members at no additional cost to the Owner.
- D. Plywood roof, floor, and wall sheathing shall be as follows:

1. Either Department of Commerce Product Standard 1 or Department of Commerce Product Standard 2, Exposure 1, structural sheathing unless otherwise indicated.
 - a. Span Rating: As indicated on the Drawings.
 - b. Nominal Thickness: As indicated on the Drawings.
 2. Hardwood plywood, particleboard and medium density fiberboard composite wood products shall meet the requirements for formaldehyde as specified in California Air Resources Board's Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.). Those materials not exempted under the ATCM must meet the specified emission tables shown in Table 5.504.4.5 of the California Green Building Standards Code.
 - a. Verification of compliance shall be provided as requested by the enforcing agency.
- E. Hanger Wire: Galvanized steel wire conforming to (FS) QQ-W-46 1f (1), Finish 5, Class 1, soft temper, minimum 9 gauge, single strand.
- F. Rough Hardware as required and suited for the work and acceptable to the Architect including, but not necessarily limited to the following more major items:
1. Nails: Common wire, flat head, diamond point, smooth bright (FS) FF-N-105.
 2. Spikes: Round wire, flat countersunk head, diamond point (FS) FF-S-611.
 3. Bolts, Nuts, Lag Screws and Washers: Steel, ASTM A307.
 4. Power-Driven Fasteners: Steel, same as noted on Drawings or other as approved.
 5. Inserts, for Items Secured to Concrete: Zinc-treated steel threaded for machine bolts, sizes as noted and required.
 6. Exposed Exterior Nails or Screws: Aluminum or Stainless Steel.
 7. Sheet Metal Connections: Shall have CBC approval, Simpson Strong-Tie connectors, Silver Metal Products, or approved equal. All connectors shall be galvanized or provided with approved corrosion protection paint.
- G. Pressure Treatment: Water borne salt preservative, non-corrosive, paintable, odorless, as listed in (FS) TT-W-571. For all foundation plates or sills and sleepers placed against concrete, which is in direct contact with earth.

- H. Adhesives: Pressure sensitive; same as 3M Co.'s "Contact Bond" or approved equal.

2.02 FABRICATION

Wood and wood products shall be air or kiln dry to maximum 15% moisture content when delivered to job site, furnished S4S, nominal sizes noted and conforming to governing rules and standards unless otherwise noted.

2.03 SOURCE QUALITY CONTROL

Lumber shall bear grade-trademark of appropriate grading agency and plywood shall bear grade and trademark of APA.

PART 3: EXECUTION

3.01 INSPECTION

Examine areas to receive rough carpentry and verify that building components, surfaces, spacing, direction and details of supports are correct to accommodate installation of blocking, grounds, stripping, backing, framing, sheathing, etc. Do not begin work before unsatisfactory conditions have been corrected.

3.02 INSTALLATION

Carpentry work shall be performed in accordance with the best standards of practice relating to the trade and under the constant supervision of a competent foreman who shall carefully plan and lay out the work to carry out the intent of the Drawings and properly accommodate the work of other trades. All framing fastenings shall comply to the applicable sections of all Codes under which this Work is performed.

- A. Sill Plates: Plates shall be accurately aligned, set in grout where indicated on the Drawings and secured with anchor bolts in accordance with structural details.
 - 1. Sill Plates: Plates shall be accurately aligned, set in grout where indicated on the Drawings and secured with anchor bolts in accordance with structural details. Washers shall be placed between plate and nut, securely tightened and again re-tightened immediately prior to becoming inaccessible.
 - 2. No power driven fasteners shall be installed in perimeter bearing walls.
- B. Framing: Framing members shall be accurately cut and fit into required locations, true to lines and levels as indicated and required and permanently secured in position with fastenings and/or fittings as detailed, or required by Code provisions.

1. Except as otherwise noted, studs and furring strips shall be spaced at 16" o.c.
 2. Stud partitions, walls or other framing containing plumbing, heating, conduit, etc shall be framed to provide proper clearance for these items.
 3. Pipes exceeding 1/3 of plate width shall not be placed in partitions used as bearing or shear walls except in accordance with structural details.
 4. Stud walls shall present a plane surface with a tolerance not exceeding 1/8" in 10 feet, vertically.
- C. Cutting and Framing: Concealment and accommodations for mechanical and electrical work shall be provided under this Section.
- D. Boltings: Holes for bolts shall be drilled true to line and layout, 1/16" maximum larger than bolt diameter, provide washers with all nuts. Bolts shall be turned up tight at time of installation and again immediately prior to becoming inaccessible.
- E. Screws: Lag screws and wood screws shall be turned into place, fitted with washers. Bore hole same diameter as unthreaded shank of screw to a depth just short of root of the head. Driving of screws by hammering shall not be permitted.
- F. Nailing Blocks: Form to shape and dimensions noted and required and secure in place in firm manner.
- G. Blocking, Bridging, Ledgers, and Grounds: Stud walls shall be blocked with 2" material same width as studs, spaced as shown and noted on drawings. Joists shall be blocked with 2" materials of size shown and at spacing noted. Fire blocking shall be at each story height or 10 feet maximum o.c.
- H. Backing: Provide at all fixtures, accessories, etc. applied to walls, ceilings and floors adequate for imposed loads. Material size shall be as required.

3.03 NAILING

- A. General:
1. Use only common wire nails or spikes of the dimension shown on the Nailing Schedule, except where otherwise specifically noted in the Drawings. When nailing guns are employed magazine type nails shall be of equivalent gauge of the required common nail.
 2. For conditions not covered in the Nailing Schedule, provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike. 16d nails may be used to connect two pieces of 2" (nominal) thickness.
 3. Do all nailing without splitting wood, pre-boring as required. Replace all split members.

B. Nailing Schedule: As indicated on Structural Drawings
3.04 CLEAN UP

Clean up shall be performed in accordance with Section 01000, Special Conditions.

End Of Section 06100

SECTION 06200: FINISH CARPENTRY AND MILLWORK

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of all finish carpentry, wood trim, millwork and other items not specifically described as being furnished and installed under other Section of these Specifications.
- B. Related Work Specified Elsewhere:
 - 1. ARCHITECTURAL WOODWORK Section
 - 2. HOLLOW METAL DOORS AND FRAMES Section
 - 3. FINISH HARDWARE Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01000, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. American Plywood Association (APA).
- B. Woodwork Institute of California, "Manual of Millwork" (WIC).

1.03 SUBMITTALS

Submittal shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Shop Drawings: Submit shop drawings indicating layout and details of all items to be furnished, when requested by the Architect.
- B. Samples: Submit samples of each wood species specified when requested by the Architect.

PART 2: PRODUCTS

2.01 MATERIALS

All materials shall be new materials as indicated on the Drawings. New wood and wood products shall be graded per latest editions of referenced standards.

- A. General Interior Trims (Millwork): Birch "Custom Grade" per WIC to receive transparent or semi-transparent finish. Any closed grain hardwood "custom grade" per WIC to receive opaque finish.
- B. Specific Interior Trims (Millwork) as indicated on the Drawings: Medium Density Fiberboard "Custom Grade" per WIC to receive opaque finish.
- C. Exterior Trims: Fiber-cement composition intended for exterior use. Smooth finish. Pre-primed for field painting. HardiTrim "4/4 Boards", or equal product from other manufacturer approved by the Architect. Fabricate to "Custom Grade" per WIC to receive opaque finish.

PART 3: EXECUTION

3.01 WORKMANSHIP

All finish carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the Drawings.

- A. Jointing: Make all joints to conceal shrinkage; miter all exterior corners; cope all interior corners, miter or scarf all end-to-end joints. Install all trim in pieces as long as possible, jointing only where solid support is obtained and scribe to abutting surfaces.
- B. Fastening:
 - 1. Install all items straight, true, level, plumb, and firmly anchored in place; where blocking or backing is required, coordinate as necessary with other trades to ensure placement of all required backing and blocking in a timely manner.
 - 2. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.
 - 3. On exposed finish work, set all nails for putty.
 - 4. Screw, do not drive, all wood screws except that screws may be started by driving and then screwed home.

3.02 INSTALLATION

- A. Install miscellaneous items in strict accordance with the Drawings and the published recommendations of the manufacturer of the item, anchoring firmly in place at the prescribed location, straight, plumb, level, and anchored for long life under hard use.
- B. Install all hardware in accordance with the provisions of Section 08710, Finish Hardware.

3.03 FINISHING

Sandpaper all finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain, except do not sand wood which is designed to be left rough; no coarse grained sandpaper mark, hammer mark, or other imperfection will be accepted.

3.04 ADJUST AND CLEAN

Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the work, in accordance with Section 01000, Special Conditions.

- A. After the work has been otherwise completed, examine hardware in place for complete and proper installation. Lubricate bearing surfaces of moving parts and adjust latching and holding devices for proper function; test keys for proper conformance with keying system.
- B. Completely remove protective materials and devices and thoroughly clean exposed surfaces of hardware; check for surface damage prior to final cleaning for the Owner's acceptance of project.

End Of Section 06200

SECTION 06400 - ARCHITECTURAL WOODWORK

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent of each type of architectural woodwork is indicated on drawings and in schedules.
- B. Types of architectural woodwork include the following:
 - 1. Architectural cabinets including:
 - a. Laminate clad cabinets.
 - b. Laminate countertops.
 - c. Solid surface countertops.

1.03 QUALITY ASSURANCE

- A. Quality Standard: Comply with applicable requirements of "Architectural Woodwork Standards" published by Woodwork Institute (WI), unless otherwise indicated.
- B. Installer Qualifications: Arrange for installation of architectural woodwork items by same firm that fabricated them.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each product and process specified as work of this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- B. Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. WI standards.
- C. Samples: Submit the following samples:
 - 1. Plastic laminate - Full collection of samples for selection, followed by 8" x 10" sample for each type, color, pattern and surface finish selected.

2. Solid Surfacing - Full collection of samples for selection, followed by 8" x 10" sample for each type, color, pattern and surface finish selected.
3. Exposed cabinet hardware, one unit of each type and finish.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.07 PROJECT CONDITIONS

- A. Conditioning: Woodwork Manufacturer and Installer shall advise Contractor of temperature and humidity requirements for woodwork installation and storage areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. Require Woodwork Manufacturer to establish optimum moisture content and required temperature and humidity conditions.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Plastic Laminate - Subject to compliance with requirements, manufacturers offering high pressure decorative laminates and acid resistant laminates which may be incorporated into the work include, but are not limited to, the following:

Formica Corp.
Ralph Wilson Plastics Co.
or approved equal

- B. Solid Surfacing - Subject to compliance with requirements, manufacturers offering solid surfacing which may be incorporated into the work include, but are not limited to, the following:

Dupont
Formica Corp.

or approved equal

2.02 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber at time of installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises precut, where possible, to receive hardware and other items and work.
 - 1. Ease edges to a 1/16" radius, for corners of cabinets and edges of solid wood (lumber) members less than 1" in nominal thickness, 1/8" radius for edges of rails and similar members over 1" in nominal thickness.
- C. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Pre-cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.
- E. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit.

2.03 LAMINATE CLAD CASEWORK - GENERAL

- A. Quality Standard: Comply with WI Section 10 "Casework".
- B. Laminate Clad Cabinets: Comply with the following requirements:
 - 1. Grade: Premium
 - 2. Type of Cabinet Construction: Flush Overlay.

2.04 LAMINATE CLAD CASEWORK - MATERIALS

- A. Lumber: In accordance with the WI Grade specified for the product being fabricated. Moisture Content: 6% to 12% for boards up to 2-inch nominal thickness, and shall not exceed 19% for thicker pieces.
- B. Core: MDF meeting the requirements of WI.

- C. Water-resistant core, where required: Particle board meeting the requirements of ANSI A208.1 Grade M3 MR-50 or MDF meeting the requirements of ANSI A 208.2 Grade 155 MR-50.
- D. Veneer core plywood: A non-telegraphing hardwood manufactured with exterior glue.
- E. Plastic laminate: Meeting the requirements of WI for its use.
 - 1. Colors, Pattern and Finishes: As indicated, or, if not otherwise indicated, as selected by Architect from laminate manufacturers' standard products allowing for a minimum of 4 colors and/or patterns.
- F. Cabinet liner: NEMA LD-3 Grade CLS
- G. Edge Band: PVC matching the color and pattern of the exposed laminate.
- H. Adhesives: Type I, fully waterproof

2.05 CABINET HARDWARE AND ACCESSORY MATERIALS

- A. Cabinet Hardware Schedule: Refer to schedule at end of this section for cabinet hardware required for architectural cabinets.
- B. Hardware Standard: Comply with ANSI/BBMA A156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BBMA numbers or referenced to this standard.
- C. Hardware finishes: Comply with BHMA 1301 for finishes indicated by BHMA Code Numbers or if not otherwise indicated, provide finishes complying with requirements indicated below:
 - 1. 626 Satin Chrome, unless indicated otherwise.
- D. For concealed hardware, provide manufacturer's standard finish which complies with product class requirements of ANSI/BHMA A156.9.

2.06 PLASTIC LAMINATE COUNTERTOPS

- A. Quality Standard: Comply with WI Section 11 "Countertops".
- B. Plastic Laminate Countertops: Comply with the following requirements:
 - 1. Grade: Premium
- C. Laminate:
 - 1. Flat countertops: NEMA LD-3 Grade HGS. 0.048 inch thick.
 - 2. Formed countertops: NEMA LD-3 Grade HGP. 0.039 inch thick.

- 3. Colors, Pattern and Finishes: As indicated, or, if not otherwise indicated, as selected by Architect from laminate manufacturers' standard products allowing for a minimum of 4 colors and/or patterns.
- C. Core material: MR-50 Grade MDF
- D. Backing sheet: NEMA LD-3 Grade BKL. 0.020 inch thick.
- E. Splash detail: As indicated on the Drawings.
 - 1. Deck mount construction
- F. Front edge:
 - 1. Bull nose edge at typical conditions.
 - 2. No-drip bull nose edge where sinks are present.
- G. Cutouts: Seal edges of cutouts in sink countertops with a color-toned (for verification) water-resistant sealer before sinks are installed.

2.07 SOLID-SURFACE COUNTERTOPS

- A. Quality Standard: Comply with WI Section 11 "Countertops".
- B. Solid-Surface Countertops: Comply with the following requirements:
 - 1. Grade: Premium
- C. Solid-surface: A filled cast polymeric resin panel meeting the requirements of ASI.
 - 1. Colors and Patterns: As indicated, or, if not otherwise indicated, as selected by Architect from solid-surface manufacturers' standard products allowing for a minimum of 2 colors and/or patterns.
- D. Splashes: Butt joint, 6inches high.
- E. Front edges:
 - 1. Bull nose edge at typical conditions.
 - 2. No-drip bull nose edge where sinks are present.

2.08 FASTENERS AND ANCHORS

- A. Screws: Select material, type, size and finish required for each use. Comply with FS FF-S0111 for applicable requirements.
 - 1. For metal framing supports, provide screws as recommended by metal framing manufacturer.

- B. Nails: Select material, type, size and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
- C. Anchors: Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion-resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

2.09 CASEWORK HARDWARE

Casework Hardware: All casework shall be totally finished in the fabricator's shop including the provision and installation of all required hardware. Hardware shall be as described herein, or equal. The schedule shall be a standard of quality for typical hardware items, some of which may not be required for this project. Shop drawings shall include hardware schedules.

A. Cabinet Hinges

Concealed hinge for flush overlay application, 110 degree opening

1. Specified Manufacturer: Blum
2. Acceptable Manufacturers: Grass America, Inc., or equal.

B. Cabinet Door Locks

1. Specified Manufacturer: Corbin
2. Acceptable Manufacturers: Hafele, National Lock, or equal.

C. Drawer Locks

1. Specified Manufacturer: Corbin
2. Acceptable Manufacturers: Hafele, National Lock, or equal.

D. Metal Drawer System:

1. Specified Manufacturer: Blum, "Metabox"
2. Acceptable Manufacturers: Mepla-Alfit "Integra", or equal.

E. Drawer and Door Pulls:

4" wide wire loop pulls providing 1" minimum finger clearance.

1. Specified Manufacturer: Stanley
2. Acceptable Manufacturers: Quality, Hafele, Amerock, or equal.

- F. Shelf Supports:
- 5mm System Holes.
1. Acceptable Manufacturers: Knappe & Vogt, Hafele, Amerock, or equal.
- G. Countertop Supports:
1. Support Brackets: Satin stainless steel, size as detailed, Federal Brace "Arrowwood", or equal.
- H. Cable Grommet:
- 3-1/2" diameter, complete with cap, brushed nickel finish: Doug Mockett #BRI-2, or equal.
- I. Bottom-Mount Waste Bin:
- Sliding assembly to hold single 20 quart bin, ball-bearing precision slides: Knappe & Vogt #SBM9-1-20WH, or equal.
- J. Rolling Door Top Guide Track
- 5/8" wide x 5/8" high, steel construction with zinc finish: Knappe & Vogt # 953, or equal.
- K. Rolling Door Bottom Sheave And Track
- 2-3/4" x 1/2" frame; ball-bearing round groove sheave 1-3/8" diameter; steel construction: Knappe & Vogt #430, or equal. 21/32" wide x 5/16" high recessed track; steel construction: Knappe & Vogt #455, or equal.

PART 3: EXECUTION

3.01 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
- B. Pre-Installation Meeting: Meet at project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor; Architect and other Owner Representatives (if any); Installers of architectural woodwork, wet work such as plastering, other finishes, painting, mechanical work and electrical work; and firms or persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with woodwork

installation only when everyone concerned agrees that required ambient conditions can be maintained.

- C. Deliver concrete inserts and similar anchoring devices to be built into substrates, well in advance of time substrates are to be built.
- D. Prior to installation of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

3.02 INSTALLATION

- A. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.
- B. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.
- D. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
- E. Tops: Anchor securely to base units and other support systems as indicated.

3.03 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION

- A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate and adjust hardware.
- C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
- D. Complete the finishing work specified as work of this section, to whatever extent not completed at shop or prior to installation of woodwork.
- E. Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

End Of Section 06400

SECTION 07200: BUILDING AND ACOUSTICAL INSULATION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work Included in This Section: Provision and installation of all thermal and acoustical insulation.

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Complete list of materials with name of manufacturer.
- B. Samples of insulation, when requested by Architect.

1.04 APPLICABLE STANDARDS

- A. In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.
 - 1. National Insulation Association (NIA) latest adopted standards.
 - 2. Comply with the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Version 1.2, January 2017 (Emission testing method for California Specifications 01350).
 - a. Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.

PART 2: PRODUCTS

2.01 BUILDING BATT INSULATION

A. General Requirements: All building batt insulation shall be fiberglass batts unless noted otherwise. Batts shall be unfaced, kraft faced, or FSK faced as indicated. Insulation shall be products of Owens/Corning Fiberglass, Johns-Manville, or equal. All insulation delivered to the project shall be in original packaging indicating manufacturer, insulation type and "R" value.

1. All stud walls exposed to the exterior or non-conditioned building spaces shall be insulated to a minimum value of R-21, FSK-face, unless specifically noted otherwise.
2. All attic areas shall be insulated to a minimum value of R-38, FSK face, unless specifically noted otherwise.
3. All interior walls shall be insulated to a minimum value of R-19, unfaced, for acoustical improvement.

2.02 NAILABLE RIGID INSULATION

- A. General Requirements: All exterior stud walls shall be faced with nailable rigid insulation as indicated on the Drawings.
 1. All nailable rigid insulation shall be composed of a closed cell polyisocyanurate foam core bonded to a coated glass facer on the inner side, and to 7/16" oriented strand board on the outer side. Total thickness of the nailable rigid insulation panel shall be 1-1/2", and total R-Value shall be 6.6.
 3. "Xci NB" panels as manufactured by Hunter Panels, Portland, ME, or equal product of other manufacturer approved by the Architect.

2.03 ACCESSORIES

All other materials such as wire supports, fasteners and retainers not specifically described but required to complete the work, shall be as recommended by approved manufacturer, provided and installed by the Contractor.

PART 3: EXECUTION

3.01 INSTALLATION

General Requirements: Except as otherwise specifically noted or as directed by the Architect, install all building insulation in accordance with the manufacturer's recommendations and governing codes.

- A. Insulation shall fit all framing spaces, including areas between joists and outside headers, behind electrical outlets and piping and other areas, to form a complete insulating blanket around the heated or cooled areas of the structure.
- B. Flanged blankets shall be positioned and recessed as specified by the manufacturer for the particular use, and vapor barriers shall be on the inside, (heated side in winter) of the insulation blanket.
- C. Insulation should not be installed over or within 3" of recessed fixtures containing lights, fans, or other heat-generating electrical devices, or as

required by applicable governing codes. Baffles shall be used where required to maintain these clearances. IC rated light fixtures may be covered with insulation.

- D. Nailable rigid insulation panels shall be attached to wall framing using #14 thread-point screws of the length, spacing, and in the manner, as specified by the panel manufacturer.

3.02 ADJUST AND CLEAN

Inspect completed installation and verify that all insulation is complete and properly installed, and remove all debris from the site.

End Of Section 07200

SECTION 07250: WEATHER BARRIERS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

1.02 DESCRIPTION OF WORK

- A. Work Included In This Section: Provision and installation of complete weather barrier system, including weather barrier membrane, seam tape, flashings, and fasteners.

1.03 REFERENCES

- A. ASTM International
 - 1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
- B. AATCC – American Association of Textile Chemists and Colorists
 - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
 - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
 - 2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Complete list of materials with name of manufacturer.

1.04 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer shall have experience with installation of similar weather barrier assemblies under similar conditions.
 - 2. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
 - 3. Provide weather barrier and accessory materials produced by single manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store weather barrier materials as recommended by system manufacturer.

1.06 SCHEDULING

Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

PART 2: PRODUCTS

2.01 SPECIFICATION DESIGN STANDARD

The following weather barrier products are based on DuPont Building Innovations "Tyvek" system. This manufacturer's weather barrier system shall serve as the design standard for this project. Weather barrier systems using similar products of other manufacturers shall be acceptable provided that they meet or exceed the following product standards and that the other products and system are approved in writing by the Architect.

2.02 MATERIALS

- A. Textured, spunbonded polyolefin, non-woven, non-perforated, weather barrier, DuPont Tyvek StuccoWrap and related assembly components.
- B. Performance Characteristics:
 - 1. Air Penetration: 0.004 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
 - 2. Water Vapor Transmission: 50 perms, when tested in accordance with ASTM E96, Method B.
 - 3. Water Penetration Resistance: 210 cm when tested in accordance with AATCC Test Method 127.
 - 4. Basis Weight: 2.1 oz/yd², when tested in accordance with TAPPI Test Method T-410.

5. Air Resistance: 300 seconds, when tested in accordance with TAPPI Test Method T-460.
6. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882, Method A.
7. Tear Resistance: 7/9 lbs, when tested in accordance with ASTM D1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 5, Smoke Developed: 25

2.03 ACCESSORIES

- A. Seam Tape: 3 inch wide, DuPont Tyvek Tape as manufactured by DuPont Building Innovations.
- B. Fasteners: Tyvek Wrap Caps, as manufactured by DuPont Building Innovations: #4 nails with large 1-inch plastic cap fasteners or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
- C. Sealants
 1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 2. Products:
 - a. DuPont Commercial Sealant
 - b. Sealants recommended by the weather barrier manufacturer.
- D. Adhesive:
 1. Provide adhesive recommended by weather barrier manufacturer.
 - a. SIA 655
- E. Primer:
 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 2. Products:
 - a. SIA 655
- F. Flashing
 1. DuPont™ FlexWrap™, as manufactured by DuPont Building Innovations: flexible membrane flashing materials for window openings and penetrations.

2. DuPont™ StraightFlash™, as manufactured by DuPont Building Innovations: straight flashing membrane materials for flashing windows and doors and sealing penetrations and masonry ties, etc.

PART 3: CONSTRUCTION AND INSTALLATION

3.01 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION – WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- C. Apply wrap with grooved surface pattern in vertical direction.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface. Maintain weather barrier plumb and level
- E. Shingle weather barrier over back edge of weep screed. Seal weather barrier with sealant or tape to weep screed. Ensure weeps are not blocked.
- F. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.
- G. Window and Door Openings: Extend weather barrier completely over openings.
- H. Weather Barrier Attachment:
 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.05 FLASHING

- A. Cut 9-inch wide DuPont FlexWrap a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont FlexWrap edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont FlexWrap at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
- D. Apply 9-inch wide strips of DuPont StraightFlash at jambs. Align flashing with interior edge of jamb framing. Start DuPont StraightFlash at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install DuPont FlexWrap at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont StraightFlash over the 45-degree seams.
- J. Tape head flap in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealants per sealant manufacturer's instructions and ASTM C1193.

3.06 PROTECTION

- A. Protect installed weather barrier from damage.

End Of Section 07250

SECTION 07542: PVC ROOFING SYSTEM

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: All provisions of labor and materials for the PVC roofing system, and companion flashing system.
- B. Related Work Specified Elsewhere:
 - 1. ROUGH CARPENTRY Section
 - 2. FLASHING AND SHEET METAL Section

1.02 EXTENT OF WORK

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the 60-mil thick white reinforced membrane roofing system including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.
- B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.
- C. The roofing contractor shall confirm all given information and advise the building owner, prior to bid, of any conflicts that will affect their cost proposal.
- D. Any contractor who intends to submit a bid using a roofing system other than the County standard manufacturer must submit for pre-qualification in writing fourteen (14) days prior to the bid date. Any contractor who fails to submit all information as requested will be subject to rejection. Bids stating "as per plans and specs" will be unacceptable.

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Shop drawings showing layout, details of construction and identification of materials.
- B. Sample of the manufacturer's Membrane System Warranty.
- C. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.

- D. Certification from the membrane manufacturer indicating the fasteners are capable of providing a static backout resistance of 10 inch pounds minimum is required.
- E. Certification from the membrane manufacturer indicating the membrane thickness over the reinforcing scrim (top ply membrane thickness) is nominal 24-mil or thicker.
- F. Provide evidence that roofing system is in compliance with all requirements of State of California Title 24 energy conservation standards.
- G. Certification of the manufacturer's warranty reserve.

Upon completion of the installed work, submit copies of the manufacturer's final inspection to the Owner prior to the issuance of the manufacturer's warranty.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.
- B. Comply with the manufacturer's written instructions for proper material storage.
 1. Store Sure-Flex membrane on provided pallets in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. Sure Flex membrane that has been exposed to the elements must be prepared with PVC membrane cleaner prior to welding.
 2. Store curable materials (adhesives and sealants) between 60°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60°F minimum temperature before using.
 3. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.
 4. Insulation must be on pallets, off the ground and tightly covered with waterproof materials. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

1.05 WORK SEQUENCE

- A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide

protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.

- B. Do not disrupt activities in occupied spaces.

1.06 USE OF THE PREMISES

Before beginning work, the roofing contractor must secure approval from the building owner's representative for the following:

- A. Areas permitted for personnel parking.
- B. Access to the site.
- C. Areas permitted for storage of materials and debris.
- D. Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.
- E. Interior stairs or elevators may not be used for removing debris or delivering materials, except as authorized by the building superintendent.

1.07 EXISTING CONDITIONS

If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the owner's representative by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

1.08 PRE-CONSTRUCTION CONFERENCE

- A. Prior to bid submittal, the roofing contractor should schedule a job site inspection to observe actual conditions and verify all dimensions on the roof. The job site inspection may occur on the day of the pre-bid meeting or prior to such a meeting. Should access to the roof be necessary before or after the pre-bid meeting, the contractor must contact the Owner's representative to coordinate an appropriate time.
- B. Any conditions which are not shown on the shop drawings should be indicated on a copy of the shop drawing and included with bid submittal if necessary to clarify any conditions not shown.

1.09 JOB SITE PROTECTION

- A. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at

completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.

- B. During the roofing contractor's performance of the work, the building owner will continue to occupy the existing building. The contractor shall take precautions to prevent the spread of dust and debris, particularly where such material may sift into the building. The roofing contractor shall provide labor and materials to construct, maintain and remove necessary temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.
- C. Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.
- D. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- E. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.
- F. Store moisture susceptible materials above ground and protect with waterproof coverings.
- G. Remove all traces of piled bulk materials and return the job site to its original condition upon completion of the work.

1.10 SAFETY

The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. Safety shall be the responsibility of the roofing contractor. All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.

1.11 WORKMANSHIP

- A. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
- B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.
- C. There shall be a supervisor on the job site at all times while work is in progress.

1.12 QUALITY ASSURANCE

- A. The PVC roofing system must achieve a UL Class A.
- B. The specified roofing assembly must be rated by Factory Mutual Global (FMG) to meet or exceed the factored uplift pressures outlined in FMG Property Loss Prevention Data Sheet 1-28, and complies with FMG Property Loss Prevention Data Sheet 1-29 for enhancements at the perimeter and corners.
- C. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.
- D. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least five (5) years successful experience installing single-ply PVC roofing systems and having installed at least one (1) roofing application or several similar systems of equal or greater size within one year.
- E. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.
- F. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the Architect. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the Architect's consideration.
- G. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the building owner seventy-two (72) hours prior to the manufacturer's final inspection.

1.13 JOB CONDITIONS, CAUTIONS AND WARNINGS

- A. When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to prevent bucking of water.
- B. When loading materials onto the roof, the applicator must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.

- C. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- D. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- E. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- F. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- G. New roofing shall be complete and weathertight at the end of the work day.
- H. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

1.14 WARRANTY

- A. Provide manufacturer's twenty (20) year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of seventy-two (72) mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.
- B. Warranty shall also cover leaks caused by accidental punctures: 16 man-hours per year fo.
- C. Pro-rated System Warranties shall not be accepted.
- D. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.

PART 2: PRODUCTS

2.01 SPECIFICATION DESIGN STANDARD

- A. The following roofing products and system are based on Carlisle SynTec "Sure-Flex KEE HP PVC Roofing System", which has been adopted as the County standard. All components of the specified roofing system shall be products of Carlisle SynTec or accepted by Carlisle SynTec as compatible.

- B. All products (including insulation, underlayment, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.
- C. Other roofing systems using similar products of other manufacturers shall be acceptable provided that they meet or exceed the following product standards and that the other products and systems are approved in writing by the Architect.

2.02 MEMBRANE

- A. Furnish Sure-Flex PVC KEE HP 60-mil thick white reinforced PVC (polyvinyl chloride) membrane with APEEL Protective Film as needed to complete the roofing system. Membrane thickness over the reinforcing scrim (top ply thickness) shall be nominal .024-mil or thicker.
- B. Membrane Weathering Performance: The PVC membrane shall be formulated with a minimum of 30% Elvaloy polymer to withstand:
 - 1. ASTM D 3045: 56 days exposure @ 176° F and 670 hrs @ 240°
 - 2. ASTM G 155 (xenon arc): a min. of 17,640 kj/m² resistance @ 63° C without cracking or showing signs of material failure.
- C. Membrane with white color shall have an SRI (solar reflectance index) not less than 107 in accordance with ASTM E 1980.

2.03 UNDERLAYMENT

- A. USG "Securock" Glass-Mat Sheathing – A non-combustible, moisture- and mold-resistant panel with a treated gypsum core combined with fiberglass face and back.
 - 1. Provide and install 5/8" thick boards on the roof deck over the structural plywood where indicated on the Drawings.
 - 2. Provide and install 1/4" thick boards on the framed crickets and vertical parapet walls over the structural plywood where indicated on the Drawings.

2.04 ADHESIVES AND CLEANERS

All products shall be furnished by Carlisle and specifically formulated for the intended purpose.

- A. Sure-Flex PVC Bonding Adhesive: A high-strength, synthetic rubber adhesive used for bonding Sure-Flex membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 45 - 50 square feet per gallon per finished surface (includes coverage on both surfaces).
- B. Low VOC PVC Bonding Adhesive: A high strength solvent-based contact adhesive that allows bonding of PVC membrane to various

porous and non-porous substrates. It is specially formulated using a blend of VOC exempt and nonexempt solvent to be in compliance with the state of California Clean Air Act of 1988 (updated in 1997) and as further regulated by California's Air Quality Control Districts listing VOC grams per liter limitations. This product also meets the <250 gpl VOC content requirements of the OTC Model Rule for Single Ply Roofing Adhesives.

- C. Hydrobond Water-Based Adhesive: A wet lay-in, one-sided dispersion adhesive. Compatible with only Sure-Flex PVC smooth-backed and FleeceBACK membranes, this product is ideal for bonding only PVC membranes to various porous and non-porous substrates (cannot be used with any KEE or KEE HP PVC bareback membranes). Coverage rates vary between 100-133 square foot per gallon using roller or spray applications.
- D. CAV-GRIP PVC Aerosol Contact Adhesive: a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: adhering PVC bareback membranes to a variety of horizontal substrates and vertical walls (cannot be used with any KEE or KEE HP bareback membranes), as well as adhering FleeceBACK membranes to vertical walls. Coverage rate is approximately 400 sq. ft. per #40 cylinder and 800 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application; 750sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided applications.
- E. Sure-Flex PVC Cut-Edge Sealant: A clear-colored sealant used to seal cut edges of reinforced Sure-Flex membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.
- F. Water Cut-Off Mastic: Used as mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).
- G. Universal Single-Ply Sealant: A 100% solids, solvent free, one-part, polyether sealant that provides a weather tight seal to a variety of building substrates. Can be used as a termination bar sealant or for use in counterflashing, coping, and scupper details.
- H. PVC One-Part Pourable Sealer: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Sealant Pockets. Packaged in four 1/2 gallon pouches per plastic bucket. One pouch will fill one Molded Sealant Pocket.
- I. Foil Grip Aluminum Tape: A general-purpose pressure-sensitive sealant used as a bond break at joints in PVC Coated Metal. Packaged in rolls 2" wide by 100' long.
- J. PVC and KEE HP Membrane Cleaner: Used to prepare membrane that has been exposed to the elements for approximately 7 days prior to

heat welding or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

- K. Sure-Flex Low-VOC PVC Step 1 Activator: A high-strength, solvent-based activator that allows PVC Pressure-Sensitive (PS) Cover Strip to be bonded to Sure-Flex PVC or KEE HP membranes. Low-VOC PVC Step 1 Activator meets the < 250 gpl VOC content requirements of the OTC Model Rule. It is specially formulated using a blend of VOC-exempt and non-exempt solvents and follows the state of California Clean Air Act of 1988 (updated in 1997) as further regulated by California's Air Quality Control Districts listing VOC limitations.
- L. Sure-Flex Low-VOC PVC Step 2 Primer: A high-solids-content, polymer based splice primer. This product is applied to KEE HP and PVC membranes to improve the adhesion of PVC Pressure-Sensitive Cover Strip. Low-VOC PVC Step 2 Primer meets the < 250 gpl VOC content requirements of the OTC Model Rule.
- M. Sure-Flex PVC Step 2 Primer: A high-solids-content, clear (translucent color), polymer-based splice primer used to prepare KEE HP and PVC membranes to be bonded to PVC Pressure-Sensitive Cover Strip.
- N. CCW 702-LV: A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces. Contains less than 250g/L VOCs.
- O. Carlisle CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer: a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: bonding Sure-Weld membrane to various surfaces, enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates, priming unexposed asphalt prior to applying Flexible FAST Adhesive and for adhering Sure-Seal/Sure-Weld/Sure-Flex FleeceBACK and Sure-Seal EPDM or Sure-Weld TPO membrane to vertical walls. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application and 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application.

2.05 FASTENERS AND PLATES

As recommended by the manufacturer for the specific field condition(s) of the installation. To be used for mechanical attachment of underlayment and to provide additional membrane securement:

- A. HP-X Fasteners: A heavy duty #15 threaded fastener with a phillips head used for membrane securement into minimum 15/32" thick plywood.

- B. HP-Xtra Fastener: An oversized diameter #21 (.135") steel threaded fastener used in conjunction with Piranha Wtra Plates for membrane securement into wood decks.
- C. InsulFast Fastener: A threaded Phillips drive fastener used with Carlisle Insulation Plates for insulation attachment to wood decks.
- D. Piranha Plates: A 2-3/8" diameter metal barbed fastening plate used with Carlisle HP-X or HP-14-10 Fasteners for membrane securement. This plate can be used for insulation securement.
- E. Piranha Xtra Plates: A 2-3/8" diameter metal barbed fastening plate with an oversized hole for use with Carlise HP-Xtra Fasteners for membrane securement.
- F. Insulation Fastening Plates: a nominal 3" diameter metal plate used for insulation attachment with the appropriate Carlisle Fastener.

2.06 METAL EDGING AND MEMBRANE TERMINATIONS

- A. General: All metal edging shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code.
- B. All metal edging shall be as recommended by the manufacturer for the specific field condition(s) of the installation.
- C. Drip Edge: a metal fascia/edge system with a 22 or 24 gauge continuous anchor cleat and .032 inch thick aluminum or 24 gauge steel fascia. Metal fascia color shall be as designated by the Owner's Representative.
- D. Termination Bar: a 1" wide and .098" thick extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

2.07 WALKWAYS

Protective surfacing for roof traffic shall be Sure-Flex PVC Walkway Rolls installed per manufacturer's requirements.

2.08 OTHER MATERIALS

Carlisle 725TR Air & Vapor Barrier / Temporary Roof: 725TR is a 40-mil composite consisting of 35- mils of self-adhering rubberized asphalt factory laminated to a 5-mil polyethylene film with an adhesion textured surface. 725TR roll dimensions are 39" x 100' and the product is applied after priming an acceptable substrate with 702LV or Cav-Grip III.

PART 3: EXECUTION

3.01 GENERAL

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

3.02 VAPOR RETARDERS

- A. The need for a vapor retarder shall be determined by the manufacturer for the specific field condition(s) of the Project.
 - 1. In conformance with the latest publications by ASHRAE (American Society of Heating, Refrigerating and Air- Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association).

3.03 UNDERLAYMENT PLACEMENT AND ATTACHMENT

- A. Install membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints both horizontally and vertically if multiple layers are provided.
- B. Secure membrane underlayment to the substrate with the required fasteners and plates in accordance with manufacturers specifications.

3.04 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Unroll and position membrane without stretching. Provide and secure both perimeter and field membrane sheets in accordance with the manufacturer's most current specifications and details.
- B. Secure the membrane with the required fasteners and plates spaced a maximum of 12 inches on center depending on project conditions (centered over the pre-printed marks approximately 1-1/2 inches from the edge of the membrane sheet).
- C. Install adjoining membrane sheets in the same manner in accordance with the manufacturer's specifications.

3.05 MEMBRANE HOT AIR WELDING PROCEDURES

- A. APEEL Protective Film should be removed from within areas that are to be heat-welded together. In areas that do not require heat welding, the APEEL Protective Film can be left in place for up to 90 days.
- B. Heat weld the Sure-Flex membrane using an Automatic Heat Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller immediately after welder crosses the membrane step-off to ensure a continuous hot air welded seam.

- C. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
- D. Repair all seam deficiencies the same day they are discovered.
- E. Apply Cut Edge Sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete. Cut Edge Sealant is not required on horizontal or vertical splices.

3.06 FLASHING

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Flex reinforced membrane. Sure-Flex non-reinforced membrane can be used for flashing pipe penetrations, scuppers, as well as inside and outside corners when the use of pre-fabricated accessories is not feasible.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
- C. Remove and discard the APEEL Protective Film after the installation of the entire PVC/KEE HP Roofing System is complete.

3.07 WALKWAYS

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as shown on the Drawings.
- B. Hot air weld walkway material to the membrane in accordance with the manufacturer's specifications.

3.08 DAILY SEAL

On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.09 CLEAN UP

- A. All work areas are to be kept clean, clear and free of debris at all times.
- B. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.
- C. All tools and unused materials must be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.

- D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.
- E. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.
- F. Clean and restore all damaged surfaces to their original condition.
- G. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

End Of Section 07542

SECTION 07600: FLASHING AND SHEET METAL

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of flashing and sheet metal not specifically described in other Section but required to prevent penetration of water through exterior shell of the buildings.
- B. Related Work Specified Elsewhere:
 - 1. PVC ROOFING SYSTEM Section
 - 2. METAL ROOF PANELS Section
 - 3. DIVISION 15, MECHANICAL Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published Specifications, standards and methods of the trade cited below shall apply to Work of this Section.

- A. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

1.03 SUBMITTALS

Submit Shop Drawings of all flashing and sheet metal to be furnished and installed under this Section, in accordance with SUBMITTALS Section.

1.04 TESTS

Upon request of the Architect, demonstrate by hose or standing water that all flashing and sheet metal is completely watertight.

PART 2: PRODUCTS

2.01 MATERIALS AND GAUGES

Where sheet metal is required and no material or gauge is indicated on the Drawings, furnish and install the highest quality and gauge commensurate with the referenced standards, with 24 gauge being the minimum acceptable.

2.02 GALVANIZED IRON

- A. General: Where flashings are not noted to be fabricated from aluminum or copper, the standard shall be sheet metal or iron of a standard brand of open-hearth copper-bearing steel, copper-molybdenum iron, or pure iron sheets.
- B. Zinc Coating:
 - 1. All galvanized sheets shall have a zinc coating applied by hot dip process to all surfaces.
 - 2. Zinc coating shall weigh not less than 1-1/4 ounces per square foot nor more than 1-1/2 ounces per square foot of surfaces covered and shall conform to ASTM A-93.
- C. Shop prime as outlined under Article 3.05.

2.03 COPPER

- A. Copper sheet per ASTM B 370
 - A. Temper H00 (cold rolled) for unformed applications.
 - 2. Temper 060 where forming required.
- B. 16 oz. (0.0216" thick) except as otherwise indicated.

2.04 ALUMINUM

- A. 6063-T5 aluminum alloy sheet.
- B. 0.063" thick except as otherwise indicated.
- C. Finish to match adjacent aluminum construction. If no adjacent aluminum present, provide mill finish.

2.05 NAILS, RIVETS AND FASTENERS

- A. Galvanized iron and steel: Use only soft iron rivets having rust-resistive coating, galvanized nails, and cadmium plated screws and washers.
- B. Copper: Use only copper rivets, copper nails, and copper screws and washers.
- C. Aluminum: Use only aluminum rivets and aluminum screws and washers.

2.06 FLUX

- A. Raw muriatic acid flux used for galvanized iron or steel.
- B. Rosin flux for copper.

2.07 SOLDER

All solder used on galvanized sheet steel or copper shall conform to the current ASTM B-32.

2.08 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of flashing and sheet metal, shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

PART 3: EXECUTION

3.01 FABRICATION

Fabricate flashing and sheet metal complying with SMACNA "Architectural Sheet Metal Manual", latest revision, except as modified by details on the Drawings.

- A. The sheet metal contractor shall be responsible to coordinate the fabrication of flashings used in conjunction with roofing systems to be in the configuration approved by the roofing contractor for such systems.

3.02 INSTALLATION

- A. General:

- 1. Form all sheet metal accurately to the dimensions and shapes required, finishing all molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
- 2. Unless otherwise specifically permitted by the Architect, turn all exposed edges back 1/2 inch.

- B. Expansion: Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished Work.

- C. Weatherproofing:

- 1. Finish watertight and weather tight where so required.
- 2. Make all lock seam work flat and true to line, and sweated full of solder.
- 3. Make all lock seams and lap seams, when soldered, at least 1/2 inch wide.
- 4. Where lap seams are not soldered, lap according to pitch but in no case less than three inches.

5. Make all flat and lap seams in direction of flow.
- D. Joints:
1. Join parts with rivets or sheet metal screws where necessary for strength or stiffness.
 2. Provide suitable watertight expansion joints for all runs of more than 40 feet except where closer spacing is indicated on the Drawings or required for proper installation.
- E. Attachment:
1. Whenever possible, secure metal by means of clips or cleats without screwing through the metal.
 2. In general, space all rivets, and screws not more than eight inches apart and, where exposed to the weather, use lead washers.

3.03 EMBEDMENT

Embed all metal in connection with roof in accordance with the recommendations of the roofing manufacturer or as detailed on the Drawings.

3.04 SOLDERING

- A. General
1. Thoroughly clean and tin all joint materials prior to soldering.
 2. Perform all soldering slowly with a well heated copper in order to heat the seams thoroughly and to completely fill them with solder.
 3. Perform all soldering with a heavy soldering copper of blunt design, properly tinned for use.
 4. Make all exposed soldering on finished surfaces neat, full flowing, and smooth.
- B. Cleaning: After soldering, thoroughly wash acid flux with a soda solution.

3.05 SHOP PRIMING

All sheet metal or iron flashing and miscellaneous sheet metal items shall be shop primed after fabrication ready to receive field applied painting as specified under Section 09900.

- A. Sheet iron shall be cleaned of all oil, dirt or other foreign material and primed with a standard metal primer meeting F.S. TT-P-615 (d), Type 1.

- B. Galvanized iron shall be cleaned of all oil, dirt and other foreign material and "pickled" with a copper sulfate solution, wiped out, and primed with zinc chromate primer.

End Of Section 07600

SECTION 07610: METAL ROOF PANELS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of factory-formed concealed fastener metal roof panels with standing seams, with related metal trim and accessories.

- B. Related Work Specified Elsewhere:
 - 1. METAL FABRICATIONS Section
 - 2. FLASHING AND SHEET METAL Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

1.03 QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years experience in manufacture of similar products in successful use in similar applications.
- C. Installer Qualifications: Installer shall have at least five years' experience in the installation of similar roof assemblies.

1.04 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include:

- A. Product Data: Manufacturer's data sheets for specified products.
- B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building.
- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- D. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

1.05 JOB CONDITIONS

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
- B. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
- C. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.

1.06 WARRANTY

- A. Panel Material: Furnish manufacturer's 25-year warranty covering the panel against rupture, structural failure, or perforation.
- B. Panel Coating: Furnish manufacturer's 40-year warranty covering the panel against cracking, checking, and peeling, and 39-year warranty covering fade and chalk of the coating.
 - 1. Manufacturer's warranty may exclude surface deterioration due to physical damage from exterior sources and corrosive environments.

PART 2: PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Radiative Property Performance: Metal roof panels shall meet State of California "Cool Roof" requirements.
- C. Panel Performance: Provide sheet metal roofing which has been manufactured, fabricated and installed to withstand structural and thermal movement, wind loading and weather exposure to maintain manufacturer's performance criteria without defects, damage, failure or infiltration of water.
 - 1. Air Infiltration: Maximum 0.06 cfm per lineal foot of seam at static pressure of 6.24 psf when tested per ASTM E1680.
 - 2. Water Penetration: No uncontrolled water penetration through the joints at a static pressure of 6.24 psf when tested in accordance with ASTM E1646.
 - 3. Fire Rating: Class A

4. Class 4 Impact Resistance: UL 2218
- D. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature difference from one side of the panel to the other.
- E. Finish Performance:
 1. Two coat coil applied, baked on full strength (70% resin, PVF2) fluorocarbon coating consisting of a nominal 0.25 mil dry film thickness primer, and a nominal dry film thickness of 0.7 to 0.8 mil color coat for a total 0.9 to 1.1 mil total system dry film thickness.
 2. Color Change and Fade Resistance: No cracking, peeling, blistering or loss of adhesion when tested in accordance with ASTM G23; color change, after removal of surface deposits such as dirt or chalk, maximum 5 NBS units.
 3. Humidity Resistance: No blistering, peeling or loss of adhesion after 1,000 hours testing, in accordance with ASTM D2247.

2.02 PERFORMANCE STANDARD

- A. This specification uses the products of McElroy Metal, Inc. to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.
- B. Manufacturer: McElroy Metal, Inc.
Bossier City, LA
(800) 950-6531
info@mcelroymetal.com

2.03 METAL ROOF PANELS

- A. Basis of Design: McElroy Metal "Meridian"
 1. Profile: Snap together clip-less standing seam roof system with pre-punched leg for attachment to substrate.
 2. Size: .91" high seam by 16" width. Full lengths as required.
 3. Panel Surface: Striated.
 4. Material: Galvalume steel sheet conforming to ASTM A792, 24 gauge sheet thickness.

2.04 ACCESSORIES

- A. Provide complete metal roof panel assembly incorporating felt underlayment, trim, copings, fascia, gutters, downspouts, and miscellaneous flashings in profiles as indicated. Provide required fasteners, closure strips, thermal spacers, splice plates, support plates, and sealants as indicated in manufacturer's written instructions.
- B. Felt Underlayment:
 - 1. ASTM D226, Type II, nominal 30 pounds.
 - 2. Without perforations.
- C. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.
- D. Panel Fasteners: Self-tapping screws and other acceptable corrosion-resistant fasteners recommended by roof panel manufacturer. Where exposed fasteners cannot be avoided, supply fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.
- F. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
 - 1. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
 - 2. Concealed Joint Sealant: Non-curing butyl, AAMA 809.2.
- G. Steel Sheet Miscellaneous Framing Components: ASTM C 645, with ASTM A 653/A 653M G60 hot-dipped galvanized zinc coating.
- H. Roof Accessories: Approved by metal roof panel manufacturer. Refer to ROOF ACCESSORIES Section.

2.05 FABRICATION

- A. Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Fabricate metal panel joints configured to accept factory-applied sealant providing weather-tight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.
- C. Form panels in continuous lengths for full length of detailed runs.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

2.06 FINISHES

- A. Two coat coil applied, baked on full strength (70% resin, PVF2) fluorocarbon coating consisting of a nominal 0.25 mil dry film thickness primer, and a nominal dry film thickness of 0.7 to 0.8 mil color coat for a total 0.9 to 1.1 mil total system dry film thickness. Finish to be selected by Architect from manufacturer's full range of standard colors.
- B. Interior face shall be treated with 0.5 mil total dry film thickness consisting of a 0.25 mil primer coat and a 0.25 mil wash coat of manufacturer's standard light-colored polyester backer finish.

2.07 RELATED MATERIALS

- A. Coordinate use of related materials:
 - 1. Plywood Sheathing: Refer to ROUGH CARPENTRY Section.

PART 3: EXECUTION

3.01 INSPECTION

- A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
- B. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
- C. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following: 1/4 inch in 20 foot in any direction.
 - 1. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal panel system installation.

3.02 PREPARATION

- A. Coordinate work with installation of associated metal flashings, caulking and sealants.
- B. Dissimilar Metals: Prevent galvanic action of dissimilar metals.
- C. Coordinate location of pipe penetrations to allow centering of pipe in panel.

- D. Coordinate work to minimize foot traffic and construction activity on installed finished surfaces.

3.03 METAL PANEL INSTALLATION

- A. General: Install metal roofing panels to profiles, patterns and drainage indicated and required for leak-proof installation. Provide for structural and thermal movement of work. Seal joints for leak-proof installation.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws.
 - 3. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 4. Install screw fasteners in predrilled holes for panel attachment.
 - 5. Locate and space fasteners in uniform vertical and horizontal alignment.
 - 6. Install flashing and trim as metal panel work proceeds.
 - 7. Install continuous length panels.
 - 8. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws.
 - 9. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 10. Provide weathertight EPDM Flashing for pipe- and conduit-penetrating panels.
 - 11. Seams: Provide uniform, neat seams.
 - 12. Fix panels at location depicted on reviewed shop drawings.
 - 13. Allow for required panel clearance at penetrations for thermal movement.
 - 14. Align pipe penetrations to occur at center of roof panel. Report and have corrected improperly placed penetrations before proceeding with panel installation. Remove and replace roof panels which have improperly placed penetration flashings.
 - 15. Allow for required panel clearance at penetrations for thermal movement.

16. Fasteners: Conceal fasteners where possible in exposed work. Cover and seal fasteners and anchors for watertight and leak-proof installation.
 17. Sealant-Type Joints: Provide sealant-type joint where indicated. Form joints to conceal sealant. Comply with Division 7 Joint Sealants Section for sealant installation.
- B. Roofing Installation:
1. Install roofing plumb, true and in correct alignment with structural framing, in accordance with shop drawings and manufacturer's printed installation instructions.
 2. Install roofing using manufacturer's concealed fastening system or non-corroding fasteners color-matched to panel.
 3. Install trim using concealed fasteners where possible; sight-exposed non-corroding fasteners color-matched to trim are permitted on vertical surfaces only.
- C. Installation Tolerances:
1. Variation from Plumb: Maximum 1/8" in 20 feet.
 2. Variation from Level: Maximum 1/8" in 20 feet.
 3. Variation from True Plane: Maximum 1/4" in 20 feet.
- D. Underlayment Installation
1. Underlayment to be supplied by metal roof panel manufacturer.
 2. Self-adhered High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 40 mils thick adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
 3. Thermal Stability: Stable after testing at 240 degree F; ASTM D1970.
 4. Low-Temperature Flexibility: Passes after testing at minus 20 degree F; ASTM D1970.
 5. Supplied by metal roof panel manufacturer.

3.04 ACCESSORY INSTALLATION

- A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 3. Provide concealed fasteners except where noted on approved shop drawings.
- D. Joint Sealers: Install joint sealers where indicated and where required for weather tight performance of metal panel assemblies, in accordance with manufacturer's written instructions.
1. Prepare joints and apply sealants per requirements of SEALANTS AND CAULKING Section.

3.04 FIELD QUALITY

Owner reserves the right to perform post-installation testing of installed metal panel installations.

3.05 CLEAN-UP

- A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

End Of Section 07610

SECTION 07713: PREFABRICATED GUTTERS AND DOWNSPOUTS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of prefabricated gutters, downspouts, and related accessories.
- B. Related Work Specified Elsewhere:
 - 1. PVC ROOFING SYSTEM Section
 - 2. METAL ROOF PANELS Section
 - 3. DIVISION 15, MECHANICAL Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published Specifications, standards and methods of the trade cited below shall apply to Work of this Section.

- A. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

1.03 SUBMITTALS

Submit Shop Drawings of all prefabricated gutters and downspouts to be furnished and installed under this Section, in accordance with SUBMITTALS Section.

1.04 TESTS

Upon request of the Architect, demonstrate by hose or standing water that all gutter and downspout installation is completely watertight.

PART 2: PRODUCTS

2.01 MATERIALS AND GAUGES

Prefabricated gutter and downspout assemblies shall be fabricated from the type and gauge of material noted on the Drawings and specified herein.

2.02 ALUMINUM GUTTER AND DOWNSPOUT

- A. 6063-T5 aluminum alloy sheet.
- B. 0.032" thick.
- C. Factory applied Kynar paint finish in custom color to match metal roof panels.
- D. Aluminum gutter and downspout shall be the products of K&M Sheet Metal, Durham, NC, or other manufacturer approved by the Architect.

2.03 ALUMINUM CONDUCTOR HEAD AND DOWNSPOUT

- B. 6063-T5 aluminum alloy sheet.
- B. 0.032" thick.
- C. Clear anodized finish.
- D. Aluminum gutter and downspout shall be the products of K&M Sheet Metal, Durham, NC, or other manufacturer approved by the Architect.

2.04 NAILS, RIVETS AND FASTENERS

- A. Use only the material as the gutter/downspout assembly.
- C. Match the finish of the gutter/downspout assembly.

2.05 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of flashing and sheet metal, shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

PART 3: EXECUTION

3.01 FABRICATION

Shop fabricate gutter and downspout assemblies complying with SMACNA "Architectural Sheet Metal Manual", latest revision, except as modified by details on the Drawings.

- A. General:
 - 1. Form all sheet metal accurately to the dimensions and shapes required, finishing all molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and anchoring securely.

3.02 INSTALLATION

Secure and attach a gutter and downspout assemblies in accordance with manufacturer's written instructions.

End Of Section 07713

SECTION 07720: ROOF ACCESSORIES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work Included in This Section: Provision for and installation of roof accessories required for this Work as indicated on the Drawings and described herein.

1.03 SUBMITTALS

Before any roof accessory items are delivered to the job site, submit Shop Drawings and catalog cuts to the Architect in accordance with the provisions of the SUBMITTALS Section of these Specifications, showing all details of installation and assembly and all requirements for work by other trades, and showing all colors available, if any, from the selected manufacturer in the quality specified.

PART 2: PRODUCTS

2.01 ROOF SCUTTLE

Furnish and install where indicated on plans, 2'-6" x 3'-0" metal roof scuttle: Type "S", as manufactured by the Bilco Company, Model No. LH as manufactured by Dur-Red, or equal approved by the Architect. Cover shall be 14 gauge galvanized steel with a 3" beaded flange, neatly welded. Insulation shall be glass fiber 1" thickness, fully covered and protected by a 22 gauge galvanized metal liner. Curb shall be 12" in height and of 14 gauge galvanized steel. It shall be formed with a 3 1/2" flange with holes provided for securing to the roof deck. Curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, full welded at the corners for weather tightness. Insulation on the exterior of the curb shall be rigid fiber board, 1" in thickness. Scuttle shall be completely assembled with heavy piano hinge, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles and padlock hasps inside, and thermoplastic rubber gasket. Cover shall be equipped with an automatic hold-open arm complete with red vinyl grip handle to permit easy release and one-hand control of the cover to its closed and latched position. All hardware shall be zinc plated and chromate sealed. Manufacturer shall guarantee against defects in material or workmanship for a period of five years.

2.02 LADDER SAFETY POST

Install on fixed ladders below each roof scuttle, Model 1 LadderUP safety post as manufactured by the Bilco Company, or approved equal. Device shall be

manufactured of high strength steel with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Finish shall be black enamel. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.

2.03 ROOF ACCESS LADDERS

- A. Pre-fabricated heavy-duty 24" wide tubular rail aluminum ladder.
 - 1. Rungs: 1-1/4" extruded aluminum rated for 1500#.
 - 2. Rails: Extruded aluminum channel rail with cover plate.
 - 3. Provide integral safety cage comprised of 2" x 3/16" aluminum flat stock where unprotected height of ladder exceeds 8'-0" above finish floor.
 - 4. Complete with wall stand-off brackets and all anchors.
 - 5. Ladders: O'Keefe's Model 501, or equal product of other manufacturer approved by the Architect.

2.04 ROOF VENTS

- A. All aluminum construction consisting of roll-formed, interlocking, standing-seam roof panels with integral frame and 12" high base. Aluminum birdscreens. Supplied with factory prefabricated curb for direct flashing into roof system. Sizes as indicated on the Drawings.
- B. Greenheck FGR, or equal product of other manufacturer approved by the Architect.

PART 3: EXECUTION

3.01 SURFACE CONDITIONS

Coordination: Coordinate with all other trades as required to ensure proper and adequate provision in framing and wall finish for the installation of the selected specialties in the locations required.

3.02 INSTALLATION

Install all roof accessory items where indicated on the Drawings and in full accordance with all pertinent regulations and the manufacturer's recommendations, anchoring all components firmly in place for long life under hard use.

3.03 INSPECTION AND ADJUSTMENT

Upon completion of the installation, and as a condition of its acceptance, visually inspect the entire work of this Section, adjust all components for proper alignment and use, and touch up all abrasions and scratches to make them completely invisible.

End Of Section 07720

SECTION 07900: SEALANTS & CAULKING

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision and installation of all caulking sealants, and other materials to provide a completely waterproof building unit. Where materials are not specifically designated Type 2 shall be considered the minimum acceptable. At any location where standing or flowing water can abut the building, Type 1 shall be considered the minimum acceptable. At locations adjacent to storefront materials, Type 3 in matching color to that present shall be considered the minimum acceptable.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. The Adhesive and Sealant Council (ASC) latest adopted standards for sealants.
- B. All materials and application of materials shall comply with the latest regulations of the California Air Resources Board and local Air Pollution Control District having jurisdiction.

1.03 SUBMITTALS

Samples, including color selections, manufacturer's literature describing recommendations for use of cleaners, primers, joint preparation, etc. when requested by the Architect.

1.04 JOB CONDITIONS

- A. Environmental Requirements: Apply materials only when surface and ambient temperatures fall within manufacturer's recommended ranges.
- B. Protection: Mask off adjacent surfaces where required and remove protection upon completion. Be responsible for damage to adjacent materials caused by sealant operations.
- C. Scheduling: Install or apply only after final installations are complete and concrete has cured.

1.05 GUARANTEE

Guarantee for this work shall be extended to a two-year period.

PART 2: PRODUCTS

2.01 MATERIALS

Sealant systems shall be compatible with contacting surfaces, membranes, pre-moulded joint fillers, liquid waterproofing systems, and shall not stain adjacent exposed surfaces. Color range shall permit matching sealants to color of contacting surfaces when applicable. All caulks/sealants shall carry a minimum 15 year warranted material life.

- A. Type 1: Acrylic Latex Caulk, one part, non-sag. Pecora, Tremco, or approved equal.
- B. Type 2: Butyl-Rubber Sealant, one part. Pecora, Tremco, or approved equal.
- C. Type 3: Silicone Sealant, one part, silicone rubber sealant, Shore A Hardness of 35. General Electric Corporation, Dow Corning, or approved equal.
- D. Type 4: Polyurethane Sealant, one part elastomeric polyurethane sealant, non-sag, complying with Fed. Spec. TT-S-0027E and ASTM C-920. Pecora, Tremco, or approved equal.
- E. Type 5: Preformed Compression Seal, compartmented neoprene extrusions conforming to AASHTO M-220-67 complete with required adhesive as suited to installation requirements.
- F. Type 6: Tapes, neoprene and vinyl extrusions and others as required, noted, or recommended by approved manufacturer.
- G. Primers, Sealers, Surface Conditioners, Solvents, etc. Same as recommended by manufacturer of approved sealant material for each substrate. Solvents shall be residue free.
- H. Back-Up Materials, Fillers, Joint Packing, etc.: Non-staining closed-cell flexible foam or sponge as recommended by manufacturer of approved sealant.
- I. Release Material: Polyethylene film, masking tape, etc.
- J. Cleaning Materials: Non-staining and non-injurious to exposed surfaces including proprietary cleaners recommended by approved sealant manufacturer.

2.02 MIXING

Multi-Component Sealants shall be mixed at job site with suitable power-operated equipment and ensure components are mixed using identical batch control numbers, all in accordance with manufacturer's instructions.

PART 3: EXECUTION

3.01 INSPECTION

Inspect and verify that faces are free from bituminous materials, release agents, bond breakers, deleterious curing compounds, water repellents, rust, mill scale, coating, oil, grease, other protective materials, and are properly cured, cleaned, prepared and all other conditions are correct. Do not start application until unsatisfactory conditions have been corrected.

3.02 PREPARATION

Preparation of surfaces to receive sealants shall be as required by neat trade standards and meet requirements of manufacturer's standards, instruction and directions.

- A. Remove moisture, frost, verify proper surface and ambient temperatures, insure primers do not stain exposed materials or deteriorate back-up material, prime and seal, all in accordance with manufacturer's recommendations.

3.03 APPLICATION

Apply in strict accordance with manufacturer's procedures. Do not obstruct weep systems, and assure release materials between back-up material and sealant will confine sealant adhesion to surfaces joined, except at polyethylene back-up.

- A. Bonding Surface Depths: For Polysulfide and Polyurethane sealants typical joint depth shall normally be one-half the width of the joint, but a maximum of 1/2" depth and a minimum of 1/4" depth. Manufacturer's recommendations shall be followed.
- B. Release Materials: Use material between back-up material and sealant at joints subject to movement and over support backing at traffic bearing joints.
- C. Tooling: Use tooling agent recommended by sealant manufacturer, neatly tool joints to compress material, improve adhesion and achieve a slightly concave surface. Repair air pockets by tooling. Use masking tape as required to facilitate tooling and protection of adjacent surfaces. Remove tape upon completion.

3.04 PATCH AND REPAIR

Patch, repair and replace defective or damaged sealants as directed by the Architect and be responsible for damage to adjacent surfaces.

3.05 CLEANING

Clean adjacent surfaces soiled in applying sealants in accordance with sealant manufacturer's recommendations. Do not use cleaning agents unless specifically recommended by manufacturer and demonstration on a mock-up of material to be cleaned has been inspected and approved by the Architect.

End Of Section 07900

SECTION 08100: METAL DOORS AND FRAMES

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of hollow metal doors and door frames.
- B. Related Work Specified Elsewhere:
 - 1. FINISH HARDWARE Section
 - 2. PAINTING Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. National Fire Protection Association "Standard for Fire Doors and Windows (NFPA 80).
- B. Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames (SDI).

1.03 SUBMITTALS

Shop Drawings showing frame types, door types, fire resistive ratings and details, referenced to the Architect's door make and hardware group, all in accordance with SUBMITTALS Section.

PART 2: PRODUCTS

2.01 GENERAL

Doors and Frames shall be the product of one manufacturer, The Steelcraft Manufacturing Company, The Ceco Corporation, Curries Manufacturing, Inc., or approved equal, standard or custom design conforming to the Architect's profiles shown on the Drawings.

- A. Fire Resistive Doors and Frames shall meet requirements of scheduled ratings and comply with all applicable NFPA, UL and CBC Codes.
- B. All rated doors to be positive latching.

- C. All 20-minute rated assemblies shall be provided with approved gasketing material so installed to provide a seal where the door meets the stop on both sides and across the top.

2.02 HOLLOW METAL DOORS

- A. All metal doors shall be full-flush and seamless design, in the dimensions and types shown on the Drawings, labeled or non-labeled as indicated on the Door Schedules, and shall be properly reinforced for the finish hardware. UL labels shall be metal, permanently attached.
 - 1. Exterior Doors shall be SDI Grade III, Model 3 or 4, 16 gauge.
 - 2. Interior Doors shall be SDI Grade II, Model 1 or 2, 18 gauge.
- B. Internal construction may be one of the following:
 - 1. Internal reinforcement shall consist of 22 gauge channels spaced not over 6" on centers, extending vertically through full door height, uniformly spot welded to mated pans. Doors shall be made free of metallic ring by providing a layer of synthetic resin based sound deadener, or approved equal sound deadening material.
 - 2. Honeycomb, polyurethane, or solid structural mineral core bonded to the inside of both faces with permanent lamination, as required by the door function and label listing.

2.03 HOLLOW METAL FRAMES

All metal frames shall be the types and sizes shown on the Drawings, labeled or non-labeled as indicated on the Door Schedule, in 16 gauge for interior doors and windows, and 14 gauge for exterior doors, and shall be properly reinforced for the finish hardware. Integral stops (rabbets) shall be not less than 5/8" in depth. UL labels shall be metal.

2.04 HARDWARE REINFORCING

Reinforcing plates for hardware shall not be less than gauges recommended by SDI. Where concealed overhead door closers are required, the necessary cut-outs reinforcement, and provisions for fastenings shall be made in heads of doors for the closers.

2.05 MATERIALS

- A. Sheet Steel:
 - 1. Interior Doors and Frames: Commercial quality, level. cold rolled steel, ASTM A 336.

2. Exterior Doors and Frames: Galvanized sheet steel, ASTM A 526 (1.25 ounce coating).
- B. Primer: Rust-inhibitive shop prime to be baked on; compatible with finish painting system specified elsewhere.

2.06 FABRICATION

Fabricate by standard methods of approved manufacturer in accordance with SDI for anchorage, hardware, lights, louvers, stops, stretcher, reinforcement, etc.

A. Doors:

1. The finish work shall be strong and rigid, neat in appearance, free from defects, waves, scratches, cuts, dents, ridges, holes, warp, or buckle. Exposed welded and soldered joints shall be dressed smooth.
2. All edge seams shall be filled and ground smooth.
3. Head channel on exterior doors shall be inverted to provide flush waterproof top of door or have rigid vinyl top cap.

B. Frames:

1. The finished work shall be strong and rigid, neat in appearance, square, plumb, and true, free from defects, waves, scratches, cuts, dents, ridges, holes, warp, or buckle. Molded members shall be clean-cut, straight, and true. Corner joints shall be well-formed and in true alignment. Fastenings shall be concealed where practicable. Corner joints shall be securely mechanically interlocked and then spot welded for additional strength. All contact edges shall meet tightly, leaving a hairline vertical or miter joint. Full face welds at joint, ground smooth, are acceptable.
2. Structural reinforcing members: Where structural members are shown at mullions, transoms, or other locations which require them to be built into the frames, the structural shapes shall be furnished as part of the frame assembly.
3. Anchors on jambs shall be formed to shapes and sizes as shown and as necessary for the adjoining type of wall construction. The design of anchors shall be standard with the manufacturer except as detailed specially and shall be formed from metal of the same gauge as the frame. Jamb anchors shall be located near the top and bottom of each jamb and at intermediate points not over 24 inches apart. Floor clips shall be formed from 12 gauge steel; they shall be fastened to the bottom of each jamb member for anchoring frame to floor construction. Clips shall be adjustable, or fixed, as detailed and drilled for 3/8" diameter anchor bolts. Where floor fill occurs, the bottom of frames shall terminate at the indicated finished floor levels and be supported by an adjustable

extension clip angle resting on, and anchored to, the structural slab.

4. All frames shall be furnished with rubber bumpers installed at the factory, three at strike jamb on single door frames and two on head for double door frames.
 5. Door frame assemblies:
 - a. Frame assemblies shall be fabricated from 16 gauge open section, closed sections, and sill sections.
 - b. Closed sections shall be two piece assemblies, with joint spot welded, filled and ground smooth.
 - c. Members shall be sized as detailed.
 - d. Horizontal sections at door head member must be flush both sides.
 - e. The individual pieces shall be cut to length and notched to assure square joints and corners. All joints and corners of the frame assembly shall be continuously welded and ground smooth at the fact of the sections to develop maximum structural strength.
 - f. Frame assemblies shall be shipped to job site completely welded. Field joints shall be permitted only when the size of the total assembly exceeds shipping limitations.
 - g. Clips for field connections shall be a minimum of 14 gauge steel.
- C. Coordinate and verify details with requirements of other schedules, templates and work; including fire-resistive ratings required.
- D. Identify type, size and mark each frame before site delivery in a way markings will not be visible through finish painting.

2.07 FINISH

Each door and frame shall be pre-cleaned, bonderized and coated with a coat of baked-on prime paint. Finish painting will be job applied under the provisions of PAINTING Section.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Custom, and Standard Frames: Frames shall be set accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. The bottom of frames shall be anchored securely to floors with expansion bolts or with power driven fasteners. Wall anchors shall be built-in or secured to adjoining construction as indicated or required. Where frames require ceiling struts or other structural overhead bracing, they shall be anchored securely to ceiling or structural framing above, as indicated.
- B. Install doors at correct openings; insure smooth swing and proper closure with frame.
- C. Fire-Resistive Door and Frames: Install in accordance with NFPA No. 80.
- D. Installation of all finish hardware is specified in FINISH HARDWARE Section.

3.02 ADJUST AND CLEAN

Make final adjustments eliminating all hinge-bound conditions and make all door and hardware items smoothly operating.

3.03 DEFECTIVE WORK

Replace, rework or adjust as required doors, frames or finish hardware found to be defective as follows:

- A. Items damaged, disfigured, or defaced.
- B. Incomplete, misaligned, or incorrectly located items.

End Of Section 08100

SECTION 08110: STAINLESS STEEL DOORS AND FRAMES

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of stainless steel doors, door frames and window frames.
- B. Related Work Specified Elsewhere:
 - 1. GLASS AND GLAZING Section
 - 2. FINISH HARDWARE Section

1.02 INCORPORATED DOCUMENTS

- A. The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.
- B. Current standards by the following agencies as cited herein:
 - 1. American Standard Test Method International (ASTM).
 - 2. Hollow Metal Manufacturing Association (HMMA).
 - 3. National Association of Architectural Metal Manufacturers (NAAMM).

1.03 SUBMITTALS

Shop Drawings showing door and frame types and details, referenced to the Architect's Drawings, all in accordance with SUBMITTALS Section.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Packing, Shipping, Handling and Unloading: Package assemblies in manufacturer's standard containers.
- B. Store assemblies in manufacturer's standard containers, on end, to prevent damage to faces, corners and edges.

1.05 WARRANTY

- A. Lifetime warranty against mechanical seam separation in door panels.
- B. 5-year warranty against failure due to corrosion from specified environment.
- C. 5-year warranty against failure due to materials and workmanship.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARD

- A. This specification uses the products of Weiland, Inc. to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.
- B. Manufacturer: Weiland, Inc.
Norfolk, NE

2.02 STAINLESS STEEL DOORS

- A. All metal doors shall be full-flush and seamless design, in the dimensions and types shown on the Drawings, and shall be properly reinforced for the finish hardware.
 - 1. Fabricate door faces from 0.050" thick ASTM A 240/A 240M austenitic stainless steel sheet, Type 304.
 - 2. Box construction TIG welded shut on all 4 sides with all welds ground smooth and polished to match.
- B. Internal construction:
 - 1. Door panels to be made void free with 2 lb. per cubic foot polyurethane closed cell foam injected into the box cavity to achieve consistent density edge-to-edge.
- C. Doors shall have vertical edges as required for double-acting operation.
- D. Molding/Frames for Glazed Lites: Stainless steel to match door.
- E. Hardware Reinforcement: Fabricate according to ANSI/NAAMA-HMMA 866 with reinforcing plates from stainless steel.
- F. Performance Level: Level A, ANSI A250.4.
- G. Stainless Steel Finishes:
 - 1. Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Polish Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.

- b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- c. Directional Stain Finish: No. 4.

2.03 STAINLESS STEEL DOOR FRAMES

- A. Description: Fabricate stainless steel frames of construction indicated, with faces of corners mitered and contact edges closed tight.
 - 1. Door Frames: Machine mitered and fully welded.
 - a. Weld frames according to HMMA 820.
 - 2. Door Frames: Fabricate from 0.078" thick stainless steel sheet.
 - 3. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 866 with reinforcing plates from stainless steel.
 - 4. Head Reinforcement: 0.109" thick stainless steel channel or angle stiffener for openings widths more than 48".
- B. Performance Level: Level A, ANSI A250.4.
- C. Materials:
 - 1. Stainless Steel Sheet: ASTM A 240/A 240M austenitic stainless steel, Type 304.
 - 2. Metallic Coated Steel Sheet: ASTM A 653/A 653M Commercial Steel (CS), Type B, with minimum C60 (Z180) or A60 (ZF180) metallic coating.
 - 3. Frame Anchors: Stainless steel sheet same as door face.
 - 4. Inserts, Bolts and Anchor Fasteners: Stainless steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4) for bolts and nuts.
 - 5. Floor Anchors: Not less than 0.079" nominal thickness metallic coated steel.
 - 6. Ceiling Struts: Minimum 3/8" thick by 2" wide from metallic coated steel.
 - 7. Plaster Guards: Not less than 0.022" thickness metallic coated steel.

2.04 STAINLESS STEEL WINDOW FRAMES

- A. Fixed windows shall be constructed of 16 ga., 304-4 finish stainless steel. The frames shall be in two parts, a "front" and a "back". Both sides shall be sloped. The glazing shall be set back from the wall 1-1/2" on the front side. The slope on the front side shall be 45 degrees. The slope on the back side shall vary depending on wall thickness and glazing thickness but no more than 60 degrees and no less than 39 degrees. There shall be no ledge along the walls for liquids or dust to settle.

2.05 FABRICATION

- A. Stainless Steel Door Fabrication: Stainless steel doors to be rigid and free of defects, warp and buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal.
 - 1. Seamless Edge Construction: Door face sheets joined at vertical edges by continuous weld extending full height of door, with edges ground and polished providing smooth, flush surfaces with no visible seams and no visible welds during normal operation.
 - 2. Doors must be welded closed with no seams for water penetration on all four sides.
 - 3. Stops and Moldings: Factory punch or cut openings in doors. Provide stops and moldings around glazed lites. Single flush stops and moldings to be fully welded with no seams. Moldings for lites requiring insulated glass to have hairline miters at each corner of the molding sealed from the back with siliconized polyurethane sealant.
 - a. Glazed Lites: Provide fixed stops and moldings welded on secure side of door.
 - b. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
 - 4. Hardware Preparation: Factory prepare stainless steel doors to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling and tapping according to the Door Hardware Schedule as specified in FINISH HARDWARE Section.
 - a. Reinforce doors to receive non-templated mortised and surface-mounted door hardware.
 - 5. Hardware Installation: All hardware to be curated and installed according to manufacturer's preference to ensure door system is a durable, corrosion resistant, hygienic and sustainable as possible.

6. Locate hardware according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames".
 7. Tolerances: Fabricate doors to tolerances indicated in ANSI/NAAMM-HMMA 866.
- B. Stainless Steel Frame Fabrication: Fabricate stainless steel frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
1. Weld flush face joints continuously; grind, fill, dress and make smooth, flush and invisible. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated from same thickness metal as frames.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Anchors: Weld anchors to jambs and mullions with at least four spot-welds per anchor.

PART 3: EXECUTION

3.01 INSTALLATION

Frames shall be set accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. The bottom of frames shall be anchored securely with expansion bolts or with power driven fasteners. Wall anchors shall be built-in or secured to adjoining construction as indicated or required.

3.02 ADJUST AND CLEAN

Make final adjustments eliminating all hinge-bound conditions and make all door and hardware items smoothly operating.

3.03 DEFECTIVE WORK

Replace, rework or adjust as required frames found to be defective as follows:

- A. Items damaged, disfigured, or defaced.
- B. Incomplete, misaligned, or incorrectly located items.

End Of Section 08110

SECTION 08220: PLASTIC LAMINATE FACED DOORS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of plastic laminate faced wood doors of types noted and vision panel frames and louvers where indicated.
- B. Related Work Specified Elsewhere:
 - 1. FINISH CARPENTRY AND MILLWORK Section
 - 2. FINISH HARDWARE Section
 - 3. METAL DOORS AND FRAMES Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01000, the published specifications, standards and methods of the trade cited below shall apply to the work of this Section.

- A. Window and Door Manufacturers Association's "Architectural Wood Flush Doors" (WDMA No. I.S.1-A).
- B. National Fire Protection Association's "Standard for Fire Doors and Fire Windows" (NFPA No. 80)
- C. National Fire Protection Association's "Fire Tests of Door Assemblies" (NFPA No. 252)
- D. Underwriters Laboratories "Standard for Positive Pressure Fire Tests of Door Assemblies" (UL 10 C).

1.03 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors".
- C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed as labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for 20-minute doors.

1.04 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Manufacturer's literature describing products
- B. Shop Drawings: Show door types, details and locations; reference to the Architect's door mark and hardware group.
- C. Samples:
 - 1. Architect will specify plastic laminate color/pattern that shall be used to match other plastic laminate on the Project.
 - a. Architect may specify up to (2) different color/pattern selections.
 - 2. Door manufacturer shall provide 8" x 10" sample for each type, color, pattern and surface finish selected.

1.05 GUARANTEE

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within the life of original installation for interior doors.
 - 1. Failures include, but are not limited to, the following:
 - a. Warp or twist in excess of 1/4" in any face including full diagonal.
 - b. Telegraphing of core construction and delaminating of face.
 - c. Other defects rendering the door unserviceable for use.
- B. Replacement shall include finishing of new door, hardware damaged by malfunction or original door, and hanging in satisfactory operating condition, as well as repair of damage to adjacent surfaces.

PART 2: PRODUCTS

2.01 MATERIALS

- A. General Requirements:
 - 1. WDMA I.S.1-A Aesthetic Grade: Custom.
 - 2. Security: Comply with ASTM F476-84

3. Fire Rated Doors: Provide construction core as needed to provide fire ratings indicated.
 4. Interior Environment: Fabricate doors with adhesives and composite wood products that do not contain added urea formaldehyde.
- B. Core Construction: Exterior grade, treated composite panels for non-structural applications.
 - C. Faces: Plastic Laminate - Subject to compliance with requirements. Manufacturers offering high pressure decorative laminates include, but are not limited to, the following:
 1. Formica.
 2. Wilsonart.
 3. Approved equal.
 - D. Vertical Edges: Match face laminate.
 - E. Horizontal Edges: Match face laminate.
 - F. Frames: Refer to Door Schedule for types required.
 - G. Metal Louvers: Door manufacturer's standard metal louver unless otherwise indicated.
 1. Blade Type: Vision proof inverted V or inverted Y.
 2. Metal and Finish: Stainless steel with satin finish.
 - H. Metal Frames for Light Openings: Stainless steel with satin finish.
 - I. Glazing for Light Openings: Per Door Schedule

2.02 MANUFACTURER

- A. Preparation: Verify size, design and fire-resistive rating required for each opening.
- B. Manufacture plastic laminate faced wood doors in accordance with WDMA I.S.1-A.
- C. Bonding:
 1. Core Assembly: Type II (water-resistant) glue.
 2. Face Assembly: All veneer plies shall be glued to core with Type II (water-resistant) for interior use.
- D. Manufacturer fire rated doors in compliance with NFPA 80.

- E. Undercut interior doors 1/2 inch from bottom of door to finish floor covering, unless specifically noted, prohibited by local governing code, or scheduled otherwise.
- F. Provisions for Hardware:
 - 1. Factory pre-fit and machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, ANSI/DHI A115-W series standards, and hardware templates.
 - 2. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 3. Bevel both stile edges 1/8 inch in two inches.
 - 4. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in FINISH HARDWARE Section. Wire nuts are not acceptable.

PART 3: EXECUTION

3.01 INSPECTION

Examine receiving frames and reviewed hardware schedules to verify proper coordination with doors.

3.02 INSTALLATION

- A. Install doors at correct openings; assure smooth swing and proper closure with frame.
- B. Fire-Resistive Doors: Install in accordance with NFPA No. 80.
- C. Hardware: Installation of finish hardware for wood doors is specified in FINISH CARPENTRY AND MILLWORK Section.
- D. Where installation requires on-site cutting, reseal surfaces cut, and re-veneer as required to match original material and finish.

3.03 DEFECTIVE WORK

Replace, rework or otherwise make good as required, doors, finish or hardware found defective as follows:

- A. Items broken, damaged, disfigured or defaced.
- B. Incomplete, misaligned or incorrectly located items.

End Of Section 08220

SECTION 08305: ACCESS DOORS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of all access doors in walls and ceilings as specified herein, located where shown on the drawings and required by governing codes. Carefully examine all drawings, including Plumbing, Mechanical and Electrical for location of all access doors.
- B. Related Work Specified Elsewhere:
 - 1. Provisions of Access Doors in ductwork in HEATING, VENTILATING, AND AIR CONDITIONING Section.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

The Codes and Standards listed in Section 01000, the published specifications, standards and methods of the trade shall apply to work of this Section.

1.03 SUBMITTALS

Before any access doors are delivered to the job site, submit catalog cuts to the Architect in accordance with the provisions of SUBMITTALS Section of these Specifications, indicating types and manufacturer's recommended installation details.

PART 2: PRODUCTS

2.01 ACCESS DOORS

- A. General:
 - 1. All access doors shall be the product of the same manufacturer as specified below, or an equal approved by the Architect.
 - 2. All access doors shall be steel frame and panel of the gauge standard for the specified manufacturer. Hinges and attachments shall be manufacturer's standard. Provide standard screwdriver operated cam locks. Key operated cylinder locks shall be provided when specifically indicated in the specification or on the Drawings.
 - 3. Finish for all access doors shall be as follows:

- a. Access doors in walls that are exposed to view shall be stainless steel.
 - b. Access doors in ceilings or in walls concealed from view shall be a chemically bonded prime coat of baked enamel prepared for job finish by PAINTING Section. Prime coat at access doors shall be white.
- B. Access Door Types: Access doors shall be Inryco-Milcor, or approved equal, in the sizes indicated on the Drawings or required for the work and of the styles indicated below:
1. Style M-Frame: Flush access door for installation in drywall or masonry.

PART 3: EXECUTION

3.01 COORDINATION

Coordinate with all other trades as required to ensure proper and adequate provision of framing and wall covering for the installation of access doors in the locations required.

3.02 INSTALLATION

Install all access doors where indicated on the Drawings or elsewhere required, anchoring all components firmly in place in accordance with the manufacturer's recommendations and governing codes.

3.03 INSPECTION AND ADJUSTMENT

Upon completion of the installation, and as a condition of its acceptance, visually inspect the entire work of this Section, adjust all components for proper operation and straight alignment, remove protective cover and clean entire installation.

End Of Section 08305

SECTION 08331: OVERHEAD COILING DOORS

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Furnish and install all overhead coiling doors as scheduled and detailed in the Drawings and as specified herein.
- B. Related Work Specified Elsewhere:
 - 1. REINFORCED UNIT MASONRY Section
 - 2. METAL FABRICATIONS Section
 - 3. Provisions of ELECTRICAL Division

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

1.03 QUALITY ASSURANCE

Products used in the work of this section shall be produced by a manufacturer regularly engaged in the fabrication of similar products with a history of successful production acceptable to the Architect.

1.04 GUARANTEE

All doors specified under this Section shall be guaranteed against defective materials and workmanship for a period of two years.

1.05 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Product Data
- B. Shop Drawings: Submit complete Shop Drawings and materials list showing all details of the fabrication and installation.
- C. Control Sequence: Submit controls diagram showing required integration with Owner's access control system.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's instructions.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARD

- A. This specification uses the products of Cornell Cookson to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.

- B. Manufacturer: Cornell Cookson
Goodyear, AZ

2.02 OVERHEAD COILING DOORS

- A. Sectional aluminum overhead coiling door.
- B. Standard duty with normal use of up to 20 cycles per day.
- C. Customized Product: Controller modified to integrate with Owner's access control system.
- D. Basis of Design: Cornell Cookson #ESD10.

2.03 MATERIALS

- A. Curtain:
 - 1. Configuration: Standard.
 - 2. Slats: No. 5F, minimum 0.050" aluminum.
 - 3. Finish: Clear anodized.
- B. Endlocks: Alternate slats each secured with two 1/4" rivets. Fabricate interlocking sections with high strength nylon. Provide windlocks as required.
- C. Bottom Bar:
 - 1. Configuration: Extruded aluminum alloy 6063-T5, minimum height 3/8"; minimum base thickness 3/16"; minimum width 4".
 - 2. Finish: Clear anodized.
- D. Guides:

1. Fabrication: Minimum 3/16" aluminum angles. Provide windlock bars of same material when windlocks are required. 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.
 2. Configuration: Standard.
 3. Finish: Clear anodized.
- E. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03" per foot of width.
 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for balance of door to ensure that maximum effort to operate will not exceed 25 pounds. Provide wheel for applying and adjusting spring torque.
- F. Brackets: Fabricate from minimum 3/16" steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
1. Finish: Zirconium treatment followed by a corrosion inhibitive baked-on zinc enriched polyester powder coat; minimum 2.5 mils cured film thickness.
- G. Hood: Minimum 0.040" aluminum with reinforced top and bottom edges. Provide minimum 1/4" steel intermediate support brackets.
1. Finish: Clear anodized.
- H. Weatherstripping:
1. Bottom Bar: Sensing/weather edge within neoprene astragal extending full width of door bottom.
 2. Guides: Vinyl strip sealing against fascia side of curtain.
 3. Hood: Neoprene/rayon baffle to impede air flow above coil.
 4. Lintel Seal: Nylon brush seal fitted at door header to impede air flow.

2.04 OPERATION

- A. Motor: The operator must not extend above or below the door coil when mounted front-of-coil. Rated for a maximum of 20 cycles per hour, to comply with UL Standards. Totally enclosed non-ventilated gear head operator rated 1/2 h.p. as recommended by door manufacturer for size and type door, 208 volts, 3 phase (to be verified by contractor prior to ordering). Provide complete with electric motor and factory pre-wired control terminals, maintenance free solenoid actuate brake, emergency

manual chain hoist, and control stations. Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device. Primary speed reduction shall be heavy-duty, lubricated gears with mechanical braking to hold the door in any position. Operator shall be equipped with an emergency manual chain hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual chain hoist. Operator drive and door driven sprockets shall be provided with #50 roller chain. Provide an integral Motor Mounted Interlock system to prevent damage to door and operator when mechanical locking devices are engaged. Operator shall be capable of driving the door at a speed up to 9" per second or as recommended for door size. Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The electrical contractor shall mount the control stations and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

B. Control Stations

1. Exterior:
 - a. Flush Mounted: "Open/Close" badge reader provided as part of building access control system.
2. Interior:
 - a. Surface Mounted: "Open/Close/Stop" push buttons with keyed lock-out; NEMA 4.

C. Control Operation

1. Exterior: Badge reader shall automatically start operator and open/close the door.
 - a. Provide extra limit switch at open and close with wire leads for badge reader.
 - b. Badge reader shall be fully connected to building's access control network.
2. Interior: Surface mounted station shall control open/close/stop.

- D. Electric Sensing/Weather Edge: Automatic sensing switch within neoprene or rubber astragal extending full width of door bottom. Contact before door fully closes shall cause door to immediately stop downward travel and automatically reverse direction to the fully opened position. Provide a wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge and motor operator.

2.05 ACCESSORIES

- A. Locking: Masterkeyable cylinder operable from both sides of bottom bar. Provide interlock switch.

1. Schlage cylinder as part of FINISH HARDWARE Section.
- B. Operator and Bracket Mechanism Cover: Minimum 0.040 aluminum sheet metal cover to enclose exposed moving operating components at coil area of unit. Finish to match hood.

PART 3: EXECUTION

3.01 INSTALLATION

Doors shall be installed by an authorized dealer of the manufacturer. Doors shall be set accurately in position, plumbed, aligned, and braced securely. Install doors at correct openings and insure smooth operation.

3.02 ADJUST AND CLEAN

Make final adjustments eliminating all binding conditions and make the door operate smoothly.

3.03 DEFECTIVE WORK

Replace, rework or adjust as required, electric operator, gears or any other part of the door found to be defective as follows:

- A. Items damaged, disfigured, or defaced.
- B. Incomplete, misaligned or incorrectly located items.

End Of Section 08331

SECTION 08400: STOREFRONT SYSTEM

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of aluminum storefront systems and sliding mall fronts as indicated on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. GLASS & GLAZING Section
 - 2. FINISH HARDWARE Section
 - 3. SEALANTS AND CAULKING Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01000, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. Aluminum Association Standards (AA).

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Shop Drawings: Submit complete Shop Drawings and materials list showing all details of the fabrication and installation, including proper and adequate provision for installation of the specified glass, and completely describing all hardware with catalog data sheets.
- B. Samples: Submit a sample of the entrance and storefront system materials illustrating the actual finish.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARD

- A. This specification uses the products of Kawneer Company, Inc. to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be

substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.

- B. All products shall be from the same manufacturer.

2.02 ENTRANCE AND STOREFRONT SYSTEMS

- A. Exterior Framing System: Center glazing provisions for glazing as scheduled on the Drawings. Frame dimensions of 2" x 4 ½" with minimum .070" wall thickness in main frames. Ultra thermal performance with dual breaks.
 - a. Kawneer TriFab 451UT, or equal product of other manufacturer approved by the architect.
- B. Interior Framing System: Center glazing provisions for glazing as scheduled on the Drawings. Frame dimensions of 2" x 4 ½" with minimum .070" wall thickness in main frames.
 - a. Kawneer TriFab 451, or equal product of other manufacturer approved by the architect.
- C. Aluminum Exterior Entrance Doors: 5" vertical stiles and top rail and 10" high bottom rail. 1-3/4" deep. Center glazing provisions for glazing as scheduled on the Drawings.
 - a. Kawneer 500 Standard Entrance, or equal product of other manufacturer approved by the Architect.
- D. Aluminum Interior Entrance Doors: Stile width per Door Schedule. Center glazing provisions for glazing as scheduled on the Drawings. Bottom rail shall be 10" high. 1¾" thick.
 - a. Kawneer 190/350/500 Standard Entrance, or equal product of other manufacturer approved by the Architect.
- E. Materials: All storefront systems shall be aluminum extruded from 6063-T5 alloy for frames and moldings.
 - 1. All exposed surfaces shall be #14 Clear Anodized finish, Architectural Class 1 (0.7 mils minimum) per AA-M10C21A41.
- F. Components: All storefront construction shall be complete with all anchors, fittings, trim pieces, weather stripping, and perimeter caulking with compatible colored silicone sealants.
- G. Hardware: All hardware shall be in finish to match storefront framing.
 - 1. Aluminum Entrance Doors:
 - a. Pull: ADA compliant, Kawneer CO-12.

- b. Push: ADA compliant, Kawneer CP-11.
- c. Cylinders: Specified in FINISH HARDWARE Section and provided within that Section when scheduled.
- d. Electronic Locksets: Schlage ND Series – Grade 1 – Electrified. Tubular Lever Trim. 6-pin E Series.
- d. Pivots: Top, bottom and intermediate offset pivots. Electrified where required for access control.
- e. Door Closers: Concealed overhead, single acting closer, LCN 2030, or equal. Hold open provisions when indicated on Drawings.
- f. Threshold: Extruded aluminum to match, one piece per door opening, with ribbed surface and maximum ½" rise.
- g. Exit Device: Rim type, bar style. Von Duprin 99 Series, or equal, with 252L Lockable Lever Trim.
- h. Electronic Exit Device: Low voltage type to integrate with automatic door operation. Complete with power supply/controller. Von Duprin 99 Series, or equal, per details on Drawings, with 252L Lockable Lever Trim.
- i. Power Operator: Low voltage type with adjustable time delay, obstruction sensing. Horton Automatics Series 7100, or equal.
- j. Power Operator Actuators:
 - aa. Wall Mounted: 4" x 4" surface mounted, made from high-density polyethylene. Provide all required mounting accessories. ADA compliant. Wikk Industries #S-4x4, or equal product from other manufacturer approved by the Architect.
 - bb. Bollard Mounted: 4" x 4" concealed surface mounted, made from high-density polyethylene. Mount on 6" diameter type 304 stainless steel bollard with a No. 4 finish and with a sloped top. Wikk Industries #S-4x4 with #B-6RD-AT-32D-SM-RD4 bollard, or equal products from other manufacturer approved by the Architect.
- k. Power Transfer: UL rated, concealed in frame. Von Duprin EPT, or equal.
- l. Electric Strike: To provide remote door control where indicated. Adams Rite, or equal.

- m. Weatherstripping: Thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing, Kawneer Sealair, or equal.
- n. Sill Sweep: EPDM blade gasket sweep strip in an aluminum extrusion to match applied to the interior exposed surface at the bottom rail with concealed fasteners.

2.03 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of entrance and storefront system, shall be new, first quality of their respective kinds, and subject to approval of the Architect.

2.04 FABRICATION

- A. General: Shop pre-fabricate, according to the approved shop drawings, all components shown, noted or required for a complete and operable system.
- B. Storefront Frames:
 - 1. The framing system shall provide for flush glazing on all sides with no projecting stops. Entrance framing members shall be compatible with glass framing in appearance.
 - 2. All screws, nuts, bolts, rivets and other fastening devices shall be of aluminum, stainless steel or other non-corrosive materials with Phillip's recessed head for those fastenings that are exposed.
 - 3. All elements of framing sections required to complete the storefront system shown shall be provided.

PART 3: EXECUTION

3.01 INSTALLATION

- A. General: Installation shall be performed in accordance with the manufacturer's recommendations, except as modified by architectural details and approved shop drawings. Storefront shall be installed in prepared openings, shall be set plumb, square, level, and at their proper elevation and plane and shall be located in proper alignment with all work. All joints between aluminum sections and adjacent construction shall be caulked with colored Silicone sealant to provide watertight installation. Sealant selected shall blend with and be inconspicuous in relation to the storefront material.
- B. Anchoring: Firmly anchor all members, using all anchoring devices required to ensure positive attachment of the members for long life under hard use. All metal shall be screwed to backing, or to plugs and masonry, or to anchor straps according to job conditions.
- C. Protection:

1. Wherever aluminum is in contact with steel, concrete, or other material potentially creative of electrolytic action, provide all required permanent isolation of the aluminum by backpainting with first quality bituminous paint or by such other isolation.
2. Protect all finished surfaces as necessary to prevent damage during progress of the work.
3. Seal all perimeter connection points with other materials with a continuous uniform bead of colored silicone.

3.03 CLEANING UP

- A. Aluminum shall be thoroughly cleaned with plain water or petroleum products such as white gasoline, kerosene or distillate. No abrasive agents shall be used.
- B. Immediately prior to acceptance of the work, remove all protective materials from the entrance and storefront system and clean all exposed members.

End Of Section 08400

SECTION 08625: TUBULAR DAYLIGHTING DEVICES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Work Included in This Section: Furnishing and installing all tubular daylighting devices, consisting of roof dome, reflective tube, and diffuser assembly; configuration as shown on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. PVC ROOFING SYSTEM Section
 - 2. FLASHING AND SHEET METAL Section

1.03 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
- C. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002.
- D. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.
- E. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- F. ASTM E 1996 - Standard Specification for Performance of Exterior Windows,

Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricane

G. ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

1.04 SUBMITTALS

Before any tubular daylighting devices are delivered to the job site, submit shop drawings and manufacturer's information to the Architect in accordance with the provisions of the SUBMITTALS Section of these Specifications, showing all details of installation and assembly and all requirements for work by other trades.

1.05 QUALITY ASSURANCE

Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 15 years.

1.06 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:

1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
3. Uniform Load Test: No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf or Negative Load of 70 psf.
4. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 PROJECT CONDITIONS

Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

- A. Daylighting Device: Manufacturer's standard warranty for 10 years.
- B. Electrical Parts: Manufacturer's standard warranty for 5 years, unless otherwise indicated.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARDS

- A. This specification uses the products of Solatube, Vista, CA, to establish a minimum standard for equipment performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the
- B. Architect in the prescribed manner and approval obtained.

2.02 TUBULAR DAYLIGHTING DEVICE – LOWER ROOF

- A. General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
 - 1. Solatube "SolaMaster" per model number listed on the Drawings, or equal product of other approved manufacturer.
- B. Daylighting System:
 - 1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
 - 2. Glazing: Type DA, 0.143 inch minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
 - 3. LightTracker Reflector, made of aluminum sheet, thickness 0.015 inch with Spectralight Infinity. Positioned in the dome to capture low angle sunlight.
 - 4. Roof Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A 792/A792 M, 0.028 inch plus or minus .006 inch thick.
 - 5. Base Style: Type FC, Curb cap to cover curb by others.
 - 6. Tube Ring: Attached to top of base section; 0.090 inch nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel

condensed moisture out of tubing.

7. Dome Seal: Adhesive backed weatherstrip 0.63 inch tall by 0.28 inch.
8. Reflective Tubes: Aluminum sheet, thickness 0.018 inch, 21" diameter.
 - a. Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 80.2 percent.
 - b. Color: a^* and b^* (defined by CIE $L^*a^*b^*$ color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
9. Extension Tube and Angle Adapters: As required by conditions.
10. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 330 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube 23.8 inches by 23.8 inches square frame to fit standard suspended ceiling grids or hard ceilings. Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch thick.
11. Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame and EPDM foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283. Visible Light Transmission shall be greater than 90 percent at 0.022 inch thick. Classified as CC2.
12. Accessories:
 - a. Security Bars: Type B Security Bars 0.375 inch stainless steel bar across flashing diameter opening.
 - b. Security Kit: Type SK Dome Security Kit, rivets with nylon spacers to replace dome screws.
 - c. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
 - d. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
 - e. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
 - f. Sealant: Polyurethane or copolymer based elastomeric

sealant as provided or recommended by manufacturer.

2.02 TUBULAR DAYLIGHTING DEVICE – UPPER ROOF

A. General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.

1. Solatube “SkyVault” per model number listed on the Drawings, or equal product of other approved manufacturer.

B. Daylighting System:

1. Capture Zone: Daylight Collector (Type C) with key components consisting of:

- a. Collector Dome: Polycarbonate 0.125 inch minimum thickness classified as CC1 material; UV inhibiting; (100 percent UVC, 100 percent UVB and 98.8 percent of the range of UVA transmission).
- b. Collector Cylinder: Polycarbonate 0.093 inch minimum thickness, classified as CC1 material; UV inhibiting, blocks all radiation <380nm: 100 percent UVC, 100 percent UVB and 76 percent of the range of UVA transmission).
- e. Base Cone Assembly: Conical shaped support connecting the daylight collection system to the curb-cap of associated TDD unit. Fabricated of corrosion resistant stainless steel (302/304), conforming to ASTM A 463/A 463M, with a thickness of 0.034 inch.
- f. Upper seal (M74 DS Type C): Outer Dome, Cylinder Dome, and Back Panel interface. Adhesive backed PU foam “D” profile with water resistant polymeric skin.
- g. Lower seal (M74 DS Type C): Outer Dome and Support Cone interface. Adhesive backed 45 degree angle pile weather-strip.

2. Domes:

- a. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
- b. Dual Dome Glazing: Type DPP.
 - 1) Outer Dome Glazing: 0.125 inch (3.2 mm) minimum thickness, vacuum formed polycarbonate classified as CC1 material; UV inhibiting; (100 percent UVC,

100 percent UVB and 98.8 percent of the range of UVA transmission).

- 2) Inner Dome Glazing: 0.040 inch (1 mm) minimum thickness, copolyester (PETG) polyethylene terephthalate with glycol classified as CC2 material.
3. Dome Options:
 - a. Security Guard: Type SG, welded powder coated steel or stainless steel rods 1/8 inch diameter mounted with an 8 inch maximum cross section. Assembly fastened with 1/8 inch diameter blind rivets in 6 locations to Curb-Cap assembly.
 - b. Security Kit: Type SK Dome Security Kit, rivets with nylon spacers to replace dome screws
4. Flashings:
 - a. Curb Cap Flashing Base: Type FC one piece, seamless, leak-proof flashing and base support for dome and top of tube and cap flashing.
5. Transfer Zone:
 - a. Extension Tubes: Aluminum sheet, thickness 0.018 inch conforming to ASTM B 209 with Tab-Lock tube joint structural connection system.
 1. Reflective Tubes:
 - (a) Reflective 24 inch extension tube, Type EXX with total length of run determined by installer.
6. Delivery Zone
 - a. Amplifier Assembly for Tubes Not Penetrating Ceilings (Open Ceiling): Type A, 36 inch diameter amplifier diffuser assembly attached directly to bottom of tube.

PART 3: EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

End Of Section 08625

SECTION 08710: FINISH HARDWARE

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of finish hardware scheduled and required for this Work including all hardware not described but required for a complete and operable facility.
- B. Related Work Specified Elsewhere:
 - 1. METAL DOOR AND FRAMES Section
 - 2. FINISH CARPENTRY AND MILLWORK Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of Sections 0 and 1 of these Bid documents apply to this Section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01000, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. American Society of Hardware Consultants (AHC)

1.03 QUALITY ASSURANCE

- A. Qualifications of Hardware Supplier: The finish hardware supplier shall be a firm or individual regularly engaged in the business of supplying finish hardware items of the quality specified and in the quantities required for this project.
- B. Requirements of Regulatory Agencies: Hardware for openings with fire resistive ratings and panic devices shall be listed by Underwriters Laboratory (UL).

1.04 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section of these Specifications.

- A. Hardware Schedule: Prior to obtaining or purchasing any finish hardware, submit a complete list of all items proposed to be furnished for this Work including the following:
 - 1. Manufacturer's name and catalog cuts for each item.

2. Separate heading for each opening listing Architect's door number and hardware type with all hardware items for such opening.
 3. All locks shall be listed by number and generic function ("Office Lock", "Closet Lock", etc.)
- B. Samples: Only as requested by the Architect.

PART 2: PRODUCTS

2.01 GENERAL

- A. Responsibility: Hardware listings on the Door Schedule are provided only to establish the basic scope and intent for each door. It shall be the responsibility of the hardware supplier to examine the use of each opening and furnish all hardware required for a complete and fully operable system that will meet safety and fire regulations and all applicable codes.
- B. Fastenings: Furnish all finish hardware with all necessary screws, bolts and other fasteners of suitable size and type to anchor in position for long life under hard use. Fastenings shall be as recommended by the hardware manufacturer and shall match the hardware finish.
- C. Packing and Marking: Package each item of hardware and each lockset separately in individual containers, complete with necessary screws, keys, instructions and installation template for spotting mortising tools. Identify each container as to location.
- D. Keying:
1. All locks shall be delivered with provisions for temporary construction keying.
 2. Final Keying: Owner will issue detailed keying instructions for all locks. Furnish two keys for each lock plus six master keys for each master key set.
 3. Delivery of Permanent Keys: Permanent keys for all locks shall be separately tagged for each Hardware Heading in Hardware Schedule. Master keys shall be tagged for each master key group. All permanent keys shall be delivered to the Owner.

2.02 HINGES

Hinges at exterior doors shall have non-removable pins (NRP).

- A. Specification Standard: Hager BB1279 4-1/2 x 4-1/2

- B. Acceptable Manufacturers: McKinney, Stanley, or equal.
Provide 3 hinges on doors 7'-0" and shorter; 4 hinges on doors taller than 7'-0".

2.03 LOCKSETS & LATCHSETS

- A. Specification Standard: Schlage ND Series – Tubular Lever Trim – 6 Pin E
- B. Acceptable Manufacturers: Falcon, or equal.

2.04 DEADBOLT LOCKS

- A. Specification Standard: Schlage B Series
- B. Acceptable Manufacturers: Falcon, or equal.

2.05 CLOSERS

See Article 3.02 for required adjustment.

- A. Specification Standard: Norton 7500
- B. Acceptable Manufacturers: LCN, Sargent, or equal

2.06 EXIT DEVICES

- A. Specification Standard: Von Duprin 99 Series - Tubular Lever Trim
- B. Acceptable Manufacturer: Yale, or equal

2.07 ALARM EXIT DEVICES

- A. Specification Standard: Von Duprin to match 2.08
- B. Acceptable Manufacturer: Yale, or equal

2.08 PUSH & PULL

- A. Specification Standard: BBW/Trimco 1001-2 & 1195-2
- B. Acceptable Manufacturers: Quality, Baldwin, or equal.

2.09 STOPS AND HOLDERS

- A. Specification Standard: BBW/Trimco 1270WX & W1210
- B. Acceptable Manufacturers: Quality, or equal.

2.10 FLUSH BOLTS

- A. Specification Standard: BBW/Trimco 590
- B. Acceptable Manufacturers: Quality, Glynn-Johnson, or equal

2.11 KICK PLATES

- A. Specification Standard: BBW/Trimco 10" x 34"
- B. Acceptable Manufacturers: Quality or equal

2.12 THRESHOLDS

Maximum ½" rise.

- A. Specification Standard: Pemko 271A
- B. Acceptable Manufacturers: Zero, National or McKinney

2.13 WEATHERSTRIP

- A. Specification Standard: Pemco 306AV
- B. Acceptable Manufacturers: Reese, McKinney, Zero, or National.

2.14 SMOKE SEALS

- A. Specification Standard: Pemco S88
- B. Acceptable Manufacturers: Reese, McKinney, Zero, or National.

2.15 DOOR BOTTOM

- A. Specification Standard: Pemco 315CN
- B. Acceptable Manufacturers: Reese, McKinney, Zero, or National.

2.16 ASTRAGAL

- A. Specification Standard: Pemco 357SP
- B. Acceptable Manufacturers: Reese, McKinney, Zero, or National.

2.17 CYLINDER

- A. Specification Standard: Schlage 20-001
- B. Acceptable Manufacturers: Falcon, or equal.

2.18 POCKET DOOR HARDWARE

- A. Specification Standard: Stanley
- B. Acceptable Manufacturers: Johnson, Grant, or equal.

2.19 SILENCERS

Provide silencers as follows for all openings where door or frame is of steel and seals do not occur.

- A. Pairs of doors: Furnish 6
- B. Single doors: Furnish 3

2.20 ACCESS CONTROL HARDWARE

Where indicated on the Door Schedule. Coordinate with Access Control details on the Drawings. Coordinate with low voltage contractor. Listed items are considered to be County Standard.

- A. At exit devices:
 - 1. Exit Device Von Duprin QEL-RX-35A-A-NL-OP
Tubular Lever Trim
 - 2. Power Hinge Von Duprin EPT2

- | | | |
|----|-------------------------|-----------------------------|
| 3. | Power Supply | Von Duprin PS902 |
| 4. | Request To Exit | Bosch DS 150-1 |
| 5. | Contact Sensor | Interlogix 1078-N |
| 6. | Card Reader | Identive 8110ABP or 8010ABP |
| 7. | Controller Power Supply | Altronix AL600ULPD8 |
| 8. | Door Controller | Provided by Owner |
- B. At locksets:
- | | | |
|----|-------------------------|---|
| 1. | Lockset | Schlage ND - Electrical
Tubular Lever Trim – 6 Pin E |
| 2. | Power Hinge | Ives 5BB1 – 4.5 x 4.5 |
| 3. | Power Supply | Von Duprin PS902 |
| 4. | Request To Exit | Bosch DS 150-1 |
| 5. | Contact Sensor | Interlogix 1078-N |
| 6. | Card Reader | Identive 8110ABP or 8010ABP |
| 7. | Controller Power Supply | Altronix AL600ULPD8 |
| 8. | Door Controller | Provided by Owner |

2.21 FINISHES

All hardware finish shall be 26D/626 Satin Chrome, unless otherwise scheduled. Accessory hardware shall match basic hardware finish.

PART 3: EXECUTION

3.01 INSTALLATION

Installation of finish hardware is specified in Section 06200, FINISH CARPENTRY AND MILLWORK, and shall be executed in accordance with the following.

- A. Inspection: Examine areas to receive finish hardware and verify that doors, frames, and other surfaces are undamaged and correct, ready to receive the work of this Section. Do not start installation until all unsatisfactory conditions have been corrected.
- B. Install finish hardware in strict accordance with all pertinent codes, referenced standards, original design, and manufacturer's templates and instructions.
- C. Accurately and properly fit hardware. Securely fasten fixed parts for smooth, trouble-free, nonbinding operation and fit faces of mortised parts snug and flush. Operating parts shall move freely and smoothly without binding, sticking or excessive clearance.
- D. Protect hardware from damage or marring of finish during construction using strippable coatings, removable tapes or other approved means.

3.02 ADJUST AND CLEAN

- A. After the work has been otherwise completed, examine hardware in place for complete and proper installation. Lubricate bearing surfaces of moving parts and adjust latching and holding devices for proper function. Test keys for proper conformance with keying system.
- B. Adjust door closers for speed and power. Closers shall operate at 8 pounds maximum pull on exterior doors and 5 pounds maximum pull on interior doors.
- C. Completely remove protective materials and devices and thoroughly clean exposed surfaces of hardware. Check for surface damage prior to final cleaning for the Owner's acceptance of project.

3.03 HARDWARE SCHEDULE

The matrix for required hardware shown on the Door Schedule shall be considered only an outline of the basic hardware required for each door. The hardware supplier shall prepare a schedule for submission to the Architect for review that shall list all hardware needed. It shall be the responsibility of the hardware supplier to provide hardware as appropriate to comply with all applicable building codes, the projected use of the door, the door schedule and these specifications.

End Of Section 08710

SECTION 08800: GLASS AND GLAZING

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of glass and glazing required for this Work including, but not necessarily limited to, sheet glass, tempered glass, and wire glass.
- B. Related Work Specified Elsewhere:
 - 1. STOREFRONT SYSTEM Section
 - 2. HOLLOW METAL DOORS AND FRAMES Section
 - 3. STAINLESS STEEL DOORS AND FRAMES Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01000, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. National Glass Association, "GANA Glazing Manual", latest edition (NGA).
- B. Consumer Product Safety Commission, "Safety Standard for Architectural Glazing Materials" (16CFR 1201).

1.03 SUBMITTALS

Submittals shall conform to the SUBMITTALS Section of these Specifications and include the following:

- A. Product literature including verification of material certification complying with 16CFR 1201.
- B. Samples of tinted and/or patterned glass.

PART 2: PRODUCTS

2.01 GENERAL

All glazing materials for doors and windows shall be certified as complying with 16CFR 1201, Category I or Category II, and so labeled.

2.02 GLASS

All glass shall bear the label of its manufacturer and shall conform in all respects with the pertinent requirements of the above standards, shall be relatively distortion-free with all distortion waves in the horizontal direction. All glass shall be as indicated on the Drawings.

2.03 GLAZING ACCESSORIES

All glazing accessories shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

PART 3: EXECUTION

3.01 GLAZING

Set all glass in true plane, tight and straight, with proper and adequate clearance, firmly anchored to prevent rattling and looseness, with all edges cleanly cut. Do not nip or seam the edges. Glass shall be installed in accordance with NGA "GANA Glazing Manual" and manufacturer's recommendations.

3.02 CLEANING UP

- A. Upon completion of glazing, thoroughly clean all glass surfaces using only cleaning agents recommended by the manufacturer. Do not use razor blades or other sharp instruments to remove spots or foreign material from tempered safety glass.
- B. Correct all imperfections, replace all damaged glass, and leave all labels on the glass until they have been inspected and approved by the Architect. Remove all labels immediately thereafter.

End Of Section 08800

SECTION 09200 - LATH AND PLASTER

PART 1: GENERAL

1.01 RELATED DOCUMENTS

General Conditions and General requirements are a part of this section and the contract for this work and apply to this section as fully as if repeated here.

1.02 DESCRIPTION OF WORK

- A. Work Included in This Section: The work includes, but is not necessarily limited to, the furnishing and installing of all lathing and plastering work as shown and noted on the drawings and specified herein.
- B. Related Work Specified Elsewhere:
 - 1. ROUGH CARPENTRY Section
 - 2. WEATHER BARRIERS Section
 - 3. STOREFRONT SYSTEM Section

1.03 CODES AND STANDARDS

Lathing materials and their application and plaster materials and their application shall be in accordance with the applicable requirements of the "California Building Code", Latest Edition, and the following American National Standards Institute: C926-23, "Standard Specification for Application of Portland Cement-Based Plaster".

1.04 DELIVERY AND STORAGE OF MATERIALS

Deliver all manufactured materials in their original packages and containers, bearing name of manufacturer and brand. Store plaster, cement, and lime off the ground, under watertight cover, and away from damp surfaces. Remove any damaged or deteriorated materials from the site.

1.05 APPLICATION OF LATH

All backing and blocking and perimeter framing for recessed items shall be in place as required by the other trades. All conduit, piping, and any other required rough-in shall be complete. Commencing of lathing work will imply acceptance by the Contractor of the surfaces to receive lath.

1.06 PROTECTION OF ADJACENT SURFACES

Adjacent surfaces of the building shall be protected from spattering or other staining caused by plastering. Any surfaces so spattered or stained shall be thoroughly cleaned to the satisfaction of the Architect.

1.07 WORKMANSHIP

- A. Intersections of planes shall be sharp and accurate. Plane surfaces shall finish plumb, straight, and true to an 8-foot straight edge. Finished surfaces shall be uniform as to texture and color throughout the area, and shall be free from irregularities.
- B. Where plaster stops, angles, wall panels, etc., are employed for architectural treatment, panels framed by these accessories or other construction shall be finished in one operation. No stopping vertically or horizontally in the middle or intermediate area of a panel will be permitted.
- C. Discoloration, separations, or other defects which occur after curing and drying shall be repaired to the satisfaction of the Architect at no additional cost to the Owner. (Damages caused by vandalism or earthquake will not be regarded as the Contractor's responsibility.)

1.08 SUBMITTALS

Submittals shall conform to the SUBMITTALS Section of these Specifications and include the following:

- A. Samples of finish material showing colors and textures available.
- B. Product literature for all items listed below in paragraph 2.01.

PART 2: PRODUCTS

2.01 MATERIALS

- A. Exterior Lath: Exterior lath for application over both exposed framing and sheathing shall be self-furring, waterproof paper-backed expanded metal lath, 3.4 lb/sq. yd., as manufactured by Unimast, Amico, Cemco, or approved equal.
- B. Lath Tie Wire: #18 gauge galvanized soft steel annealed wire.
- C. Lathing Accessories: Aluminum, in shapes as indicated on the Drawings.
 - 1. Fry Reglet
 - a. Clear anodized finish.
 - 2. Equal products of other manufacturer approved by the Architect.
- D. Nails for Exterior Lath: Galvanized box or roofing nails, long enough to penetrate studs to minimum depth of 1-1/4". All metal shall be galvanized.

- E. Cement: Portland Cement, ASTM C150, Type II, low alkali.
- F. Exterior Finish Coat: Factory mixed, 100% acrylic based coating with an elastomeric binder, with integral color and texture.
 - 1. Dryvit Systems Inc. "Weatherlastic"
 - a. Texture: "Sandpebble Fine".
 - b. Color: As selected by Architect from manufacturer's full range.
 - 2. Equal product of other manufacturer approved by the Architect.
- G. Aggregate: Sand shall be clean and graded, ASTM C144-66T for cement plaster, graded in accordance with ASA Specifications for stucco.
- H. Lime: Special finishing hydrated lime conforming to ASTM C206 ASA Specification K67.12-1960 for cement plaster.
- I. Water: Fresh, clean, potable, and free from impurities detrimental to plaster.

PART 3: EXECUTION

3.01 APPLICATION OVER WOOD FRAMING

- A. Exterior Lath: Apply paper-backed stucco lath directly over weather barrier with nails or approved fasteners hereinbefore specified, as appropriate, spaced not more than 6" apart vertically and 12" apart horizontally, directly over studs and framing members. Nails or fasteners shall engage the back wire of the lath securely and shall be driven home tight into framing. Laps of stucco lath shall be 1" minimum and shall be laced with lath tie wire. Furnish and install strip lath where required for transitions or reinforcing.
- B. Accessories: Install all required plaster grounds, casing beads or stops, base screeds, corner reinforcement, special stops, and other metal accessories. Apply and shim out to required thickness. Set plumb, level and straight, free of kinks and bends. Install casing beads or stops at the edges of all plaster continuously. Provide expansion joints or control joints where shown on Drawings. Do not change expansion joint locations unless approved by the Architect.
- C. Approval of Lath Installation: Upon completion of lathing work, Contractor shall call for an inspection by the Architect of the completed work. No plastering shall be started until the lathed surfaces have been approved by the Architect.
- D. Cement Plaster Ingredients:

1. Scratch and brown coats of cement plaster consist of ingredients proportioned as follows: 1 part Portland cement to not less than 3 parts aggregate, and not more than 10% of lime putty.
 2. The use of detergents or other adulterants will not be permitted. Areas which have been treated with such agents shall be removed and re-plastered at Contractor's expense.
- E. Exterior cement plaster (stucco) shall be applied in three-coat work to a minimum thickness of 3/4", and shall be finished in texture matching the approved sample. The finishing of stucco with rubber floats will not be permitted.
1. Scratch Coat shall be applied to a minimum thickness of 3/8", completely embedding the lath. Scratch coat shall be scratched to provide mechanical key, and left to cure and dry a minimum of 4 days before applying brown coat. Scratch coat shall be kept moist for a minimum period of 48 hours after application.
 2. Brown Coat shall be applied to a minimum thickness of 1/4" in two applications and shall be brought to a true, even plane by rodding and floating, and shall be left rough and ready to receive the finish coat. Scratch coat shall be dampened to provide suction before applying brown coat. Brown coat shall be left to dry a minimum of 10 days. Brown coat shall be kept moist for a minimum period of 48 hours after applications.
 3. Acrylic Finish Coat shall be laid out to permit the completion of entire surface in one operation. Acrylic finish coat shall be applied to a minimum thickness of 1/8", or in such thickness as may be necessary to insure the full thickness of 3/4" or other thickness where shown as required for this work. Brown coat shall be dampened evenly to provide suction before applying finish coat.
- F. Curing of Plaster:
1. Cement plaster and stucco shall be cured for a minimum period of 4 days after completion. Moistening shall begin as soon as the plaster has hardened sufficiently. Water shall be applied in a fine fog spray or other approved method. Soaking of walls shall be avoided.
 2. Apply only as much water as will be readily absorbed. Plaster shall be protected from uneven and excessive evaporation during hot, dry weather, and from strong blasts of wind. Contractor shall provide for curing on Saturdays and Sundays and holidays, if necessary.
 3. Provide temporary heat where required for proper curing of plaster and to protect all work against damage from too rapid

drying or from any other cause. Provide such temporary enclosures as may be necessary to close openings.

3.02 CLEAN-UP

Work area shall be maintained in an orderly condition with good housekeeping conditions prevailing. Upon completion of installation, all debris shall be cleared and removed from the job site.

End Of Section 09200

SECTION 09252: GYPSUM WALLBOARD AND CEMENT BOARD

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provisions of gypsum wallboard and/or cement board for all interior wall and ceiling surfaces and interior texture coating where indicated on the Drawings and elsewhere scheduled.
- B. Related Work Specified Elsewhere:
 - 1. PAINTING Section
 - 2. PRE-FINISHED WALL PANELS Section

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to the Work of this Section.

- A. United States Gypsum's "Drywall Construction Handbook" with Product and Construction Standards (DCH), Latest Edition.
- B. Gypsum Association's Brochure GA216 "Application and Finishing of Gypsum Board".

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include complete list of materials with name of manufacturer.

1.04 JOB CONDITIONS

Control heating and ventilating during finishing operations to ensure uniform temperature in the range of 55 degrees to 70 degrees F. Provide ventilation to remove excess moisture.

PART 2: PRODUCTS

2.01 INTERIOR GYPSUM WALLBOARD PANELS

- A. Fire Rated Panels: Gypsum panels 5/8" thick, fire-resistant approved for rated construction, conforming to the requirement of ASTM C36. Refer to the Drawings for locations. "Gold Bond Fire-Shield" as manufactured by

National Gypsum, or equal product of United States Gypsum, Georgia Pacific, or other manufacturer approved by the Architect.

- B. Moisture-Resistant Panels: Gypsum panels 5/8" thick, moisture-resistant formulation, fire-resistant approved for rated construction, conforming to the requirement of ASTM C36. Refer to the Drawings for locations. "Gold Bond MR Type X" as manufactured by National Gypsum, or equal product of United States Gypsum, Georgia Pacific, or other manufacturer approved by the Architect.

2.02 CEMENT BOARD

5/8" thick cement board to comply with ANSI A118.9 and ASTM C1325.

- A. "Durock" as manufactured by United State Gypsum Co., or equal product of other manufacturer approved by the Architect.

2.03 FURRING CHANNEL

Where indicated on the Drawings, provide and install 25-gauge furring channel, Unimast, or equal product of other manufacturer approved by the Architect.

2.04 JOINT SYSTEM

The joint system, including tape and compounds, shall be a system recommended by the manufacturer of the gypsum panels used as compatible with the gypsum panels.

2.05 FASTENERS

All fasteners shall be specially designed for application of gypsum panels to the studs and shall be the length and pattern recommended by the manufacturer of the gypsum panels used, for the type of studs present, and in accordance with the C.B.C.

2.06 METAL CORNERBEAD, TRIMS, AND ACCESSORIES

- A. Edges of wallboard which abut other surfaces and are visually exposed, edges of wallboard which would be visually exposed, and external angles shall be protected with metal trim.
 - 1. Standard Cornerbead: Where not exposed.
 - a. As recommended by Gypsum Wallboard Manufacturer.
 - 2. Standard Edge Trim: Where not exposed.
 - a. As recommended by Gypsum Wallboard Manufacturer.
 - 2. Decorative Trim: Where exposed. Shape as indicated on the Drawings. Aluminum with clear anodized finish.

- a. Fry Reglet.
- b. Other manufacturer as approved by the Architect.

2.07 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of gypsum wallboard, shall be as selected by the Contractor subject to approval of the Architect.

PART 3: EXECUTION

3.01 INSTALLATION - GYPSUM BOARD AND CEMENT BOARD

- A. General: Install all panels plumb, level, and with all vertical joints on bearing.
- B. Cutting: For cut-outs in panels for pipes, fixtures, and other small openings, make holes and cut-outs by sawing or by such other method as will not fracture the core or tear the covering and with such accuracy that plates, escutcheons, or trim will cover the edges. The use of "core-and-knockout" method will not be permitted.
- C. Fastening:
 1. Properly space all fasteners in careful accordance with the manufacturer's recommendations and Code requirements, with heads driven slightly below the surface for proper cementing but without breaking the paper cover. Fasteners shall start 3" maximum from panel ends and shall be spaced in accordance with C.B.C. unless otherwise indicated on the Drawings.
 2. Loosely butt all joints to be taped; firmly butt all joints to be left untreated.
 3. Stagger all end joints between panels to achieve a maximum of bridging and a minimum of continued joints.

3.02 INSTALLING METAL TRIM

- A. General: The Drawings do not purport to show all metal trim required. The precise locations and types of trim to be used shall be determined by the existing conditions which must be matched.
- B. Installation:
 1. Install all trim in strict accordance with the manufacturer's recommendations, paying particular attention to make all trim

installation plumb, level, and true to line, with firm attachment to supporting members.

3.03 TAPING AND FINISHING

A. First Coat:

1. Spread compound evenly over all joints, using suitable tools designed for the purpose.
2. Fill all joint recesses and metal trim.
3. Center the reinforcing tape on the joint and press into the fresh compound, wiping down with sufficient compound under the tape for proper bond.
4. Feather all edges and leave the surface free from blisters and tape wrinkles.
5. Apply compound to all fastener recesses, leaving flush with the adjacent surfaces.
6. Fold reinforcing tape along its centerline and apply to all interior angles, following the same procedure as for joints.

B. Second Coat:

1. Lightly sand the dry compound with fine sandpaper to remove all irregularities.
2. Apply a second coat of compound to all joints, feathering approximately three inches beyond edges of tape.
3. Apply second coat to all fastener recesses; allow to dry.

C. Third Coat:

1. Lightly sand the dry compound with fine sandpaper to remove all irregularities.
2. Apply final skim coat, feathering out approximately two inches beyond second coat.
3. Third coat all fastener recesses and metal trim, and all interior angles; allow to dry.

3.04 CLEANING UP

Do not allow the accumulation of scraps and debris arising from the Work of this Section, but maintain the premises in a neat and orderly condition at all times; in the event of spilling or splashing of compound onto other surfaces, immediately remove the spilled or splashed material and all trace of the residue to the approval of the Architect.

3.05 SCHEDULE OF FINISHES

The following finishes shall be applied to the drywall surfaces within the scope of this Section. Refer to the Finish Schedule for specific location of each finish.

PFP	Uniformly smooth and ready to receive pre-finished wall panels.
P-* (walls)	Light orange peel texture.
P-* (soffits)	Uniformly smooth and ready to receive paint unless noted to match wall texture.
P-* (ceilings)	Light orange peel texture.
P-* (at Lobby ceiling)	Hand troweled as required to match texture of exterior plaster soffit.

End Of Section 09252

SECTION 09500: ACOUSTICAL CEILING TREATMENT

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of acoustical ceilings required for this Work as scheduled and indicated on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. GYPSUM WALLBOARD AND CEMENT BOARD Section
 - 2. HEATING, VENTILATING AND AIR CONDITIONING Section
 - 3. ELECTRICAL Section

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Complete list of materials with name of manufacturer.
- B. Shop drawings indicating details of all methods of installation, suspension proposed to be used, layout of the grid system, fields and all lateral restraint details.
- C. Samples:
 - 1. Two samples of each type of acoustical material to be installed.
 - 2. Two samples of ceiling grid material when requested by the Architect.

1.04 APPLICABLE STANDARDS

- A. In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.
 - 1. Ceilings and Interior Systems Construction Association (CISCA) latest adopted standards.
 - 2. Comply with the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor

Sources Using Environmental Chambers”, Version 1.2, January 2017 (Emission testing method for California Specifications 01350).

- a. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

1.05 EXTRA MATERIALS

Refer to Section 01935 for quantities of materials to be delivered to the Owner for repair and replacement.

PART 2: PRODUCTS

2.01 GRID SYSTEMS

- A. All grid systems shall be in the pattern indicated on the Drawings and shall be as specified.
- B. All systems shall be complete with all hangers, supporting members, anchors, wall cornices, and adapters for light fixtures and ceiling grilles, plus all accessories of every nature required for a complete installation.
- C. Where so indicated in the Drawings and the “Acoustical Ceiling Schedule”, Paragraph 2.05 of the Section:
 1. All ceiling grids noted to be for conventional panels shall have all exposed surfaces with baked enamel finish, color as indicated.
 2. All ceiling grids noted to be for washable panels shall have an applied aluminum cap with baked enamel finish, color as indicated.
 - a. Grid shall be capable of withstanding cleaning and/or disinfecting chemicals as tested in accordance with ASTM D5402.
- D. Systems Use Rating
 1. Systems for conventional acoustical ceiling panels shall be rated for intermediate-duty.
 2. Systems for cementitious acoustical panels shall be rated for heavy-duty.
- E. Systems shall be fire rated where indicated.

2.02 ACOUSTICAL CEILING PANELS

- A. All acoustical ceiling panels shall be the product of one manufacturer and shall have similar face appearances, acceptable to all governing

authorities for the application scheduled. All acoustical units shall have a flame spread index of 0-25 in accordance with Class I requirements of Federal Specification SS-S-118a, unless otherwise scheduled.

B. Acoustical panels shall be fire rated where indicated.

2.03 WIRE HANGERS

Hangers shall be galvanized, soft-annealed, mild steel wire, 12 gauge minimum.

2.04 OTHER MATERIALS

All other materials, not specifically described but required for a complete and proper installation of suspended acoustical, shall be as selected by the Contractor subject to the approval of the Architect.

2.05 ACOUSTIC CEILING SCHEDULE

Key letters refer to Reflected Ceiling Plan drawing.

B

Panels: 24" x 48" x 1" washable and disinfectant safe panel.
Color: White Edge: Shadowline Tapered
USG #88343 "Mars Healthcare High-NRC", or equal product by Armstrong, or other manufacturer approved by the Architect.

Suspension: 15/16" wide washable exposed grid.
Color: White Edge: Shadowline Tapered
Donn "DNLA24", or equal product of Armstrong, or other manufacturer approved by the Architect.

Matching wall angle.

Matching retention clips

C

Panels: 24" x Full Length x 1" cementitious acoustic panel.
Color: White Edge: Reveal
Tectum "Full-Span Corridor Panels", or equal product by other manufacturer approved by the Architect.

Suspension: 15/16" wide exposed grid. Color : White
Minimum 1-1/2" high main and cross t's.
Donn "DX", or equal product of Armstrong, Chicago Metallic, or other manufacturer approved by the Architect.

Reveal Wall Molding: Donn #MS174 "Shadowline", or approved equal.

D

Panels: 24" x 24" x 7/8" fine texture panel.
Color: White Edge: Shadowline
USG #76524 "Eclipse High-NRC", or equal product by Armstrong, or other manufacturer approved by the Architect.

Suspension: 9/16" wide exposed grid. Color : White
Donn "DXT Centricitee", or equal product of Armstrong, Chicago Metallic, or other manufacturer approved by the Architect.

Reveal Wall Molding: Donn #MS174 "Shadowline", or approved equal.

PART 3: EXECUTION

3.01 INSTALLATION OF GRID

A. General: Ceiling Grid shall be installed in accordance with CBC Standards and manufacturer's directions.

B. Installation:

1. Erect metal grid members to achieve the pattern shown on the Drawings, spacing member symmetrically about the centerline of areas in both directions.
2. Space hanger wires a maximum of four feet on centers along main runners. Attached wires to structure as indicated on Drawings.
3. Install separate hanger wires for light fixtures, in accordance with governing codes and as required by Division 16 of these Specifications.
4. Accurately level all main runners; space main runners a maximum of four feet on centers.
5. Space cross members as required and secure to main runners and wall angles in accordance with the approved Shop Drawings.
6. Securely anchor all wall angle members in place.

C. Lateral Bracing: Provide lateral bracing consisting of at least four 12 gauge wires secured to the main runner within 2 inches of the cross runner intersection. Wires shall be splayed 90 degrees from each other at an angle not exceeding 45 degrees from the plane of the ceiling. Horizontal restraint points shall be placed within 4 feet of the surrounding wall and

not over 12 feet on center. Secure lateral bracing to structure. Install in accordance with CBC Standards.

- D. Soffits: Where indicated, shall be constructed as detailed and in accordance with manufacturer's instructions. Provide additional hang wires, wall angles and corner reinforcing as required.

3.02 INSTALLATION OF SUSPENDED ACOUSTICAL CEILING PANELS

- A. Install all acoustical ceiling tile systems so that linearity of facing is in one direction only, or as directed by the Architect.
- B. Acoustical lay-in units shall be installed to rest tightly on grid flanges and shall be secured on 4 sides by hold-down clips, where specified. Vertical acoustical panels at suspended soffits shall be secured with two hold down clips at each grid member.

3.03 ADJUST AND CLEAN

Completely remove all fingerprints and traces of soil from the surfaces of grid and acoustical ceiling materials, using only those cleaning materials specifically recommended for the purpose by the manufacturers of the materials cleaned.

3.04 CLEAN-UP

- A. Upon completion of the application, remove from floors and adjacent areas any overspray and all debris and waste, and leave the work area in a broom clean condition. Clean up and properly dispose of drop cloths, empty paper bags and adhesive barrels.

End Of Section 09500

SECTION 09660: RESILIENT FLOORING

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of resilient flooring indicated and scheduled on the Drawings including, but not necessarily limited to, premium vinyl floor tiles, homogenous vinyl sheet flooring with matching prefabricated cove base, and rubber topset base.
- B. Related Work Specified Elsewhere:
 - 1. CAST-IN-PLACE CONCRETE Section

1.03 REFERENCES

- A. ASTM International
 - 1. ASTM F 710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - 2. ASTM F 1861: Standard Specification for Resilient Wall Base
 - 3. ASTM F 1869: Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor
 - 4. ASTM F 1913: Standard Specification for Vinyl Sheet Covering Without Backing
- B. In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.
 - 1. Resilient Floor Covering Institute (RFCI) latest adopted standards.
 - 2. At least 80% of floor area receiving resilient flooring shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Version 1.2, January 2017 (Emission testing method for California Specifications 01350).
 - a. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

1.04 SUBMITTALS

Submittals shall be in accordance with the SUBMITTALS Section of these Specifications and shall include a complete list of all materials and installation methods to be furnished under this portion of the work. Two identical sets of samples of all colors available in the product specified shall be submitted to the Architect.

1.05 EXTRA MATERIALS

Refer to Section 01935 for quantities of materials to be delivered to the Owner for repair and replacement.

1.06 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
- B. Installer shall be experienced and competent in the installation of the specific resilient flooring system.
 - 1. Installer shall be certified by the manufacturer of the specific resilient flooring system. Provide certification evidence to the Architect.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- B. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.08 WARRANTY

- A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
 - 1. Warranty Period: 10 years.

PART 2: PRODUCTS

2.01 RF-1: PREMIUM VINYL FLOOR TILE

- A. General: All premium vinyl floor tile shall be the product of one manufacturer and shall, to the maximum extent possible, be of a single batch number.
 - 1. Field Tile: All field tile shall be 12" x 24" x 1/8", or 18" x 18" x 1/8", shall have a 20-mil wear layer, and shall have a cultured diamond-infused wear coating.
 - a. Armstrong "Natural Creations", or approved equal product from Tarkett, or other manufacturer.
 - b. Color/pattern as selected by Architect from full range.

2.02 RF-2: HOMOGENEOUS SHEET VINYL FLOORING

- A. General: All homogeneous sheet vinyl flooring shall be un-backed and non-layered, and shall be the product of one manufacturer and shall, to the maximum extent possible, be of a single batch number. Homogeneous sheet vinyl flooring shall have a nominal thickness of .080", and shall have a nominal wear layer thickness of .080" with color and pattern detail dispersed uniformly throughout the full thickness.
- B. Coating: All homogeneous sheet vinyl flooring shall be protected by a diamond-infused uv-cured polyurethane finish.
- C. Armstrong "Medintone", or approved equal product from Tarkett, or from other manufacturer.
 - 1. Color/pattern as selected by Architect from full range.

2.03 TOPSET RUBBER BASE

Rubber cove topset base, height as listed in Finish Schedule, in Commercial and Decorator colors as selected by the Architect. Burke "BurkeBase TP", Roppe "700 Series", or equal.

2.04 OTHER MATERIALS

All other materials, including primers, adhesives, crack fillers and underlayment, not specifically described but required for a complete and proper installation of resilient flooring, shall be as recommended by the flooring manufacturer and shall be subject to the approval of the Architect.

- A. Edge Strips: Vinyl beveled edging, 1" wide by thickness to match floor tile, Mercer, Roppe, or equal, unless otherwise indicated on the Drawings. Color as selected by the Architect from manufacturer's standards.

PART 3: EXECUTION

3.01 PREPARATION OF FLOOR SURFACES

- A. Floor surfaces that are to receive flooring shall be clean, thoroughly dry, smooth, firm and sound, and free from springiness, oil, paint, wax, dirt, and any other damaging material. Concrete curing compounds, other than the type that does not adversely affect adhesive, shall be entirely removed from the slabs.
- B. Vapor transmission rate shall be no greater than 5 lbs./1000 s.f. as verified by test results per Specifications Section 01430.
- C. Grind all ridges and other uneven surfaces smooth. Cut out and fill cracks 1/16 inch wide and wider with a crack filler as specified for this application. Provide manufacturer-approved underlayment to fill the remaining holes, cracks, and depressions, and for smoothing, leveling, and feather edging the concrete. Remove loose particles, vacuum chalky, dusty surfaces and prime the cleaned surfaces if recommended by the flooring manufacturer.

3.02 INSTALLATION: PREMIUM VINYL TILE

Install premium vinyl tile in strict accordance with the original design and the manufacturer's recommendations. Adhesives for premium vinyl tile shall be as recommended by manufacturer.

- A. Start Application of tile in the center of the room or area, and work towards the edges. Keep tile lines and joints square, symmetrical, tight, and even; and keep each floor in a true, level plane, except where indicated to be sloped. Vary edge width as necessary to maintain full-size tiles in the field but no edge tile shall be less than one-half the field tile size, except where irregular shaped rooms make it impossible.
 - 1. Install premium vinyl tile in pattern as recommended by the manufacturer to maintain a random, natural appearance.
- B. Cutting: Cut tile to and fit around permanent fixtures, built-in furniture and cabinets, pipes, and outlets. Cut edges, fit, and scribe to walls and partitions after field flooring has been applied.
- C. Edge Strips: Provide edging strips where flooring terminates at points higher than the contiguous finished flooring, except at doorways where thresholds are provided. At doorways, edge strips shall be one piece full width of opening and located under door.

3.03 INSTALLATION: HOMOGENEOUS SHEET VINYL FLOORING

Install sheet flooring in strict accordance with the original design and the manufacturer's recommendations. Adhesives for sheet flooring shall be as recommended by manufacturer.

- A. Start Application of sheet flooring in the center of the room or area, and work towards the edges. Lay flooring to provide a minimum number of

seams. Keep seam lines square, symmetrical, tight, and even; and keep each floor in a true, level plane, except where indicated to be sloped.

- B. Cutting: Cut flooring to and fit around permanent fixtures, built-in furniture and cabinets, pipes, and outlets. Cut edges, fit, and scribe to walls and partitions after field flooring has been applied.
- C. Seams: Prepare sealed seams with special seam adhesive supplied for this purpose. Use methods and sequence of work in conformance with manufacturer. Finish all seams flush and free from voids, recesses, and raised areas.
- D. Prefabricated Cove Base:
 - 1. Fabricated from the same material and dye lots as sheet flooring, in maximum practical lengths, with 1-1/2" by 1-1/2" formed aluminum reinforcing bonded to back of base material.
 - a. Riser: As indicated on Drawings
 - b. Toe: 3"
 - 2. Metal Base Cap: Stainless Steel.
 - 3. Miter cut inside and outside corners.
 - 4. Integral seams as per sheet flooring.
 - 5. "FlashCove Prefabricated Base", or approved equal product of other manufacturer.
- C. Edge Strips: Provide edging strips where flooring terminates at points higher than the contiguous finished flooring, except at doorways where thresholds are provided. At doorways, edge strips shall be one piece full width of opening and located under door.

3.04 INSTALLATION: RUBBER TOPSET BASE

Install topset base in strict accordance with the original design and the manufacturer's recommendations. Adhesives for topset base shall be as recommended by manufacturer.

- A. Use full lengths of base as required to minimize joints. Do not piece short lengths of base together. Keep joints square and tight, and keep base in a true, level plane.
- B. Cutting: Cut base to and fit around permanent fixtures, built-in furniture and cabinets, pipes, and outlets.
- C. Outside Corners: Install prefabricated outside corners manufactured from the same dye lot as the base.

3.05 CLEANING AND PROTECTION

- A. Cleaning:
 - 1. Upon completion of the installation, immediately remove all surplus adhesive from adjacent surfaces.
 - 2. After installation, and in accordance with the timing recommended by the manufacturers, clean the entire resilient flooring surface using the materials recommended for that purpose by the manufacturer.
- B. Protection: Provide a non-staining paper pathway taped to the installed resilient flooring in direction of foot traffic throughout the work and remove only at completion of Work.

End Of Section 09660

SECTION 09672: RESINOUS FLOORING

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 GENERAL

- A. Work Included in This Section: Provision of Resinous Flooring, including integral cove base, where indicated and scheduled on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. CAST-IN-PLACE CONCRETE Section.
 - 2. EPOXY CHEMICAL RESISTANT WALL COATING Section.

1.03 REFERENCES

- A. Current standards by the following agencies as cited herein:
 - 1. American Standard Test Method International (ASTM).
 - 2. American Concrete Institute (ACI).
 - 3. International Concrete Repair Institute (ICRI).
 - 4. International Organization for Standardization (ISO).
 - 5. Society of Protective Coatings (SSPC).
 - 6. United States Defense Standard (MIL).

1.04 SUBMITTALS

Submittals shall be in accordance with the SUBMITTALS Section of these Specifications.

- A. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
- B. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors, patterns and textures available.

- C. Verification Samples: For products specified, two samples, 6 inches square representing actual product, color, texture and patterns.
- D. Shop Drawings: Details of materials, construction and finish. Include relationship with adjacent construction.
- E. Contractor Certification: Manufacturer's letter certifying installer is properly trained in application of materials being installed, and is acceptable to materials manufacturer.
- F. Guarantee Certification: Letter from the primary materials manufacturer certifying that the manufacturer will issue a joint installer/manufacturer guarantee with the installing contractor.
- G. Material certificates signed by manufacturer certifying that the resinous flooring complies with California Department of Public Health requirements for volatile organic chemical emissions.
- H. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with ISO certification and a minimum ten years documented experience.
- B. Installer Qualifications: Specializes in installations similar to that required for the Project with five years experience. Installer shall be acceptable to materials manufacturer.
- C. Source Limitations: Each product type from a single manufacturer ensuring uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundation and support.
 - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
 - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
 - 3. Retain mock-up during construction as standard for comparison with completed work.
 - 4. Do not alter or remove mock-up until work is completed or removal is authorized by the Architect.

1.06 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Meeting: Coordinate work of this Section with related work.
 - 1. Attendance: Subcontractor performing work and manufacturers and fabricators involved with, or affected by, installation. Coordinate installations that precede or follow.
 - 2. Agenda: Review progress of construction activities and preparations for the particular activity under consideration. Agenda shall include schedule, drain and floor sink interface, detailing, sealing at door frames, door thresholds, responsibilities, critical path items and approvals.
 - 3. Contractor to provide written record of agreements, disagreements, and corrective measures and actions discussed at each meeting.
 - a. Distribute minutes to each party present and any others requiring information.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers with unbroken seals and bearing manufacturer's labels with date of manufacture and production lot number. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.
- C. Stage materials in area of Work 48 hours prior to the beginning of Work.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, surface temperature, material temperature, and ventilation) within limits recommended by manufacturer during installation and cure. Do not install under conditions outside manufacturer's recommended limits.
- B. Restrict access to Work area except installing contractor and site supervision during preparation, installation and cure period.
- C. Lighting: Permanent lighting shall be in place prior to flooring installation.

1.09 WARRANTY

- A. Manufacturer's Warranty: Manufacturer warrants that for a period of one year from the date of installation of the product that such product is free from manufacturing defects.

- B. Installer's Warranty: Installing contractor warrants that for a period of one year from the date of Substantial Completion the flooring installation is free from workmanship defects.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARDS

- A. This specification uses the products of Crossfield Products Corporation to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.

- B. Manufacturer: Crossfield Products Corporation
Rancho Dominguez, CA 90221

2.02 URETHANE CONCRETE FLOORING SYSTEM

- A. Troweled Urethane Cement Composition Flooring with Slip Resistant Broadcast.
 - 1. Basis of Design: Dex-O-Tex Bio-Tex
 - a. Compressive Strength (ASTM C579): 6,100 psi.
 - b. Thermal Distortion (350 degrees F Emersion): Passes
 - c. Tensile Strength (ASTM C307): 1,000 psi.
 - d. Flexural Strength (ASTM C580): 2,000 psi.
 - e. Density (ASTM C905): 130 pcf.
 - f. Water Absorption (MIL-PRF-3134): 0.64 percent.
 - g. Surface Hardness (ASTM D2240): 85-90 Durometer "D".
 - h. Abrasion Resistance (ASTM D1044): 33 mg.
 - i. Adhesion (ASTM D4541): 400 psi, 100 percent failure in concrete.
 - j. Flammability – Critical Radiant Flux (ASTM E648): 1.07 watts/sq. cm.
 - k. Resistance to Fungal Growth (ASTM G21): Passes, Rating 1.
 - 2. Body Coat: ¼ inch thick with slip resistant aggregate.

3. Color: As selected by Architect.
 4. Top Coat: AeroFlor 100.
- B. Grout Coat
1. Basis of Design: Dex-O-Tex Posi-Tred
 - a. 100% solids pigmented epoxy coating.
 - b. Pre-engineered aluminum oxide aggregates in profile selected by Architect from manufacturer's five skid-resistant profiles.
 - c. High chemical and stain resistance.
 - d. High abrasion resistance.
 2. Apply coats at 12-14 mils thickness.
- C. Top Coat
1. Basis of Design: Dex-O-Tex AeroFlor 100
 - a. Aliphatic polyester urethane coating.
 - b. Ultraviolet light stable.
 - c. High chemical and stain resistance.
 - d. High abrasion resistance.
 2. Apply coat at 4 mils thickness.

2.03 OTHER MATERIALS

All other materials, including vapor control primers and crack fillers, not specifically described but required for a complete and proper installation, shall be as recommended by the manufacturer and shall be subject to the approval of the Architect.

PART 3: EXECUTION

3.01 EXAMINATION

- A. Do not begin preparation and installation until substrates are properly constructed and inspected complying with ACI 311.4R-05 Guide for Concrete Inspection. The General Contractor is to correct non-conformities if defects are discovered. Repair per ACI 546.R-04. Turn over work in broom clean condition free of debris and foreign matter.

- B. Perform moisture testing per ASTM F1869 and F2170. Document results per this specification. If MVER or RH exceeds manufacturer's recommended level for specified product: apply vapor control primer before proceeding.
- C. Verify the substrate has proper slope for drainage. If proper slope for drainage is not in the substrate: notify the Architect and General Contactor immediately in writing. Do not proceed with flooring installation until the conditions are corrected.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to commencement of the preparation and installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving best results for substrate under project conditions.
- C. Concrete Surfaces: Shot-blast, or diamond grind per SSPC SP-13/NACE 6. Remove material to provide a sound surface free of laitance, glaze, efflorescence, bond inhibiting curing compounds or form release agents. Remove grease, oil, and other penetrating contaminates. Repair damaged and deteriorated concrete to acceptable condition per ACI 546.R-04. Produce a surface profile equal to ICRI 310.24 CPS2, CPS 3, or CPS 4. Leave surface free of dust, dirt, laitance, and efflorescence.
- D. Cut 1/8" x 1/2" keyways around the perimeter, around drains, clean outs, access panels or other floor interruption, and at expansion or isolation joints.
- E. Verify proper surface profile per ICRI 310.25 CPS coupons. Perform water break test and tape dust cleanliness test per ISO 8502-3 to determine surface is acceptable to proceed.

3.03 INSTALLATION

- A. Apply Flooring System components according to manufacturer's written instructions. Produce a uniform, monolithic wearing surface of thickness, color and texture indicated.
 - 1. Coordinate application of components. Provide optimum adhesion of coatings to substrate, and optimum intercoat adhesion.
 - 2. Cure coatings per manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. Expansion, Isolation and Control Joint Treatment: At substrate expansion, isolation and control joints, comply with resinous flooring manufacturer's written instructions.

4. Contractor shall keep daily logs recording the work performed and environmental conditions as required by the materials manufacturer.
- B. Install 6" integral cove base with 5/8" radius at all vertical horizontal transitions.
- C. Self-Leveling Body Coats: Apply in thickness indicated for flooring system.
 1. Aggregates: Broadcast aggregates at rate recommended by manufacturer. After resin cures, remove excess aggregates. Provide surface texture indicated.
- D. Top Coat: AeroFlor 100. Apply in number indicated for flooring system and at spreading rates recommended by manufacturer to produce wearing surface indicated.

3.04 CLEANING AND PROTECTION

- A. Clean products after 96 hours cure in accordance with the manufacturer's recommendations.
- B. Prohibit foot and wheel traffic over flooring for 24 hours. Light foot traffic is acceptable after 24 hours. Normal traffic after 48 hours.
- C. Do not expose to harsh chemicals until full 7 days cure.
- D. Touch-up, repair or replace damaged products before Substantial Completion.
- E. Provide floor protection acceptable to the materials manufacturer.

End Of Section 09672

SECTION 09851: EPOXY CHEMICAL RESISTANT WALL COATING

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 GENERAL

- A. Work Included in This Section: Provision of all labor, materials, equipment and services necessary to complete Epoxy Resin Chemical Resistant Wall Coating where indicated and scheduled on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. REINFORCED UNIT MASONRY Section
 - 2. GYPSUM WALLBOARD AND CEMENT BOARD Section.
 - 3. RESINOUS FLOORING Section.

1.03 REFERENCES

- A. Current standards by the following agencies as cited herein:
 - 1. American Standard Test Method International (ASTM).
 - 2. United States Defense Standard (MIL).

1.04 SUBMITTALS

Submittals shall be in accordance with the SUBMITTALS Section of these Specifications.

- A. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
- B. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors, patterns and textures available.
- C. Verification Samples: For products specified, two samples, 6 inches square representing actual product color and texture.

- D. Shop Drawings: Details of materials, construction and finish. Include relationship with adjacent construction.
- E. Contractor Certification: Manufacturer's letter certifying installer is properly trained in application of materials being installed, and is acceptable to materials manufacturer.
- F. Guarantee Certification: Letter from the primary materials manufacturer certifying that the manufacturer will issue a joint installer/manufacturer guarantee with the installing contractor.
- G. Material certificates signed by manufacturer certifying that the epoxy resin chemical resistant wall coating complies with California Department of Public Health requirements for volatile organic chemical emissions.
- H. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with ISO certification and a minimum ten years documented experience.
- B. Installer Qualifications: Specializes in installations similar to that required for the Project with five years experience.
- C. Source Limitations: Each product type from a single manufacturer ensuring uniformity.

1.06 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Meeting: Coordinate work of this Section with related work.
 - 1. Attendance: Subcontractor performing work and manufacturers and fabricators involved with, or affected by, installation. Coordinate installations that precede or follow.
 - 2. Agenda: Review progress of construction activities and preparations for the particular activity under consideration. Agenda shall include schedule, door and window interface, detailing, sealing at door and window frames, responsibilities, critical path items and approvals.
 - 3. Contractor to provide written record of agreements, disagreements, and corrective measures and actions discussed at each meeting.
 - a. Distribute minutes to each party present and any others requiring information.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers with unbroken seals and bearing manufacturer's labels with date of manufacture and production lot number. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.
- C. Stage materials in area of Work 48 hours prior to the beginning of Work.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, surface temperature, material temperature, and ventilation) within limits recommended by manufacturer during installation and cure. Do not install under conditions outside manufacturer's recommended limits.
- B. Restrict access to Work area except installing contractor and site supervision during preparation, installation and cure period.
- C. Lighting: Permanent lighting shall be in place prior to installing wall coating.

1.09 WARRANTY

- A. Manufacturer's Warranty: Manufacturer warrants that for a period of one year from the date of installation of the product that such product is free from manufacturing defects.
- B. Installer's Warranty: Installing contractor warrants that for a period of one year from the date of Substantial Completion the flooring installation is free from workmanship defects.
- A. Erect suitable barriers and post legible signs at points of entry to prevent traffic and trades from entering the work area during application and cure period of the wall.
- B. Protection of finished walls from damage by subsequent trades shall be the responsibility of the General Contractor.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARDS

- A. This specification uses the products of Crossfield Products Corporation to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.

- B. Manufacturer: Crossfield Products Corporation
Rancho Dominguez, CA 90221

2.02 EPOXY RESIN CHEMICAL RESISTANT WALL COATING SYSTEM

- A. Epoxy Resin Chemical Resistant Wall Coating
1. Basis of Design: Dex-O-Tex Wallcote "E"
 - a. Solids Content: 100% epoxy solids.
 - b. Thickness: 12 mils
 - c. Compressive Strength (ASTM D638): 8,000 psi.
 - d. Odor at Installation: Nil.
 - e. Elongation (ASTM D638): 13%.
 - f. Surface Hardness (ASTM D2240): 62 Durometer "D".
 - g. Adhesion (ASTM D695): Exceeds internal strength of board backing.
 - h. Volatile Organic Content: None.
 - i. Flexibility (ASTM D522): Passes 1/8" mandrel at 180 degree bend without cracking.
 - j. Wear Resistance (ASTM D1044): 16 mg weight loss.
 - k. Water Absorption (MIL-PRF-3134, Paragraph 4.7.8): <0.5%
psi.
 - l. Flashpoint (Tag Closed Cup): Exceeds 200 degrees F.
 2. Supplemental Materials
 - a. Incorporate anti-microbial chemical additive to prevent growth of most bacteria, fungi, algae and actinomycetes.
 3. Color: As selected by Architect.
 4. Top Coat: AeroFlor 100.
- B. Top Coat
1. Basis of Design: Dex-O-Tex AeroFlor 100
 - a. Aliphatic polyester urethane coating.
 - b. Ultraviolet light stable.

- c. High chemical and stain resistance.
 - d. High abrasion resistance.
2. Apply coat at 4 mils thickness.

2.03 OTHER MATERIALS

All other materials, including vapor control primers or block fillers, not specifically described but required for a complete and proper installation, shall be as recommended by the manufacturer and shall be subject to the approval of the Architect.

PART 3: EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where epoxy resin chemical resistant wall coating is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the Work including the absence of adjacent floor bases or other construction elements which are to be overlapped by wall coating. Do not proceed with the Work until unsatisfactory conditions have been corrected by the General Contractor in a manner acceptable to the Architect.

3.02 PREPARATION

- A. Substrate: Perform preparation and cleaning procedures according to wall coating system manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry substrate.
- B. Materials: Mix epoxy resin components when required, and prepare materials according to wall coating system manufacturer's instructions.

3.03 APPLICATION

- A. General: Apply each component of epoxy resin chemical resistant wall coating system according to manufacturer's direction to produce a uniform monolithic wall coating of thickness indicated.
- B. Bond Coat: Apply bond coat over prepared substrate at manufacturer's recommended spreading rate.
- C. Body Coat: Over bond coat apply two coats at 6 mils thickness each epoxy resin chemical resistant wall coating. Overlay adjacent floor base, door frames, window frames, or other building elements as shown on the Drawings.

- D. Top Coat: After body coat has cured sufficiently, apply one coat of AeroFlor 100 at 4 mils thickness to produce finish matching approved sample at spread rate recommended by the manufacturer.
 - 1. Final top coat shall be in color approved by the Architect.
 - 2. Finished wall coating system shall be minimum 16 mils thick, uniform in color and texture.

3.04 CLEANING AND PROTECTION

- A. Clean products after fully cured in accordance with the manufacturer's recommendations.
- B. Prevent contamination during application stages and before completing curing process.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

End Of Section 09851

SECTION 09900: PAINTING

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section:
1. Provide all labor, material, equipment, and services necessary to complete painting and finishing of all exposed surfaces throughout the interior of the structure as indicated on the Drawings, including appurtenances thereto, and top, bottom, and all edges of all doors. Except as specifically indicated otherwise, all "paint" finishes other than factory finish shall be job applied.
 2. Coatings specified herein or included in the finish schedule are in addition to other coatings which may be required by other sections.
 3. Factory applied finishes on electrical panel covers, and devices; mechanical grilles, registers and louvers; fire extinguisher cabinets, and similar items shall be considered prime coats. Surfaces shall be cleaned and de-glossed by sanding or other means prior to field painting to match adjacent surfaces unless otherwise noted.
 4. The painting contractor shall examine the specifications for the various other trades and shall thoroughly familiarize himself with all conditions of the work of this Section.
 5. Refer to Specifications Section 01210 for required contingency allowance to be included in bid price for specific work to be completed under this Section.
- B. Related Work Specified Elsewhere:
1. Prefinishing: Shop priming and factory prefinishing are required on some items described in other Sections of these Specifications.
 2. SEALANTS AND CAULKING Section
 3. GYPSUM WALLBOARD AND CEMENT BOARD Section
 4. ARCHITECTURAL WOODWORK Section
 5. FINISH CARPENTRY AND MILLWORK Section
 6. METAL DOORS AND FRAMES Section
 7. METAL FABRICATIONS Section
- C. Definitions: The term "paint", as used herein, includes enamels, paints, sealers, fillers, emulsions, and other coatings whether used as prime, intermediate, or finish coats.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the published specifications, standards and methods of the trade cited below shall apply to work of this Section.

- A. Painting Contractors Association (PCA) "Industry Standards", latest edition.
- B. All materials and application of materials shall comply with the latest regulations of the California Air Resources Board and local Air Pollution Control District having jurisdiction.
 - 1. Verification of compliance shall be provided at the request of the enforcing agency.

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section of these Specifications and shall include the following:

- A. Materials List:
 - 1. Before any paint materials are delivered to the job site, submit to the Architect a complete list of all materials proposed to be furnished and installed under this portion of the Work.
 - 2. Accompanying the materials list submit two copies of the full range of colors available in each of the proposed products.
- B. Samples:
 - 1. Prepare and deliver to the Architect two (2) identical sets of samples:
 - a. Paint samples of each color and sheen selected on 8-1/2" x 11" card stock.
 - b. Samples of each stain, opaque stain and clear finish selected on the same material as that on which the coating will be applied in the Work. Sample size shall be 12" x 12".
- C. Manufacturers' Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable alternate in this Section of these specifications, submit for the Architect's review the current recommended method of application published by the manufacturer of the proposed material.

- D. Copy of PCA "Industry Standards" PCA P14. Contractor shall also submit a letter indicating their intent to conform to surface preparation defined under "Level 3 – Superior" of that Standard.

1.04 EXTRA STOCK

Upon completion of this portion of the Work, deliver to the Owner an extra stock of paint of each color used in each coating material used, with all such extra stock tightly sealed in clearly labeled containers. See Section 01935 for quantities required.

PART 2: PRODUCTS

2.01 PAINT MATERIALS

- A. Manufacturer:
 - 1. All paint materials selected for coating systems for each type of surface shall be the product of a single manufacturer.
 - 2. Acceptable Manufacturers: The paint standard for the County of Tulare has been established as the products of Sherwin Williams. Products of Benjamin Moore or PPG may be submitted for consideration by the Architect.
- B. Compatibility:
 - 1. All paint materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.
 - 2. Thinners, when used, shall be only those thinners recommended for that purpose by the manufacturer of the material to be thinned.

2.02 COLOR SELECTIONS

Bid price shall include up to six (6) different colors on the interior of the building, and shall include color breaks for accent walls, hollow metal doors and frames, hollow metal window frames, and metal accessories as designated on the Drawings or directed in the field.

PART 3: EXECUTION

3.01 SURFACE CONDITIONS

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

2. Verify that paint finishes may be applied in strict accordance with all pertinent codes and regulations and the requirements of these Specifications.
- B. Discrepancies: In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 PREPARATION OF SURFACES - GENERAL

- A. Protection: Prior to all surface preparation and painting operations, completely mask, remove, or otherwise adequately protect all hardware, accessories, machined surfaces, plates, lighting fixtures, and similar items in contact with painted surfaces but not scheduled to receive paint.
1. Electrical device plates shall be removed, cleaned, then re-installed after painting has been completed.
 2. Door hardware escutcheon plates shall be removed, cleaned, then re-installed after painting has been completed. Actual door hardware shall remain in-place and be masked as required.
 3. Light fixture trim shall be removed, cleaned, then re-installed after painting has been completed. Actual light fixtures shall remain in-place and be masked as required.
- B. Prepare all surfaces to be painted in conformance with "Level 3 – Superior" as defined under PCA "Industry Standards" PCA P14.

3.03 PREPARATION OF WOOD SURFACES

- A. Filling: Nail holes, cracks or defects shall be carefully puttied after the first coat, with putty matching color of stain or paint.
- B. Smoothing:
1. Unless specifically noted to be left rough, smooth all finished wood surfaces exposed to view, using the proper sandpaper.
 2. Where so required, use varying degrees of coarseness in sandpaper to produce uniformly smooth and unmarred wood surfaces.
- C. Knots:
1. On small, dry, seasoned knots, thoroughly scrape and clean the surface and apply one coat of good quality knot-sealer before application of the priming coat.
 2. On large, open, unseasoned knots, scrape off all pitch and thoroughly clean the area, followed by an application of one coat of good quality knot-sealer.

3. Remove and treat all pitch surfaces as required for large knots.
- D. Dryness: Unless specifically approved by the Architect, do not proceed with the painting of wood surfaces until the moisture content of the wood is 12% or less as measured by a moisture-meter approved by the Architect.

3.04 PREPARATION OF METAL SURFACES

- A. Galvanized Metal:
1. Clean all surfaces thoroughly with mineral spirits until they are completely free from dirt, oil and grease.
 2. Apply specified pretreatment wash primer or thoroughly treat the cleaned surface with phosphoric acid etch. Remove all excess etching solution and allow to dry completely before application of paint.
- B. Other Metals: Thoroughly clean all surfaces until they are completely free from dirt, oil and grease. Allow to dry thoroughly before application of paint.
- C. Factory applied finishes on electrical panel covers and devices, mechanical grilles, registers and louvres, fire extinguisher cabinets, and similar items shall be cleaned and de-glossed by sanding or other means prior to field painting.

3.05 PREPARATION OF MASONRY SURFACES

- A. Clean all masonry surfaces per instructions of paint manufacturer.
- B. Lightly sandblast surface as required to remove stains, efflorescence, or other surface condition that will affect paint application.
1. Where sandblasting is used, ensure that resulting masonry surface is uniform from corner to corner.
- C. Dryness: Unless specifically approved by the Architect, do not proceed with the painting of masonry surfaces until the moisture content of the masonry is 12% or less as measured by a moisture-meter approved by the Architect.

3.06 PAINT APPLICATION

- A. General:
1. Paint all surfaces within designated rooms except as noted on the Drawings.
 2. Paint all grilles, registers, louvers and panelboard covers and other mechanical and electrical items to match adjacent surfaces unless noted otherwise.

- B. Drying:
 - 1. Allow sufficient drying time between coats. Manufacturer's recommended drying time for re-coating shall be considered as minimum.
 - 2. Extend the period as recommended by the material manufacturer to suit adverse weather conditions.
 - 3. The application of another coat of paint shall not cause lifting or loss of adhesion of the undercoat.
- C. Environmental Conditions:
 - 1. Comply with the manufacturer's recommendations as to environmental conditions under which the coating systems may be applied. No coating shall be applied when ambient temperature is below that recommended by the manufacturer.
 - 2. Do not apply paint in areas where dust is being generated.
- D. Moisture Content: Do not apply the initial coating until moisture content of surfaces are within the limits recommended by the paint materials manufacturer.
- E. Defects: Sand and dust between coats to remove all defects visible to the unaided eye from a distance of five feet.
- F. Color of Undercoats: Slightly vary the color of succeeding coats, except with deep tone colors all coats shall be final color.

3.07 INSPECTION

- A. General: Do not apply additional coats until completed coats have been inspected and approved by the Architect.
- B. Number of Coats: Only inspected and approved coats of paint will be considered in determining the number of coats applied.

3.08 DRY MIL THICKNESS

- A. General: Apply all coatings to the dry mil thickness recommended by the paint manufacturer.
- B. Measurement: When specifically requested by the Architect, provide and use a "Tooke Dry Film Thickness Gage", or other gage approved by the Architect, to prove the dry mil thickness of paint applied.

3.09 REINSTALLATION OF REMOVED ITEMS

Following completion of painting in each space, promptly reinstall all items removed for painting, using only workmen skilled in the particular trade.

3.10 ADJUST AND CLEAN

- A. General
 - 1. During progress of the Work, do not allow the accumulation of empty containers or other excess items except in areas specifically set aside for that purpose.
 - 2. Prevent accidental spilling of paint materials and, in event of such spill, immediately remove all spilled material and the waste of other equipment used to clean up the spill, and wash the surfaces to their original undamaged condition or replace damaged material, all at no additional cost to the Owner.
- B. Prior to Final Inspection: Upon completion of this portion of the Work, visually inspect all surfaces and remove all paint and traces of paint from surfaces not scheduled to be painted.

3.11 PAINTING SCHEDULE

- A. The painting schedule shall be a standard for coatings in areas designated. Refer to Drawings for finish required at specific items and areas. Some types may not be required for this project. The number of coats indicated shall be considered a minimum. Additional coats shall be required if chromatic hue is not uniform in appearance or if undercoat or substrate ghosting is evident. Apply the following specified finishes to the areas designated and indicated on the Drawings.
- B. Schedule has been prepared using the products of Sherwin Williams, unless otherwise indicated. The products of Benjamin Moore or PPG may be submitted for consideration by the Architect.

INTERIOR FINISHES

Type P-1 (interior gypsum drywall, masonry, or plywood – semi-gloss 100% acrylic)

First Coat (at gypsum drywall and plywood):	Interior Flat Wall Paint
First Coat (at concrete masonry)	Concrete Block Filler - Smooth
Second Coat:	Interior Semi-gloss Acrylic Paint
Third Coat:	Interior Semi-gloss Acrylic Paint

Type P-2 (interior gypsum drywall, cement board, or masonry – high performance finish)

First Coat (at gypsum drywall):	Interior Flat Wall Paint
First Coat (at cement board and masonry)	Concrete Block Filler - Smooth
Second Coat:	Waterborne Acrylic Epoxy

Third Coat: Waterborne Acrylic Epoxy

(Second and third coat may be omitted from those areas of walls scheduled to receive pre-finished panels.)

Type P-3 (interior ferrous metal - semi-gloss 100% acrylic)

First Coat: Red Oxide Alkyd Rust Preventative Primer
Second Coat: Interior Acrylic Semi-Gloss Paint
Third Coat: Interior Acrylic Semi-Gloss Paint

(First coat may be omitted if shop primed and touched up prior to painting.)

Type P-4 (interior concrete masonry - clear sealer)

First Coat: Masonry Sealer
Second Coat: Aliphatic Acrylic Urethane Clear Gloss Finish
Third Coat: Aliphatic Acrylic Urethane Clear Gloss Finish

Type P-5 (interior concrete floors – clear sealer)

First Coat: Flood Coat Clear Sealer

Type P-6 (interior galvanized metal – semi-gloss 100% acrylic)

First Coat: Epoxy Galvanized/Aluminum Primer
Second Coat: Interior Acrylic Semi-Gloss Paint
Third Coat: Interior Acrylic Semi-Gloss Paint

Type P-7 (interior gypsum drywall – elastomeric coating)

First Coat: Primer Per Coating Manufacturer
Second Coat: Elastomeric Coating
Third Coat: Elastomeric Coating

Type P-8 (interior concrete floors – clear lithium silicate waterproofer)

First Coat: L.M. Scofield "Formula One Finish Coat", or approved equal.

EXTERIOR FINISHES

Type P-50 (exterior concrete masonry - clear sealer)

First Coat: Masonry Sealer
Second Coat: Aliphatic Acrylic Urethane Clear Gloss Finish

Third Coat: Aliphatic Acrylic Urethane Clear
Gloss Finish

Type P-51 (exterior plaster – elastomeric coating)

First Coat: Masonry Sealer
Second Coat: Elastomeric Coating
Third Coat: Elastomeric Coating

Type P-52 (exterior ferrous metal – gloss 100% acrylic)

First Coat: Red Oxide Alkyd Rust Preventative
Primer
Second Coat: Exterior Acrylic Gloss Paint
Third Coat: Exterior Acrylic Gloss Paint

(First coat may be eliminated if shop primed and touched-up prior to painting.)

Type P-53 (exterior galvanized and aluminum – gloss 100% acrylic)

First Coat: Epoxy Galvanized/Aluminum Primer
Second Coat: Exterior Acrylic Gloss Paint
Third Coat: Exterior Acrylic Gloss Paint

End Of Section 09900

SECTION 09986: PRE-FINISHED WALL PANELS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 GENERAL

Work Included in This Section: Provision of Pre-finished Wall Panels indicated and scheduled on the Drawings, and related molding.

1.03 SUBMITTALS

Submittals shall be in accordance with the SUBMITTALS Section of these Specifications and shall include a complete list of all materials to be furnished under this portion of the Work. Furnish samples of all colors available.

PART 2: PRODUCTS

2.01 PFP-1: PREFINISHED PANELS

A. Pre-finished panels shall be 4'-0" x length as required x 3/32" with melamine impregnated surfacing materials thermally bonded to a fiber-reinforced plastic core, complete with all specified metal molding and trims. Color and pattern shall be as indicated below. Panels shall be of length required to eliminate end joints.

1. Acceptable Manufacturers:

a. Marlite "Induro FRP"

1. Color/pattern as selected by Architect from manufacturer's full range including Faux Woodgrains, Abstract Patterns and Solid Colors.

b. or equal product of other manufacturer approved by the Architect.

2.02 PFP-2: PREFINISHED PANELS

A. Pre-finished panels shall be 4'-0" x length as required x 3/32" and comprised of a homogeneous mixture of fiberglass, calcium carbonate and resin, complete with all specified metal molding and trims. Color and pattern shall be as indicated below. Panels shall have a pebble finish. Panels shall be of length required to eliminate end joints.

1. Acceptable Manufacturers:

- a. Marlite "FRP"
 - 1. Color: White.
- b. or equal product of other manufacturer approved by the Architect.

2.03 ACCESSORIES

- A. Use only the following accessories:
 - 1. Inside Corner: Satin, anodized aluminum, Marlite #F551, or equal.
 - 2. Outside Corner: Satin, anodized aluminum, Marlite #F560, or equal.
 - 3. Edge: Satin, anodized aluminum, Marlite #F570, or equal.
 - 4. Division: Satin, anodized aluminum, Marlite #F555, or equal.

2.04 OTHER MATERIALS

All other materials, including adhesives and crack fillers, not specifically described but required for a complete and proper installation, shall be as recommended by the manufacturer and shall be subject to the approval of the Architect.

PART 3: EXECUTION

3.01 INSTALLATION

Installation shall be in strict accordance with the manufacturer's written installation instructions utilizing specified metal accessories and adhesive recommended and supplied by the manufacturer, and as detailed on the Drawings. All panels shall be seamed per the manufacturer using matching silicone sealant.

End Of Section 09986

SECTION 10050: MISCELLANEOUS SPECIALTIES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work Included in This Section: Provision for and installation of specialty and built-in items required for this Work as indicated on the Drawings.

1.03 SUBMITTALS

Before any specialty items are delivered to the job site, submit Shop Drawings and catalog cuts to the Architect in accordance with the provisions of the SUBMITTALS Section of these Specifications, showing all details of installation and assembly and all requirements for work by other trades, and showing all colors available from the selected manufacturer in the quality specified.

PART 2: PRODUCTS

A. WIRE WALL SHELVING

1. Reinforced wire shelving with matching 30" wall brackets to accommodate three shelves. 18" deep x length as shown on the Drawings; stainless steel finish.
2. Metro "Erecta Shelf", or equal product of other manufacturer approved by the Architect.

B. WIRE SHELVING

1. 72" tall capped posts adjustable to 1" increments; (5) shelves in sizes as shown on the Drawings; stainless steel finish.
2. Metro "Super Erecta", or equal product of other manufacturer approved by the Architect.

C. VERTICAL BLINDS

1. Height as shown on the Drawings (field verify) by track length shown on the Drawings (field verify).
 2. 3-1/2" wide, curved, non-perforated, solid vinyl blades in color as selected by the Architect from the manufacturer's full range.
 3. Anodized aluminum headrail system.
 4. Single-tier valence with matching end caps.
 5. Cordless wand control in matching finish.
 6. Stacking as indicated on Drawings.
 7. Hunter Douglas "Contract Vertical Blind", or equal product of other manufacturer approved by the Architect.
- D. STAINLESS STEEL CORNER GUARDS
1. 2" x 2" x 48" with 3/16" radius at outside corner. 16 gauge type 304 stainless steel with #4 satin finish.
 2. Wallguard #2330.1, or equal product from other approved manufacturer.
- E. FORMED GUARD POST COVERS
1. Molded HDPE slip-on covering with integral reflective tape designed to fit over a 6" diameter steel guard post. Height shall be tall enough to allow for field trimming. Color as selected by Architect from manufacturer's full range. Install per manufacturer's written instructions.
 2. "Post Guard" as manufactured by Encore Commercial Products, or equal product of other approved manufacturer.

PART 3: EXECUTION

3.01 SURFACE CONDITIONS

Coordination: Coordinate with all other trades as required to ensure proper and adequate provision in framing and wall finish for the installation of the selected specialties in the locations required.

3.02 INSTALLATION

Install all specialty items where indicated on the Drawings and in full accordance with all pertinent regulations and the manufacturer's recommendations, anchoring all components firmly in place for long life under hard use.

3.03 INSPECTION AND ADJUSTMENT

Upon completion of the installation, and as a condition of its acceptance, visually inspect the entire work of this Section, adjust all components for proper alignment and use, and touch up all abrasions and scratches to make them completely invisible.

End Of Section 10050

SECTION 10426: SIGNAGE AND GRAPHICS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Work Included in This Section: Provide identifying devices where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Exterior Signs
2. Interior Signs
3. Parking Lot Signs

B. Related Work Specified Elsewhere:

1. CAST-IN-PLACE CONCRETE Section
2. FINISH CARPENTRY AND MILLWORK Section
3. PAINTING Section

1.03 QUALITY ASSURANCE

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

1.04 SUBMITTALS

Before signage is delivered to the job site, submit shop drawings to the Architect for approval in accordance with the provisions of the SUBMITTALS Section of these specifications, showing all details of installation and assembly and all requirements for work by other trades and showing all colors available.

PART 2: PRODUCTS

2.01 EXTERIOR INDIVIDUAL METAL LETTERS

A. Provide and install precision, waterjet cut, aluminum letters and numerals of height as indicated on the Drawings.

- B. Thickness: ½"
- C. Typeface: "Optima Medium" upper and lower case as indicated.
- D. Finish: Factory-applied acrylic polyurethane cured in oven.
 - 1. Gloss Finish
 - 2. Color selected by Architect from manufacturer's full range
- E. Mounting: Projecting Welded Studs with integral spacers for blind mounting into wall substrate while providing a 1" clear offset from the finish face of the exterior wall.
- F. Flat cut, metal letters and numerals shall be manufactured by Gemini, ASI Sign Systems, or equal product of other manufacturer approved by the Architect.

2.02 INTERIOR ADA SIGN SYSTEM

- A. All interior signs indicated on the Drawings shall be from a common manufacturer and shall be consistent in typeface, colors, trim and mounting. All signs shall conform to relevant ADA Accessibility Guidelines (ADAAG).
 - 1. Room Identification
 - 2. Exit Identification
 - 3. Informational
- B. High impact acrylic/pvc thermoplastic alloy, pressure molded using co-molding process.
 - 1. Colors as selected by Architect from manufacturer's full range.
- C. Tactile lettering and raised grade 2 braille shall be integral to the face and shall be a minimum of 1/32" in height.
- D. Mounting shall be by adhesives recommended by the manufacturer, or by stainless steel screws where so indicated on the Drawings.
- E. ASI Sign Systems, Culver City, CA, or equal product of other manufacturer approved by the Architect.

2.03 HANDICAPPED PARKING SIGN

The parking spaces reserved for the handicapped shall be identified by permanently affixed reflectorized signs constructed of steel, beaded text, displaying the International Symbol of Accessibility. Parking spaces identified on Drawings as being van accessible shall also be identified on sign as "Van Accessible". The signs shall not be smaller than 70

square inches in area and shall be centered at the interior end of the parking space at a minimum height of 80 inches from the bottom of the sign to the parking space finished grade. Mounting posts shall also be included. Signs shall be in conformance with SBC 2-7102(e).

2.04 PARKING LOT ENTRANCE SIGN

At parking lot entrance, in location to be coordinated with Architect in the field, there shall be posted a sign not less than 17 inches x 22 inches in size with lettering not less than 1 inch in height, which states the following:

"Unauthorized vehicles not displaying distinguishing placards or license plates issued for the physically handicapped may be towed away at owner's expense. Towed vehicles may be reclaimed by contacting the City of Tulare Police Department"

Mounting posts shall also be included. Sign shall be in conformance with SBC 2-7102(e).

2.05 INFORMATIONAL PARKING LOT SIGNS

Informational parking lot signs shall be reflectorized signs constructed of steel with beaded text. The signs shall not be smaller than 70 square inches in area and shall be located as shown on the Drawings at a minimum height of 80 inches from the bottom of the sign to the parking lot finished grade. Mounting posts shall also be included.

PART 3 EXECUTION

3.01 INSTALLATION

Coordinate the work with all other trades as required to ensure proper and adequate provisions in framing and the connection of all signs to building surfaces.

3.02 INSPECTION AND ADJUSTMENT

Upon completion of the installation, and as a condition of its acceptance, visually inspect the entire work of this Section, adjust all components for proper alignment and use, and touch up all abrasions and scratches to make them completely invisible.

End Of Section 10426

SECTION 10500: PHENOLIC LOCKERS AND BENCHES

PART 1: GENERAL

1.01 DESCRIPTION

- A. Work Included in This Section: Provisions of phenolic lockers and benches as indicated on the Drawings required for this Work.

1.02 INCORPORATED DOCUMENTS

- A. The provisions and requirements of Sections 0 and 1 of these Bid documents apply to this Section. The Contractor shall be responsible for, and governed by all requirements thereunder.

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include the following:

- A. Submittals for Review:
 - 1. Shop Drawings: Include dimensioned layouts, elevations, trim, closures and accessories.
 - 2. Product Data: Manufacturer's descriptive data
 - 3. Samples: 3 x 3 inch samples showing available colors.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 years of experience in manufacture of solid plastic lockers with products in satisfactory use under similar service conditions.
- B. Installer Qualifications: Minimum 5 years of experience in work of this Section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store in an upright position in manufacturer's original protective packaging. Protect lockers and benches from damage, temperature, humidity and exposure to the elements.

1.06 PROJECT CONDITIONS AND COORDINATION

- A. Field Measurements: Before material fabrication, verify actual field measurements and show actual measurements on shop drawings.
- B. Coordination: Coordinate field measurements with fabrication schedule

and construction progress to avoid construction delays.

1.06 WARRANTY

- A. Provide manufacturer's 20 year warranty against breakage, corrosion, and delamination under normal conditions.

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARD

- A. This specification uses the products of Summit Lockers, Inc. to establish a minimum standard for material performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.
- B. Manufacturer: Summit Lockers, Inc.
Columbia, SC
- C. Locker Layout:
 - 1. Each locker 15" wide by 20" deep by 72" tall.
 - 2. Single level with flat tops.
 - 3. Integral 6" tall base with toe kick.
 - 4. Integral matching fill trim at ends.

2.02 LOCKER MATERIALS

- A. Decorative papers impregnated with a melamine resin on faces with a clear protective overcoat and integrally compression molded within a core consisting of solid phenolic impregnated kraft papers.
 - 1. Fire Rating: Core or panel material shall meet fire Class B resistance per ASTM E84.
- B. Material Thickness:
 - 1. Doors, End Panels, Filler Panels: 1/2".
 - 2. Tops, Bottoms, Shelves: 3/8".
 - 3. Sides, Backs: Minimum 5/16".
 - 4. Wall Mounting Cleats: 1/2".

- C. Locker Bodies:
 - 1. Solid phenolic composite material with ventilation holes.
 - 2. Mortise and Tenon Joints: All tops, bottoms and shelves shall use mortised joints and be secured with mechanical fasteners.
 - 3. Exposed Edges: Straight profile; eased edges to remove sharpness, machine polished and free from tooling imperfections.
 - 4. Body Color: As selected by Architect from manufacturer's full range of available colors.
- D. Locker Doors:
 - 1. Full overlay, covering full width and height of locker body; eased edge corners.
 - 2. Door Fastening: Blind fastening.
 - 3. Door Color/Pattern: Custom color/pattern as selected by Architect from the full offerings of Wilsonart or Formica.

2.03 HARDWARE

- A. Hinges: Concealed 6-knuckle stainless steel hinge. Opens 90 degrees. Include (3) hinges for doors greater than 36" tall or (2) hinges for all other heights.
- B. Hooks: (2) stainless steel hooks per opening for all openings 30" tall or greater. Plastic or nylon are not acceptable.
- C. Fasteners: All fasteners shall be stainless steel.
- D. Locks: Stainless steel hasp bar for customer supplied padlock.
- E. Number Identifications Plates:
 - 1. Material: 1.75" x 6.25" black plastic with reverse engraved numbers and surface mounted with permanent adhesive.
 - 2. Font to be minimum 1/2" high.
 - 3. Numbering shall commence with "1" and run from left to right.

2.04 VENTILATION

- A. Vertical Ventilation: Provide (6) 5/16" diameter ventilation holes on tops, bottoms, and intermediate shelves. Provide (3) 5/16" diameter ventilation holes on "Z" type intermediary shelves.
- B. Horizontal Ventilation: Provide ventilation around the edge of the door

Equal to at least 1.4 square inches of ventilation surface area per lineal foot of door perimeter.

2.05 BENCHES

- A. Phenolic Benches: Decorative papers impregnated with a melamine resin on faces with a clear protective overcoat and integrally compression molded within a core consisting of solid phenolic impregnated kraft papers.
 - 1. Bench Tops: 1" thick solid phenolic composite material.
 - 2. Color: As selected by Architect.
 - 3. Bench Pedestals: Stainless Steel. Moveable.
 - 4. 12" wide x 48" long.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Install lockers in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Set lockers on integral locker base.
- C. Set plumb, level, rigid, and aligned.
- D. Attach lockers to supporting construction with anchors best suited to substrate conditions.

3.02 ADJUSTING

- A. Adjust doors and latches to operate correctly.

End Of Section 10500

SECTION 10520: FIREFIGHTING DEVICES

PART 1: GENERAL

1.01 DESCRIPTION OF WORK

- A. Work Included in This Section: Provision of firefighting devices, consisting of hand-portable fire extinguishers and metal cabinets, located where shown on the Drawings.

1.02 INCORPORATED DOCUMENTS

The provisions and requirements of the General and Supplementary Conditions and Division-1 Specifications sections of these Bid Documents apply to this section. The Contractor shall be responsible for, and governed by all requirements thereunder.

In addition to the Codes and Standards listed in Section 01090, the applicable portions of the Codes cited below shall apply to work of this Section.

- A. Chapter 1, Subchapter 3, Title 19, CAC.

1.03 SUBMITTALS

Submittals shall be in accordance with SUBMITTALS Section and shall include catalog cuts of all devices to be provided under this Work.

PART 2: PRODUCTS

2.01 FIRE EXTINGUISHERS

All fire extinguishers shall be Dry Chemical type, be mounted in cabinets or wall mounting brackets as scheduled and indicated on the Drawings. All extinguishers shall bear the UL label indicating the rating, and shall be approved by the State Fire Marshal.

- A. Manufacturers: All extinguishers shall be the products of the same manufacturer and shall be as specified below, or an equal approved by the Architect. All extinguishers shall have minimum UL ratings as follows:
 - 1. 5 pound nominal capacity, 2A-10BC (standard extinguisher):
 - a. Larsen's Manufacturing Company, Model MP5

- b. Equal product of J.L. Industries, or other approved manufacturer.
 2. 10 pound nominal capacity, 4A-60BC:
 - a. Larsen's Manufacturing Company, Model MP10
 - b. Equal product of J.L. Industries, or other approved manufacturer.

2.02 RECESSED CABINETS

- A. All recessed fire extinguisher cabinets for 2A-10BC extinguishers shall have trim to comply with A.D.A. maximum projection requirements. Fire extinguisher cabinets shall include inner tubs designed to maintain full fire protection when installed in fire-rated walls. Cabinets shall be of size to accommodate specified extinguishers.
 1. Solid aluminum door with no glazing in clear mill finish. Optional die cast "FIRE" handle in red finish.
 2. Heavy gauge steel box pre-finished in white baked enamel.
- B. Manufacturers: All fire extinguisher cabinets shall be the products of the same manufacturer and shall be one of the following:
 1. Larsen's Manufacturing Company: Architectural Series
 2. Equal product of J.L. Industries, or other approved manufacturer.

2.03 SURFACE MOUNTED CABINETS

- A. All surface fire extinguisher cabinets for 2A-10BC extinguishers shall be stainless steel construction. Cabinets shall be of size to accommodate specified extinguishers.
 1. Solid stainless steel door with no glazing in No. 4 finish.
 2. Heavy gauge stainless steel box.
- B. Manufacturers: All fire extinguisher cabinets shall be the products of the same manufacturer and shall be one of the following:
 1. Larsen's Manufacturing Company: Architectural Series
 2. Equal product of J.L. Industries, or other approved manufacturer.

2.04 MOUNTING BRACKETS

Provide and install mounting brackets for 40A-60BC fire extinguishers without cabinets, as recommended by manufacturer for specified extinguishers.

PART 3: EXECUTION

3.01 INSTALLATION

Install the firefighting devices where indicated on the Drawings and in full accordance with all pertinent regulations under direction of the local Fire Authority and the manufacturer's recommendations, setting the top of the cabinet no more than five feet above the finish floor, and anchoring all components firmly in place for long life under hard use.

3.02 SERVICE

Determine the approximate completion date of the Work and then inspect, charge, and tag the fire extinguishers at a date not more than ten days before nor less than one day before actual completion date of the Work.

End Of Section 10520

SECTION 10800: TOILET AND BATH ACCESSORIES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION

A. Work Included in This Section: Provision of all toilet and bath accessories indicated on the Drawings and Specified herein:

B. Related Work Specified Elsewhere:

1. Provisions of blocking under ROUGH CARPENTRY Section.

1.03 SUBMITTALS

A. Product Literature: Submit in accordance with the SUBMITTALS Section of these Specifications, manufacturer's product literature for each scheduled item including recommended methods of installation.

B. Samples: Submit sample of any item proposed as a substitution, when requested by the Architect.

PART 2: PRODUCTS

2.01 FASTENINGS

All toilet and bath accessories shall be complete with all required fastenings, and all fastenings shall be compatible with the support material.

2.02 TOILET AND BATH ACCESSORIES

All toilet and bath accessories shall be as indicated on the Drawings and scheduled in Article 3.02, or an equal approved by the Architect.

PART 3: EXECUTION

3.01 INSTALLATION

All toilet and bath accessories locations shall be confirmed with Architect prior to installation and shall be installed in full accordance with the manufacturers' recommendations, anchoring all components firmly in place for long life under hard use.

3.02 SCHEDULE

Scheduled items are the products of Bobrick, or equal products of Bradley or other manufacturer approved by the Architect.

<u>ITEM</u>	<u>NO.</u>	<u>DESCRIPTION</u>
T1	B-293-2240	22" wide x 40" high tilting mirror, stainless steel, surface mount.
T2	B-43944	Paper towel dispenser/waste disposal, stainless steel, recessed mount, "Contura" series.
T3	B-8221	Lavatory/sink mounted liquid soap dispenser, 20 oz. Capacity, stainless steel.
T4	B-5806 x 48	48" grab bar, satin stainless steel, concealed mounting.
T5	B-4353	Sanitary napkin disposal, stainless steel, recessed mount, "Contura" series.
T6	B-4388	Multi-roll toilet tissue dispenser, stainless steel, recessed mount, "Contura" series.
T7	B-526	Paper towel dispenser, stainless steel, recessed counter mount, "TrimLine" series.
T8	B-223 x 24	Mop and broom holder, stainless steel, surface mount.
T9	B-4288	Multi-roll toilet tissue dispenser, stainless steel, surface mount, "Contura" series.
T10	B-270	Sanitary napkin disposal, stainless steel, surface mount, "Contura" series.
T11	B-4221	Seat cover dispenser, stainless steel, surface mount, "Contura" series.
T12	B-5806 x 36	36" grab bar, satin stainless steel, concealed mounting.
T13	B-2621	Paper towel dispenser, stainless steel, surface mount.

T14	B-5806 x 24	24" grab bar, satin stainless steel, concealed mounting.
T15	B-5192	Folding shower seat, stainless steel frame, phenolic top, 22" wide.
T16	B-9542	Coat hook, stainless steel, surface mount, "Fino" collection.
T17	B-4207 x 60	1" diameter curved shower rod, stainless steel, surface mount. Complete with B-204-3 70" wide vinyl curtain.

End Of Section 10800

SECTION 11110: LAUNDRY EQUIPMENT

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 GENERAL

- A. Work Included in This Section: Provision of all laundry equipment as shown on the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. PLUMBING Sections
 - 2. HEATING, VENTILATING AND AIR CONDITIONING Section
 - 3. ELECTRICAL Sections

1.03 QUALITY CONTROL

- A. Manufacturer Qualifications: Manufacturer regularly and presently manufactures laundry equipment.
- B. Electrical Components and Devices: UL listed and labeled for intended use.

1.04 SUBMITTALS

Submittals shall be in accordance with the SUBMITTALS Section of these Specifications.

- A. Manufacturer's Literature and Data: Include illustrations and descriptions of laundry equipment.
- B. Operating Instructions

PART 2: PRODUCTS

2.01 REQUIRED EQUIPMENT

- A. Equipment Schedule: As shown on the Drawings and described below.

2.02 EXTRACTOR

- A. To meet NFPA 1851:2020 requirements; direct drive drum without belt and pulley; tilted drum; stainless steel drum; glass front mounted door; stainless steel finish.

- B. Ready Rack Model EX22, or equal product of other manufacturer approved by the Architect.

2.03 GAS DRYER

- A. Commercial grade; 7 cubic feet capacity; 7-cycle; touch pad controls; heavy-duty 220 c.f.m. exhaust fan; stainless steel cylinder; reversible door; stainless steel finish.
- B. Speed Queen Model DF7000SG, or equal product of other manufacturer approved by the Architect.

PART 3: EXECUTION

3.01 INSTALLATION

Install all laundry equipment according to manufacturer's written instructions.

3.02 TESTS

- A. Field test installed units after service systems are pressurized for proper operation.
 - 1. Operate each component of equipment. During and after testing, there shall be no evidence of leaks, electrical malfunction, or other symptom of failure.
 - 2. For units that fail testing, make adjustments and corrections to installation, or replace units, and repeat tests until units operate properly.

3.03 PROTECTING AND CLEANING

- A. Protect equipment from dirt, water, and chemical or mechanical injury during the remainder of the construction period.
- B. At the completion of work, clean equipment as required to produce ready-for-use condition.

3.04 INSTRUCTIONS

Instruct personnel and transmit operating instructions in accordance with requirements in GENERAL CONDITIONS Section.

End Of Section 11110

SECTION 11450: RESIDENTIAL EQUIPMENT

PART - 1 GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Section 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of residential equipment required is indicated on drawings and in schedules
- B. Types of residential equipment required include the following:
 - Countertop Microwave
 - Refrigerator
- C. Electrical services and connections are specified in Section 16

1.03 QUALITY ASSURANCE

- A. Certification Labels: Provide residential equipment which complied with standards and bears certification labels as follows:
 - 1. Energy Ratings: Provide energy guide labels with energy cost analysis (annual operating costs) and efficiency information required by Federal Trade Commission.
 - 2. UL Standards: Provide residential equipment with UL labels.
- B. Uniformity: Provide products of same manufacturer for each type of residential equipment required. All residential equipment that occurs in same room shall be of same manufacturer in models that are complimentary.

1.04 SUBMITTALS

Product Data: Submit manufacturer's specifications and installation instructions for each type of residential equipment, including data indicating compliance with requirements. Submit operation and maintenance instructions for each item of residential equipment.

1.05 DELIVERY AND STORAGE

Deliver products to project site in manufacturer's undamaged protective containers after spaces to receive them have been fully enclosed.

1.06 SPECIFIED PRODUCT WARRANTIES

Submit manufacturer's standard written warranty for each item of residential equipment.

PART 2 – PRODUCTS

2.01 REQUIRED EQUIPMENT

- A. REFRIGERATOR. 17.5 cubic feet capacity with french doors and bottom freezer drawer. Counter depth. Filtered ice maker. Stainless steel finish with "Print Shield".
 - 1. Samsung #RF18A5101SR, or equal product of Whirlpool, Maytag or other approved manufacturer.

- B. COUNTERTOP MICROWAVE. 2.2 cubic feet capacity with 10 power levels and 1,200 watt power. Stainless steel finish.
 - 1. Kitchen Aid #KMCS3022GBS, or equal product of General Electric, Maytag or other approved manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations
- B. Built-in Equipment: Securely anchor units to supporting cabinetry or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate for proper operation of equipment.
- D. Utilities: Refer to Section 15 and 16 for plumbing and electrical requirements.
- E. Care shall be taken to prevent damage to surrounding finishes during installation. Any damage to adjacent surfaces resulting from installation shall be repaired and/or replaced at no additional cost to the Owner.

3.02 ADJUST AND CLEAN

- A. Testing: Test each item of residential equipment to verify proper operation. Make necessary adjustments.
- B. Accessories: Verify that accessory items required have been furnished and installed.
- C. Cleaning: Remove packing material from residential equipment items and leave units in clean condition, ready for operation.

End Of Section 11450

SECTION 11490: CLEANING EQUIPMENT

PART - 1 GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Section 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of cleaning equipment required is indicated on Drawings and in schedules
- B. Types of cleaning equipment required include the following:
 - Pressure Cleaning System – Central Unit
 - Pressure Cleaning System – Remote Stations
 - Pressure Cleaning System - Portable Hose Reel

1.03 QUALITY ASSURANCE

- A. Certification Labels: Provide residential equipment which complied with standards and bears certification labels as follows:
 - 1. UL Standards: Provide electrically powered equipment with UL labels.
- B. Uniformity: Provide products of same manufacturer for each type of equipment required. All cleaning equipment that occurs in same room shall be of same manufacturer in models that are complimentary.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of residential equipment, including data indicating compliance with requirements. Submit operation and maintenance instructions for each item of residential equipment.
- B. Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components.

1.05 DELIVERY AND STORAGE

Deliver products to project site in manufacturer's undamaged protective containers after spaces to receive them have been fully enclosed.

1.06 SPECIFIED PRODUCT WARRANTIES

Submit manufacturer's standard written warranty for each item of cleaning equipment.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. The products of Spray Master Technologies, Rogers, Arkansas have been used to establish the minimum performance standard for cleaning equipment. Equal products of other manufacturers approved by the Architect that meet or exceed these standards may be submitted for consideration.
- B. Requests for substitution will be considered in accordance with provisions of Section 01300.
- C. Provide all cleaning equipment from a single manufacturer.

2.02 REQUIRED EQUIPMENT

- A. Central Unit
 - 1. 2 h.p. motor; chemicals are injected by solenoid at the unit before the pump; master control panel with 24 volt lead; thermal limit switch; water level float switch assembly; automatic line pressure relief manifold with bleeder valve; manifold hose; water inlet hose; water filter; metering chemical pump with hour meter; stainless steel cover and frame; stainless steel wall mount brackets; stainless steel chemical jug folders.
 - 2. 2.2 GPH at 1000 PSI.
 - 3. 208-230 Volts (verify); Single Phase.
 - 4. Spray Master Technologies #600WCY.
- B. Remote Stations
 - 1. Surface mounted; top entry with custom modification to accept 2" stainless conduit to house feed tube and control wires; front shut-off quick connect port; touch pad controls
 - 2. Spray Master Technologies #300-1267.
- C. Portable Hose Reel
 - 1. Heavy-duty construction; powder coated finish; non-marking wheels; stainless steel gun hanger.
 - 2. Spray Master Technologies #300-5258

D. Accessories

1. 30 feet non-marking, high pressure hose.
 - a. Spray Master Technologies #300-0106
2. Foamer and Rinsing Wands
 - a. Spray Master Technologies #300-0711
3. Wall and Tile Brush
 - a. Spray Master Technologies #300-2957

E. Installation Supplies

1. 3/8" stainless steel tubing as required to connect remote stations to central unit.
2. 24 volt control wire as required to connect remote stations to central unit.
3. All conduit, insulation; connections; fasteners; clamps; and any other accessory required for a fully operable system.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations.
- B. All tubing, wire and conduit from remote stations back to central unit shall be concealed from view wherever possible. Verify any item requiring exposed installation with the Architect prior to installation.
- C. Built-in Equipment: Securely anchor units to supporting structure per manufacturer. Use only non-ferrous anchors at masonry surfaces. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- D. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate for proper operation of equipment.
- E. Utilities: Refer to Section 15 and 16 for plumbing and electrical requirements.
- F. Care shall be taken to prevent damage to surrounding finishes during installation. Any damage to adjacent surfaces resulting from installation shall be repaired and/or replaced at no additional cost to the Owner.

3.02 ADJUST AND CLEAN

- A. Testing: Test each item of cleaning equipment to verify proper operation. Make necessary adjustments.
- B. Accessories: Verify that accessory items required have been furnished and installed.
- C. Cleaning: Remove packing material from residential equipment items and leave units in clean condition, ready for operation.

End Of Section 11490

SECTION 11780: MORGUE EQUIPMENT

PART 1: GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 GENERAL

- A. Work Included in This Section: Provision of all morgue related equipment as shown on Sheet EQ-1 of the Drawings.
- B. Related Work Specified Elsewhere:
 - 1. PLUMBING Sections
 - 2. HEATING, VENTILATING AND AIR CONDITIONING Section
 - 3. ELECTRICAL Sections

1.03 QUALITY CONTROL

- A. Manufacturer Qualifications: Manufacturer regularly and presently manufactures morgue equipment.
- B. Electrical Components and Devices: UL listed and labeled for intended use.

1.04 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Scientific Equipment and Furniture Association (SEFA): Recommended Practices for Installation of Scientific Laboratory Furniture and Equipment; Fixtures

1.05 SUBMITTALS

Submittals shall be in accordance with the SUBMITTALS Section of these Specifications.

- A. Manufacturer's Literature and Data: Include illustrations and descriptions of morgue equipment.
- B. Shop Drawings: Show details of installation, coordination with mechanical and electrical work, anchorage, and other work required for complete installation.
- C. Operating Instructions

PART 2: PRODUCTS

2.01 PERFORMANCE STANDARDS

- A. This specification uses the products of Mortech Manufacturing, Azusa, CA, to establish a minimum standard for equipment performance. Products of other manufacturers that meet or exceed these established standards may be substituted if required documentation is submitted to the Architect in the prescribed manner and approval obtained.

- B. Equipment Schedule: As listed on Sheet EQ-1 of the Drawings.

2.01 MORGUE EQUIPMENT – GENERAL REQUIREMENTS

- A. Factory install service fixtures and electrical devices in locations shown on drawings.

- B. Service Fixtures, General: Heavy-grade designed for mortuary use and complying with relevant requirements in SEFA 7.

- C. Cabinets: Fabricated of prime quality type 304 stainless steel with a no. 4 satin finish. Countertops to match cabinets, 1-1/4" thick, with 4" high splashes where adjacent to walls.

1. Minimum Gauge Requirements

Cabinet Top	14 – 16 gauge
Cabinet sides, back, bottom	18 gauge
Cabinet finish back panels	18 gauge
Door and drawer outer pans	18 gauge
Door and drawer inner pans	20 gauge
Drawer body	20 gauge
Drawer suspension	14 gauge
Countertop, backsplash, sink bowl	16 gauge
Shelves, sloped tops, sub-bases	18 gauge
Hinge reinforcement	14 gauge
Table frames, legs	18 gauge

- D. Water Service Fixtures: With integral vacuum breaker and as follows:
 - 1. Female 3/8 inch threaded outlet for attachment of filter pumps, hose connectors, antihose nozzle or antispash spout ends.

 - 2. Equip with goosenecks with minimum clearance of 7-1/2 inches between threaded outlet and tabletop. Bend gooseneck 180 degrees to direct water flow vertically into sinks. Attach gooseneck to base with adapter-type connection, which will permit field conversion of swing-type to fixed-type gooseneck and fixed-type to swing-type gooseneck.

3. Unless otherwise indicated, provide water fixtures for manual operation with wrist-blade handles.
- E. Gas, Air, and Vacuum Fixtures: Needle valves with stainless-steel replaceable cone and valve seat. Equip valve with a bonnet with exterior packing and packing gland designed to permit valve to be repacked while under pressure. Valves shall withstand a minimum pressure of 100 psi without leakage. Equip valves with four-arm handles and hose ends.
- F. Waste Disposal Unit: 1/2-hp heavy-duty commercial disposer, with vacuum breaker, standpipe, solenoid valve, waterproof control switch, starter, overload protection, trap with cleanout, and necessary fittings for a complete functional unit.
- G. Electrical Outlets: Hospital grade, weatherproof duplex electrical, 110 V, 60 cycle, single phase.

PART 3: EXECUTION

3.01 INSTALLATION

Install morgue equipment according to manufacturer's written instructions and relevant requirements in SEFA 2.

3.02 TESTS

- A. Field test installed units after service systems are pressurized for proper operation.
 1. Operate each component of equipment. During and after testing, there shall be no evidence of leaks, electrical malfunction, or other symptom of failure.
 2. For units that fail testing, make adjustments and corrections to installation, or replace units, and repeat tests until units operate properly.

3.03 PROTECTING AND CLEANING

- A. Protect equipment from dirt, water, and chemical or mechanical injury during the remainder of the construction period.
- B. At the completion of work, clean equipment as required to produce ready-for-use condition.

3.04 INSTRUCTIONS

Instruct personnel and transmit operating instructions in accordance with requirements in GENERAL CONDITIONS Section.

End Of Section 11780

]SECTION 15100

GENERAL MECHANICAL AND PLUMBING REQUIREMENTS

GENERAL

DESCRIPTION

Related Documents:

The other Contract Documents complement the requirements of this Section.

Division 1 - General Requirements applies to the Work of this Section.

Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

Codes and Regulations:

In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.

Included: Work includes, but is not limited to the following:

Heating, Ventilating, Air Conditioning and System Balancing

Plumbing

Fire Protection

Carpentry and metal Work required for Work of this Section and not specifically shown under another Section. Openings in concrete or masonry construction shall be either core drilled or saw cut unless indicated otherwise on Drawings.

Excavation and Backfill

Shop Drawings

Related Work:

Painting (Division 9)

Cutting and Patching (Division 1)

Low voltage electrical control (Division 16)

DEFINITIONS

AHJ: Authority Having Jurisdiction.

CBC: California Building Code.

Furnish: Purchase and deliver to job site in new condition.

Install: Receive and store at job site until required; place secure and connect; furnish required appurtenances.

Provide: Furnish and install as defined above.

Section: Refers to a Section of these Specifications.

Standards: The issue in effect as of the date of the contract documents.

PROJECT RECORD DRAWINGS

Comply with pertinent provisions of Architectural Sections (Division 1).

SERVICE INTERRUPTIONS

When Work of this Section requires temporary shutdown of existing systems for connections, the shutdown shall be made only during pre-arranged time agreeable to the Owner.

CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

The Mechanical and Plumbing Floor, Roof and site plans are, in general, made to scale and the Contractor may obtain approximate distances and dimensions by scaling the Plans. It is distinctly understood, however, that it is done entirely at the Contractor's responsibility. Refer to Architect's Plans and Specifications for construction details, which will affect the scope of work included in this division. Examine all bid documents, including but not limited to Architectural, Civil, Structural, Mechanical, Electrical, Landscape, Irrigation, Data, Fire Protection and Plumbing Plans and Specifications to ensure that this work does not conflict with the above trades. Plumbing, and Mechanical Plans are diagrammatic and, therefore, do not necessarily represent the exact installation. However, pipe sizing for utility services and ductwork are calculated per their respective codes and Standard Engineering Practice and shall be installed as sized from point of origin to terminal point. It shall remain the Contractor's responsibility to submit Shop Drawings if he/she has any questions about the final arrangement. Nothing on these Plans or Specifications shall be construed to permit work not conforming to all applicable codes and regulations.

PRODUCTS

ACCESS PANELS

If not called for under other Sections, furnish Milcor, Elmdor, or Jay R. Smith access panels where shown on the Drawings or required for maintenance access to completed Work of this Section. Submit size, type, and location of proposed access panels not specifically shown, for review by Architect.

Access panels shall be constructed of 16 gauge prime coated steel or stainless steel with screwdriver operated cam latch, concealed hinges, and fire rating equal to adjacent construction.

Provide flush type doors with:

Stainless steel finish for tiled surfaces.

Prime coated finish for other surfaces.

FLASHING

Provide watertight flashing at all openings through exterior walls and roof. Refer to Architectural Drawings.

BELT DRIVES

All belts shall be "Vee" type, or approved equal. Sheaves shall be adjustable and shall be sized to drive fan at scheduled RPM when set at midpoint of adjustment range. All belt drive assemblies shall be rated at 150% of drive motor horsepower. OSHA approved belt guards shall be provided over all drive assemblies. The Contractor shall change any belts and drives as required to produce the specified CFM.

VIBRATION ISOLATION AND NOISE CONTROL

All fans, heating and ventilating units, air conditioning units, blowers and similar equipment shall be securely mounted to and/or supported from the structure.

Isolate all bare water piping from structural members or hangers with "Trisolators" or submitted and approved equal insulating sleeves. Install hangers on outside of insulated jacket on all insulated lines.

WEATHERPROOFING

All equipment exposed to weather shall be protected by means of a suitable finish (e.g. paint). All fan cabinets, roof-mounted equipment, and ductwork shall be fabricated in such a manner to prevent leakage through seams and joints. Water rated, exterior hoods shall be provided over motors, belts, and other devices to insure against damage by water. At all locations where pipes and/or ducts penetrate exterior walls, or roofs, suitable weather tight flashing shall be provided.

PIPE WRAPPING

All pipe, metal components, and joints buried in ground shall be primed and protected with 10-mil tape double wrapped or approved equal per the latest addition of IAPMO IS 13. Before tape application, all bare pipe and fittings to be wrapped must be coated with pipe wrap primer. Stretch first layer of tape to conform to the surface while spirally half-lapping, apply a second layer, half-lapped and spiraled as the first layer with spirals perpendicular to first wrapping. In lieu of tape wrap, heat shrinkable 10-mil minimum thick polyethylene sleeve may be used.

When applying tape, use only enough pull to cause the tape to properly conform to the irregular surfaces of the item. The proper amount of pull is reached when the tape surface is smooth without any wrinkles. Continue tape 4" above finished grade. End overlaps should point down. Tape shall be applied per manufacturer's installation instructions.

ELECTRIC MOTORS AND ELECTRICAL DEVICES

All Electric motor current characteristics are as shown in equipment schedules on drawings and as specified hereinafter in this Specification. The Contractor shall refer to the Electrical Plans and shall confirm all voltage, amperage and phase characteristics before processing submittals or ordering equipment. If any equipment is installed different from the supplied electrical power, it is the contractor's responsibility to correct equipment to the required electrical characteristics.

All electrical devices of a type normally listed by Underwriters Laboratories, Inc. (UL) shall bear the UL label of approval.

EXECUTION

GENERAL EQUIPMENT INSTALLATION REQUIREMENTS

Install equipment to provide neat appearance, required manufacturer's operational and access clearance, and required space to allow replacement or maintenance. Provide curbs, platforms housekeeping pads, bases, supports, anchor bolts, and other items required to install equipment. Installation shall be level and braced per the latest addition of the CBC.

Equipment shall operate quietly and without objectionable vibration. Excessive vibration, other than from specified equipment operating at optimum conditions, shall be the Contractor's responsibility to correct and shall be eliminated as directed by Architect.

COORDINATION OF WORK

Coordinate Work of this Section with Work of other Sections to avoid conflicts. If required, provide shop drawings and submit to Architect for approval.

Insure that Work of other Sections is suitable to accommodate Work of this Section.

ADEQUACY OF FURRING

Conceal piping and ductwork in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect prior to ordering materials and fabrication of components.

PROTECTION AND CLEANING

At the time of rough-in installation and during storage on the construction site and until final startup of heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or other methods acceptable to Architect, Engineer and AHJ.

Protect equipment, ductwork and piping from dirt, moisture, and mechanical damage during construction. Restore or replace damaged equipment to original condition.

Keep interior of piping free of foreign material during construction. Flush piping systems with test medium specified under Piping Tests before installing equipment and appurtenances or making final connections.

CLOSING-IN OF UNINSPECTED WORK

Do not conceal or cover Work before tests and observations are completed. Uncover Work prematurely closed in and repair resulting damage to all Work, if requested by Architect, Engineer, or AHJ.

DAMAGE

Repair or replace items damaged by leaks or overflow from Work provided under this Section and for any damage to any part of the project site, for a period of 1 year after notice of completion date. This is in addition to and not a limitation of other rights the Owner may have against the contractor under the Contract Documents.

MECHANICAL SYSTEM TESTING

Furnish all test pumps, gauges, and equipment. Test all safety controls and devices.

For air tests, install a calibrated test pressure gauge in the piping system to observe any loss in pressure. Calibrate the test pressure gauge with a dead weight tester within 15 days before use and certify by initial and date on a sticker applied to the dial face. Maintain the required test pressure for the time indicated. Apply leak detector such as Oatey All Purpose Leak Detector to check for leaks if the required pressure cannot be maintained.

After any test, repair all leaks found as directed and re-test as necessary until the system is proven tight.

Before applying test pressure to any piping systems the Contractor shall be responsible for isolating all equipment e.g. control valves, regulators, relief devices, tanks and any other line accessories, which would otherwise be damaged by the test pressure.

Soil, Waste, Vent, Roof, and Condensate Drainage:

Entire System: Tightly close all openings except the highest one. Fill to overflowing with water.

Sections of System: Tightly close all openings except the highest opening of the section under test. Fill section with water to test each section with a minimum 10-foot head of water except for the uppermost 10 feet of the system.

Allow to stand for four hours or longer, as required to complete the inspection.

Domestic Water: Fill with water and test at 150 psig. Retain for four hours.

Gas Piping: Air test to pressure equal to one and one-half times the design pressure, but in no case less than 50 psig. Retain for four hours.

Refrigerant: Pressurize the system with nitrogen to 200 psig and hold for twenty-four hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.

After all Systems have been tested as outlined, all flow rates shall be balanced, and all control devices adjusted. See Section 15600.

The equipment and installations shall be operated by the Contractor and he/she shall demonstrate that all Systems are performing according to the requirements of the Plans and Specifications and to the satisfaction of the Architect, Engineer and Owner.

Acceptance Testing Requirements: For applicable acceptance tests see the energy compliance documentation. Acceptance testing shall be the responsibility of the mechanical contractor and shall be performed by an Acceptance Testing Technician who has been certified by a California Energy Commission approved Acceptance Test Technician Certification Provider Program. The Test and Balance Contractor can also be the Acceptance Testing Technician

CUTTING AND PATCHING

The Contractor shall do all cutting and patching which may be required for the installation of the Work under this Division of the Specifications. Patching shall be of the same quality, materials and finish as, and shall match accurately, all surrounding construction. No cutting of the Structure shall be permitted without the approval of the Architect.

Wherever concrete or paved surfaces are cut to provide for the installation under this Section, the Contractor shall restore the surfaces to their original condition. Sub grade materials, concrete, and paving materials, along with the placement of same, shall be in accordance with the respective Sections of this Specification as they apply to the installation of such material.

EXCAVATION AND BACKFILL: (BURIED PIPES WITHIN THE BUILDING WALLS AND TO 5 FEET FROM THE BUILDING.)

Dig trenches straight and true to line and grade; bottom shall be left smoothed of rock points. Pipe shall be supported for the entire length on undisturbed, original earth. The minimum trench width shall be 16" and all pipe shall be 2 feet below the finished grade, minimum, wherever conditions permit. Sewer pipes to be below grade as necessary to meet the slope and invert on the Drawing. Whenever substantial variations of pipe bury is indicated by field conditions, the proposed changes in depth of bury shall be submitted, in writing, to the Architect for approval.

All piping shall be laid on a bed of clean dry sand not less than 6" thick. The space between the pipe and the sides of the trench shall be backfilled with clean dry sand to a point 6" above the crown of the pipe. Both sides of the pipe shall be filled at the same time.

The remainder of the trench shall be backfilled with native soil in lifts no greater than 12" and shall be mechanically compacted by tamping so to maintain a minimum relative dry density of 95%, determined by California Impact Test Method No. 216.

Trenches shall be backfilled immediately after approval. All backfilling shall be brought flush with finished sub grade. Excess material shall be removed and disposed of by the Contractor unless otherwise directed by the Architect.

INSTALLATION OF PIPING, DUCTWORK AND EQUIPMENT

The installation of piping, ductwork, and equipment shall be made in such a manner to clear beams and obstructions. Do not cut into or reduce the size of plates or any load carrying members without approval of the Architect. Check Drawings and Work of others to prevent interference. Deviations of the Work determined by the Architect shall be installed by the Contractor without additional cost.

Install piping and ductwork promptly, cap or plug open ends of pipe. No piping shall be permanently covered by construction before inspection and approval. Piping and ductwork shall be installed in accordance with best practice and recommendations of the manufacturer.

Conceal piping and ductwork unless indicated otherwise. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Remove defective material from site. Install piping generally level, free of traps and unnecessary bends to conform with building requirements, and provide space for other work. Piping to be free of unusual noises. Avoid any possible galvanic action by isolating dissimilar metals with suitable Dielectric Insulating Fittings.

Unless called for otherwise, hereinafter in this Specification or by specific detail on the Drawings, all water pipes in contact with structure and/or hangers shall be suitably isolated. In the case of uninsulated pipe, "Trisolators" or equal shall be used.

Protect enameled or polished equipment from damage, tool marks, etc.

STERILIZATION OF PIPES

After preliminary purging of the Systems, the entire domestic potable water system pertaining to Work under this Contract shall be chlorinated in accordance with American Water Works Association, State of California Health and Safety Code procedure for disinfecting water mains. A thorough flushing operation shall be run upon completion of sterilization. Contractor shall then arrange with local health authority for test on mains and water systems and provide three (3) copies of test results to the Architect.

EQUIPMENT IDENTIFICATION TAGS

Major pieces of equipment shall include, but are not limited to: water heaters, air conditioners, unit heaters, supply and exhaust fans, and shall be tagged.

Tags shall be 2" tall, 1/8" thick, and length as required for the lettering. Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.

Tags shall be white with 3/4" high red engraved letters.

Tags shall be attached to the equipment with bolts, screws or chains as per valves.

Tags shall have the following information:

Equipment number and nomenclature corresponding to the information on the Mechanical and Plumbing contract drawings.

Examples: WH-1, AC-3, EF-10

SEISMIC BRACING

It shall be required that pipes, ducts and conduits be supported and braced per the most current edition of the SMACNA "Seismic Restraints Manual Guidelines for Mechanical Systems."

When the SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems" does not specifically address the size of duct or pipe to be braced, the following shall apply:

All ducts shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and AHJ.

All pipes shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and AHJ. Absolutely, no "Plumber's Tape" shall be used anywhere on this project.

The SMACNA Manual can be obtained through SMACNA (VA) at (703) 803-2989. Contractor shall obtain manual prior to the start of any work.

OPERATION AND INSTRUCTION

The Contractor shall furnish competent Technicians to supervise start-up operations of equipment specified by the Architect or Engineer and to instruct Owner's operators. The Contractor shall furnish operating instructions and service manuals to the Architect in the form of a PDF file.

Instruction period shall be started after instruction and service manuals have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect or Owners agent.

Service manuals shall include oiling, cleaning, and servicing data, compiled in clearly and easily understood form and in a durable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

WARRANTY

Job Name: Tulare Co Morgue

Page 9

Job Number: 23013

Section 15100

The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or Owner.

END OF SECTION 15100

SECTION 15400

PLUMBING

GENERAL

DESCRIPTION

Related Documents:

The other Contract Documents complement the requirements of this Section and apply to this Section

Division 1 - General Requirements and Section 15100 and 15995 Commissioning of HVAC and Plumbing Systems apply to the Work of this Section.

Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

Codes and Regulations:

California Plumbing Code (CPC).

California Mechanical Code (CMC).

California Building Code (CBC).

California Green Building Stand Code.

National Fire Code (NFC).

National Fire Protection Association (NFPA).

Local Building Department.

Local Fire Marshal.

Office of the State Fire Marshall.

Division of the State Architect.

Office of the Statewide Health Planning and Development.

California Energy Commission.

In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

Scope of Work: (Plumbing Section Division 15)

Material and labor including rough-in for and connection to fixtures, appliances and equipment are:

WASTE AND VENT

Soil piping

Drain waste and vent piping (DWV)

Indirect waste piping

Area drains.

Floor drains.

Traps.

Vent flashings.

SEWERS (To five feet beyond building)

Including metallic or non-metallic piping used to convey sewage and other waste to, and including, connection with offsite utility or onsite treatment and disposal system.

Manholes (pre-cast or pre-formed), cesspools, septic tank systems, and leaching lines, backwater valves and lift stations.

STORM AND SUB-SOIL DRAINAGE

Roof and overflow drains, including flashing, rain water drainage piping. Exterior rainwater leader downspouts (10 gauge and heavier).

WATER

Potable water piping systems including above and below grade tanks, pressure reducing valves, relief valves, balancing valves, water hammer shock absorbers, air chambers.

Isolation, Zone and Control Valves.

Hot water systems including heaters and storage tanks.

Disinfecting of water systems.

Insulation of piping and equipment for heat, sound, and vibration.

Backflow preventers.

ALL PLUMBING FIXTURES AND SUPPORTS

Including, but not limited to:

Sinks, lavatories, water closets, urinals, tubs, service sinks, etc., - all materials

Shower pans, shower receptors, and shower stalls

Supports (backing) for all plumbing fixtures and accessories

Installation of sinks in or part of drainboards - all materials

FUEL GAS PIPING

Natural distribution, meters, regulators and connections to all gas fired equipment.

PIPE IDENTIFICATION – Refer to Section 15100

CONNECTIONS

Utilities-Sanitary sewer, storm drain, water, gas

Make-up water for heating and cooling systems

Hot water tanks

Temporary water, waste lines

The joining of pipe by any mode or method including, but not limited to, acetylene and arc welding, brazing, lead burning, plastics welding, soldering, wiped joints, caulked joints expanded or rolled joints, etc., used in connection with any of the work listed herein.

LAYOUT AND CUTTING

Holes, chases, channels, the setting and erection of bolts, inserts, stands, brackets, stanchions, supports, sleeves, escutcheon plates, thimbles, hangers, conduits, and boxes.

LAUNDRY, DRY CLEANING SYSTEMS

Water, drain and vapor vent piping

Other drain and vent piping and connections thereto

EXCAVATION, TRENCHING AND BACKFILL

In connection with plumbing and piping work shown herein

TEMPORARY PIPING in connection with:

Building and construction work

Excavating and underground construction

Demolition work

PIPE HANGERS, SUPPORTS, ANCHORS, GUIDES, EXPANSION JOINTS

Including:

Supports for equipment to which pipe is connected, such as tank supports

Isolators-dielectric and vibration

Anchors and thrust blocks of concrete, metal, etc.

Seismic bracing

Anvil/Badger, Mason Industries, B-Line/TOLCO or approved equal.

Seismic hanger system design shall comply with CBC 2022 requirements and ASCE 7-16.

SIGNS AND NOTICES

ROOF FLASHINGS FOR PIPING PENETRATIONS

TESTS

Piping, for tightness

Equipment for performance

Operating instructions

Final operation

ACCESSIBLE PLUMBING FIXTURES

Accessible plumbing fixtures shall comply with all of the requirements of CBC 11B-213, 11B-305, & 11B-308.

QUALITY ASSURANCE

Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

Welder's Qualifications: Comply with ASME B31.8. The pipe welder shall have a copy of a certified ASME B31.8 qualification test report. Contractor shall also conduct a qualification test. Submit each welder's identification symbols, assigned number, or letter, used to identify work of the welder. Affix symbols immediately upon completion of welds. Welders making defective welds after passing a

qualification test shall be given a requalification test and, upon failing to pass this test, shall not be permitted to work this contract.

SUBMITTALS

Comply with pertinent provisions of Architectural Sections.

Product Data: Within 35 calendar days after the Contractor has received the Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:

Materials list of items proposed to be provided under this Section.

Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.

Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.

All submittals for the entire project shall be submitted at the same time. Submittals shall be provided in PDF format. Incomplete or noncompliant submittals may be rejected.

DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.

Acceptance of alternate products by Architect does not change this requirement.

PRODUCT HANDLING

Comply with pertinent provisions of Architectural Sections.

PRODUCTS

WASTE, VENT, SEWER AND STORM DRAINAGE

Above Grade

All waste, vent, sewer and storm lines shall be of cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888 or ASTM A-74 for all pipe and fittings. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and be listed by NSF International.

1.A.1.a. Acceptable Manufacturers:

AB&I Foundry

Charlotte Pipe and Foundry

Tyler Pipe Company

Joints

Joints for hubless pipe and fittings shall conform to the manufacturer's installation instructions and local code requirements. Hubless coupling gaskets shall conform to ASTM Standard C-564 and be listed with NSF International. Couplings shall consist of a 304 stainless steel shields, clamp assembly and a high quality elastomeric gasket conforming to ASTM 564. Clamp shall be 4 band construction, Husky HD 4000 or approved equal.

Mandatory Referenced Standards

Cast Iron Soil Pipe Institute Standard Specifications - Latest Issue

CISPI 301: Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

CISPI 310: Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

ASTM Standard Specifications - Latest Issue

A-888: Standard Specifications for Hubless Cast Iron Soil Pipe and Fittings.

C-564: Standard Specifications for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

Below Grade:

Schedule 40 Solid wall PVC plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 1785 - Latest Issue.

- 1.A.1.a. SCH. 40 Solid Core PVC plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 4396 may be used at Contractor's option for vent piping. -Latest Issue.

Condensate (sized per CMC) and indirect waste drains

Type L Copper Water Tube ASTM B88 with wrought Copper solder fittings, ANSI-B16.22

DOMESTIC WATER PIPING

Below Grade (Water Service)

3" NPS and smaller, Schedule 40 PVC Plastic Pipe and fittings. ASTM D1785, D2466, with Solvent Cement Joints ASTM D2564.

2" NPS and smaller, Type K Soft Annealed Temper Copper Tube ASTM B88 with Wrought Copper pressure fittings, ANSI B16.22. SIL-FOS - High temperature Brazing Metal Filler.

Above Grade (Distribution System)

Piping

- 1.A.1.a. For soldered, brazed and mechanical joints, 4" and smaller Copper Water Tube Type L Annealed Temper (Hard Drawn) ASTM B75 or ASTM B88.

Fittings

- 1.A.1.a. Wrought Copper Pressure Solder Fittings, ASME B16.22 or ASME B16-25, 95-5 Tin-Antimony Filler Metal.

Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

Copper Unions: MSS SP-123, cast-copper alloy, hexagonal-stock body, with ball-and-socket, met-to-metal seating surfaces, and solder-joint or threaded ends.

Below Grade (Distribution System)

Piping

- 1.A.1.a. All underground water piping within the building boundaries shall be ASTM B88-93a Type "L" annealed (soft) copper tube made up without fittings below the floor level.

GAS PIPING

Below Ground

Polyethylene (PE) Natural and Liquefied Petroleum Gas Yard Piping ASTM D2513 with Fusion Joints. Provide Steel Transition Risers and Detectable Warning Tape.

Above Ground

Schedule 40, Seamless Black Steel Pipe ASTM A 120 2 1/2" and smaller with Malleable Iron Threaded fittings ANSI B16.3 Class 150.

PUMP DISCHARGE PIPING

Discharge piping from sump/sewage pumps shall be Schedule 40, ASTM A-120-84, galvanized steel pipe with ANSI B16 galvanized malleable iron fittings. Four inch and larger pipe shall be made up with welded fittings and 125# flanges.

FLUE VENT PIPE AND FITTINGS

For condensing equipment: IPEX System 1738 pipe, fittings, terminations, and cement. All materials shall be third party listed to UL 1738. Materials shall comply with ASTM D1784 and have a cell class of 12454 or 23447. All materials that make up the venting system shall be by the same manufacturer and shall be installed per the manufacturers installation instructions.

Flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Flues or vents shall terminate as required per current CMC.

Vent cap shall be of the same manufacturer as the flue pipe.

VALVES

Acceptable Manufacturers: Milwaukee, Hammond, NIBCO, Jomar, Watts, others as noted.

<u>Type</u>	<u>Size Range</u>	<u>Part Number</u>
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Ball	2" and smaller (2 piece)	Milwaukee UPBA400 Hammond UP8301A NIBCO 585-80-LF
Ball	2-1/2" and larger (3 piece)	Milwaukee UPBA300 Hammond UP8604 NIBCO 595Y-LF
<p>Note: Stem extensions of non-thermal-conductive material and protective sleeve that meets UL 2043 approved for inside air plenum and allows operation of the valve without breaking the vapor seal shall be used on insulated pipe. NIBCO NIB-Seal handle or acceptable equal.</p>		
Gate	2" and smaller	Milwaukee UP115 Hammond UP645 NIBCO T-113-LF
Gate	2-1/2" or larger	NIBCO F-619-RW
Gate-Underground	3" and larger	Mueller A-2362 NIBCO F-619-RW
Check-Swing	2" and smaller	Milwaukee UP509 Hammond UP943 NIBCO 413Y-LF
Check-Spring	2" and smaller	Milwaukee UP548T NIBCO 480Y-LF
Check-Swing	2½" and larger	Apollo 61YLF NIBCO F-910-B-LF

Check-Spring	2-1/2" and larger	NIBCO F-938--33
Gas Cock (ball)	2" and smaller	Milwaukee BA475B Hammond 8901 NIBCO FP600
Gas Cock (plug)	1/2" to 4"	Homestead 611/612 Walworth 1796/1797 (with wrench)

All pump discharges shall have a check valve placed minimum 5 pipe diameter from the pump.

NIBCO W920W or F910B

Acceptable equal.

All below grade ball valves shall have stainless steel handles.

HANGERS AND SUPPORTS

In general, all pipe hangers and supports shall conform to the following except where special pipe hangers and supports are detailed on the Drawings. In all cases hanger and support details on the Drawings shall take precedent over the following:

<u>Items</u>	<u>TOLCO</u>	<u>Anvil</u>
Pipe Hanger	1; 2; 200	260
Side Beam Clamp for Wood Joist	58	207
Beam Coupling for Steel Beams	65	92
Rod Coupling for Connection to "Hilti"	70	135
Inserts in Concrete Decks	107;109A;109AF	N/A
Trapeze Hangers	Tolstruct A12	AS200
Pipe Clamp	Tolco Cush Clamp	AS004OD – AS098OD

Similar items by Anvil International, Erico-Caddy, or TOLCO/B-Line will be acceptable.

Hanger Rods shall conform to the following table:

<u>Tube/Pipe Size</u>	<u>Rod Diameter</u>
1/2" to 4"	3/8"
5" to 8"	1/2"
10" to 12"	5/8"

Trapeze hangers may be used where parallel runs of pipe occur. All rods on trapeze hangers shall be 1/2" minimum size.

Hanger Support Spacing shall be as follows unless shown otherwise on the Drawings:

Horizontal:

1.A.1.a. Cast Iron: Every other joint unless over 4 feet, then at every joint.

Copper: Every 6 feet for 1-1/2 inch and smaller, and 10 feet for 2 inch and larger.

Steel, Gas: Every 6 feet for 1/2 inch, 8 feet for 3/4 inch and 1 inch, and 10 feet for 1-1/4 inch and larger.

Vertical:

1.A.1.a. Cast Iron: Base and every floor not to exceed 15 feet.

Copper: Every floor not to exceed 10 feet.

Steel, Gas: Same as horizontal spacing except 1-1/4" and larger at every floor.

Refer to the plumbing code for materials not listed above.

At all points where insulated pipe contacts a hanger or support, the point of contact shall be protected by a metal insulation pipe shield #B3153 as manufactured by B-Line. Equivalent pipe protectors will be considered provided the substitute item meets the same standard of quality and performance as the specified item.

Seismic restraint devices

Available Manufacturers:

1.A.1.a. Anvil/Badger

Mason Industries

B-Line Tolco Division of Eaton

Seismic hanger system design shall meet the requirements of IBC, CBC and ASCE 7-16.

WALL AND FLOOR PENETRATIONS

Fire walls and floors:

Wall and floor penetrations shall be protected with a U.L. approved fire rated system. The system shall be per the Drawing Details, or other manufacturer's installation instructions.

Fire stopping materials by Hilti, Metacaulk, or 3M are considered equal. The material shall be the same as called out for in the U.L. approved system.

Poured concrete walls and floors.

Pipes penetrating poured concrete walls and floors shall be protected by providing the following:

- 1.A.1.a. A Schedule 40 PVC sleeve one (1) size larger than the pipe or one quarter (1/4) inch of foam material wrapped around and secured to the pipe or packed and caulked with mineral wool.

Protection shall end flush with the wall or floor surface.

All walls and floors:

Piping passing through walls and floors exposed to view shall be provided with chrome plated split-ring escutcheon plates in finished areas. Brass or galvanized escutcheon plates may be used elsewhere.

FLASHING

All flashing shall be 4 lb. sheet lead and all vents penetrating the roof shall be flashed and counter-flashed. Stoneman Co. roof flashing assembly with 10" skirt or equal may be used.

The flashing for vents penetrating a metal roof shall have a corrosion resistant aluminum base compatible with the roofing system. A rubber type flashing by "Tech Specialties" shall be installed between the flashing and pipe.

For single ply roofing, provide flashing per roofing manufacturer recommendations or installation instructions.

VALVE BOXES

Brooks Products Inc., Christy Co., or equal with the word "Water" or "Gas" cast in cover as applicable.

CLEANOUTS

Provide cleanouts per Drawings and details on Drawings. Cleanouts as manufactured by J. R. Smith, Mifab, Wade, or Zurn are approved equals.

Cleanout tops to be installed with tamper-proof screws.

FLOOR DRAINS, FLOOR SINKS AND ROOF DRAINS

Provide drains as specified on the Plumbing Schedule. However, drains as manufactured by Watts, J.R. Smith, Mifab, Wade, or Zurn will be acceptable provided they are equal.

Floor sinks by Watts, J.R. Smith, Mifab, Wade, Zurn, or Commercial Enameling are acceptable provided they are equal.

WATER HAMMER ARRESTORS

Provide Watts #LF15M2, Wilkins Piston Model #1260XL, Sioux Chief #65X-X or equal, as sized on the Drawings or required by PDI. Install per manufacturer's instructions.

AUTOMATIC TRAP PRIMERS

Provide Precision Plumbing Products, J.R. Smith, Mifab or Sloan as specified on the Drawings. Install per manufacturer's instructions.

PLUMBING FIXTURES

Fixture locations, quantities, types, sizes and connections shall be as shown on both the Plumbing and Architectural Drawings. If a conflict in fixture location is noted between the Plumbing and Architectural Drawings, the Architectural Drawings shall take precedence.

Fixtures shall be thoroughly protected against damage to the chrome plate or enamel, by chipping, scratching or other damage during the entire period of construction. Roof drains, floor sinks and drains, toilet and sink drains, plumbing vents, and all

other similar fixtures shall be covered to prevent trash from entering the pipes until final installation of grates, domes, fixtures or other protective devices.

Provide fixtures as specified in the Plumbing Schedule. American Standard, Crane, Kohler, or Just are acceptable substitutes as equal if approved by Engineer.

Fixture carrier numbers listed are as specified on the Plumbing Schedule; however, carriers as manufactured by J.R. Smith, Mifab, Wade, or Zurn, are acceptable provided they are equal.

CONNECTORS

Provide Brass Craft "Speedway" or equal heavy pattern iron pipe size brass stops, rigid or flexible supplies and chrome plated brass "P" traps. Stops in "Public" areas to have screwdriver slots and those in "Private" areas to have all cross handles.

Provide Brass Craft or equal flexible stainless steel braided water supplies to appliances. They may also be used to fixtures as an option to rigid supplies. Aquaflo is an acceptable substitute.

Provide Brass Craft flexible or equal, stainless steel gas appliance connectors. Dormont is an acceptable substitute. Diameter of connector to be as recommended by manufacturer based on connector length and rated capacity of equipment.

ACCESS BOXES

See section 15100 for access panels.

PRESSURE GAGES AND THERMOMETERS

Provide Marsh Quality gages or equal with 3-1/2" dial, gage cock, in type required. For pump suction, provide compound type.

Provide Trerice 7" BX or 3" Bimetal Dial series thermometers or equal, straight, angle, or oblique as required, equipped with separable sockets and well. Provide extension necks as required on insulated line.

Arrange gages and thermometers for easy reading.

PRESSURE REGULATORS AND BACKFLOW PREVENTORS

Provide the pressure regulator(s) and backflow preventer(s) as specified on the drawings and/or as required by the governmental authority having jurisdiction.

Pressure regulators and/or backflow preventers by Febco, Hersey, Watts or Wilkins are considered equal when their pressure fall-off/loss is equal to or less than the specified regulators/preventer's loss for the given flow rate.

Provide all potable water outlets with hose attachments with non-removable hose bibb backflow preventers per the C.P.C.

WATER HEATERS

Provide water heaters as specified in Plumbing Schedule or approved equal of size, capacity, recovery, and KW/BTUH input. American, A.O. Smith and State are considered equal. Heater shall be A.G.A. or U.L. listed.

Heater storage tank shall be provided with magnesium anodes, approved standard pressure/temperature relief valve and all standard factory trim.

Gas heaters shall be provided with an A.G.A. approved 100% safety shut-off.

Provide approved flexible copper supplies for the water heater water connections.

Instantaneous tankless water heaters shall be with water flow activated switch to energize the electrical/gas power source, a safety high water temperature limit, and all standard factory trim.

Provide a Smitty Co., Benjamin Co. with 1" drain outlet or equal, water heater pan as specified in the Water Heater Schedule.

PRESSURE-TEMPERATURE RELIEF VALVE

Pressure-temperature relief valve shall be Wilkins TP220, or TP3000 Series or equal.

EXPANSION TANK

Expansion tank shall be Wilkins WXTP series as specified on the Drawings or approved equal in size and capacity. Amtrol and Watts expansion tanks are considered equal.

WATER HEATER SEISMIC RESTRAINTS

Seismic restraints shall be Holdrite model QS-50 or QS-120 or approved equal as applicable for the water heater specified.

PROTECTIVE INSULATION (ADA FIXTURES)

Provide approved manufactured, EVA foam antimicrobial material protective pipe and fitting covering for exposed waste and drain assembly and for hot and cold water supplies and stops. Protective system shall consist of pre-formed pipe or tubing sleeve and pre-formed fitting patterns for trap and stops.

Provide protective covering for off-set drain assembly and disposer at kitchen sinks.

Foam pipe wrap, duct tape, baggy-type covers, tie-strap fasteners are not acceptable.

Acceptable manufacturers:

Oatey Dearborn "Safety Series"

Truebro "Lav-Guard"

Plumberex "Pro-Xtreme"

INSULATION

All pipe insulation shall conform to Section 120.3 of the California Energy Efficiency Standards except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent. Outside insulation shall be protected with a hard plastic or metal shell covering.

Insulation material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASRM-E-84, NFPA 225 or U.L. 723.

Domestic cold water piping shall be insulated with a minimum 1" insulation in unheated areas of the building and where exposed outside of the building.

Domestic hot water piping shall be insulated with Owens-Corning Fiberglass heavy density pipe insulation 25 ASJ/SSL-II (All Service Jacket/Double/ Self-Sealing Lap). Insulation shall be UL rated non-combustible pipe insulation with a k factor of 0.24-0.28 @ 100 degrees F. mean temperature, an embossed vapor barrier

laminated and pressure sealing lap adhesive. All lap and butt strips shall have integral pressure-sensitive strips and shall be applied in strict accordance with manufacturer's instructions.

Closed cell polyethylene foam by IMCOA or equal may be used at Contractor's option provided it meets the above requirements.

Insulation thickness' shown below are based on insulation having a conductivity range of 0.24 to 0.28 per BTU/inch per hour per square foot per °F temperature of 100 degrees F.

Temperature Range: Above 105°F

<u>Pipe Size</u>	<u>Minimum Insulation Thickness</u>
Runouts* up to 2"	0.5"
3/4" and less	1.0"
1.00" and larger	1.5"
*Runouts are defined as being less than 2" in diameter, less than 5 feet long, and connected to fixtures or individual terminal units.	

Insulation materials not meeting the specified conductivity range shall be submitted for approval and determination of the insulation thickness required.

Water, soil and waste pipes installed in the exterior walls, attics, crawl spaces or outside of the building shall be protected from freezing.

CIRCULATION PUMP: (DOMESTIC)

Provide pump(s) per schedule. Bell and Gossett, Grundfos, Laing or March are considered equal.

EXECUTION

GENERAL CONDITIONS

Examine the areas and conditions under which Work of this Section will be performed. Conditions detrimental to timely and proper completion of the Work shall be

brought to the attention of the Architect before the installation of materials. Do not proceed until unsatisfactory conditions are corrected. Incorrectly installed materials requiring changes will be at Contractor's expense.

All plumbing fixtures, appliances, and appurtenances furnished with manufacturer's installation instructions shall be installed per those instructions.

PLUMBING SYSTEM LAYOUT

Lay out the plumbing system in careful coordination with the Drawings. Determine proper elevations for all components of the system and use only the minimum number of bends to produce a satisfactorily functioning system.

Follow the general layout shown on the Drawings in all cases except where other Work may interfere.

Lay out pipes to fall within partitions, walls, or roof cavities, and to not require furring other than as shown on the Drawings.

PIPING INSTALLATION

Pipe sizes as shown on drawings are Nominal Pipe Size (NPS) or Iron Pipe Size (IPS). Drawings and fixture schedule indicate pipe sizing per the CPC and Standard Engineering Practice. Pipe sizes shall be maintained to fixtures, appliances and equipment. Approved reducing fittings shall be installed at all points of connections.

Install piping generally square with building, free of traps or air pockets, and true to line and grade. Keep all piping tight to the building structure, unless pipe slope is required. Do not install piping in any locations where, in the Architect's opinion, it will interfere with the use of the building or create a safety hazard. Where space is inadequate, notify the Architect in time to avoid unnecessary Work. Install all exposed piping as high as possible without interfering with other trades.

Make changes in direction with manufactured fittings; use long radius elbows. Street elbows, bushings, close nipples and bending of pipe or tubing will not be allowed.

Provide "P" traps at sanitary sewer drainage devices without integral traps.

All natural gas piping under structures or concrete slabs will be installed in a protective vent sleeve. Sleeves under a building will be vented to outside the building per

detail on Plans. Sleeves under concrete slabs will extend a minimum of 1 foot beyond the slab. All sleeves will be sloped 1/8" per foot up toward the vented end. The vent end of sleeves under slabs will terminate under a landscaped or asphalted area.

Gas piping shall be tapped off the top or side of pipe and ends of mains shall be provided with dirt legs.

Underground plastic pipe will horizontally transition to metal pipe 5 feet before the above ground riser. Install plastic pipe with a minimum of 36" of cover when located under areas of possible vehicle traffic. Approved metallic pipe must be used if the minimum depth is not met. A tracer wire, terminating at each end at an exposed location, will be installed with all underground plastic pipe. Gas piping will also have a continuous tape marked "Gas" laid 6" above it.

Piping may terminate a maximum of one foot above ground when encased in a listed metallic transition riser.

Use friction wrenches when installing brass, polished, or soft metal piping, and when installing piping exposed in finished areas. Replace piping showing wrench marks.

Attach escutcheon plates to pipes with set screws or spring clamps with concealed hinges. Continue insulation through escutcheon plates.

General:

Proceed as rapidly as the building construction will permit.

Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.

Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.

Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.

Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.

Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment. Support the equipment independently from the pipe.

Pipe the drains from mechanical equipment, drip pans, relief valves, air vents and similar locations, to an open sight drain, floor drain, or other acceptable discharge point, and terminate with an air break or air gap per C.P.C.

Securely bolt all equipment, isolators, hangers, and similar items in place.

PIPE SUPPORT INSTALLATION

Support pipes from structure with assemblies specified. Provide auxiliary members, anchors, guides, and sway braces necessary to maintain pipe alignment and prevent excessive movement or strain on piping system or components; allow for expansion and contraction of piping. Provide at least one hanger for each branch. Do not use powder driven fasteners, wire, perforated tape, nails, wood blocking, or other makeshift devices to support pipe.

Attach supports to structure with bolts, screws or concrete anchors, per support manufacturer's requirements.

JOINTS AND CONNECTIONS

Cut pipe shall be reamed to full inside diameter of pipe. Cut threads straight and true. Insure all filings have been removed from inside of the pipe. Apply liquid Teflon to male pipe threads and not inside fittings. Use graphite on cleanout plug threads.

Joints in cast iron "No-Hub" soil/waste pipe and fittings shall be made up with neoprene gaskets and stainless steel bands conforming to CISPI 310, torque to the manufacturer's specification with an approved torque wrench.

Joints in copper tube shall be made with 95-5 tin-antimony or lead-free solder, applied in strict accordance with the manufacturer's directions.

Dissimilar metals shall be isolated with dielectric couplings, "EPCO" or approved equal. Provide access panels at all hidden couplings.

All plastic pipe shall be joined in accordance with the manufacturer's recommendations for their pipe and IAPMO Installation Standard per the latest edition of the C.P.C.

Pipe Protection: Provide protection against abrasion where copper tubing is in contact with other building members by wrapping with an approved tape, pipe insulation or otherwise suitable method of isolation.

Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly

SANITARY SEWER, VENT AND INDIRECT WASTE SYSTEM INSTALLATION

Install horizontal drainage piping at a minimum 2%, condensate 1%, slope unless otherwise noted. Where this is impractical notify the Architect before installing the pipes.

Install vent piping to drain back into the sewer system.

Provide cleanouts where shown on Drawings and where required by governmental agencies having jurisdiction.

All cleanouts to grade shall be firmly secured by means of a concrete block 20" square by 5" thick, and shall be flush with finished grade, unless otherwise noted on the plans.

Provide automatic trap primers as specified at floor sinks and drains as indicated on Drawings or where required by governmental agencies having jurisdiction. Provide access panels for all hidden mechanical trap primers.

FLUE VENT PIPE INSTALLATION

All flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Vent cap shall be of the same manufacturer as the flue pipe. Flues or vents shall terminate per the latest Edition of the C.P.C..

VALVE INSTALLATION

Provide valves in the water, air, and gas systems. Locate and arrange so as to give a complete regulation of apparatus, equipment, and fixtures.

Provide valves in at least the following locations:

In branches and/or headers of water piping serving a group of fixtures.

On both sides of apparatus and equipment.

For shutoff of risers and branch mains.

For flushing and sterilizing the system.

Where shown on the Drawings.

Locate valves for easy accessibility and maintenance. Provide access panels for all hidden valves.

Unions shall be installed downstream of all screwed valves.

All gas pressure regulating valves shall be vented to the atmosphere.

CLEANOUTS:

Horizontal drainage pipe shall be provided with a cleanout at its upper terminal, and each run of piping, that is more than 100 feet in total developed length, shall be provided with a cleanout for each 100 feet, or fraction thereof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change in direction exceeding 135 degrees. A cleanout shall be installed above the fixture connection fitting, serving each urinal, regardless if the location of the urinal in the building.

Exceptions – See CPC 707.4

WATER HAMMER ARRESTOR INSTALLATION

Provide water hammer arrestor on hot and cold water lines.

Install at all quick closing valves, solenoids, and supply headers at plumbing fixture groups.

Locate and size as shown on Drawings, and where not shown, locate in accordance with Plumbing and Drainage Institute Standard WH-201.

Install water hammer arrestor behind access panels.

BACKFLOW PREVENTION INSTALLATION

Protect plumbing fixtures, faucets, hose connections, and other equipment having plumbing connection, against possible back-siphonage.

Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

PLUMBING FIXTURE INSTALLATION

Connect plumbing services to fixtures as shown on Drawings and as specified.

Install compression stops and flexible supplies per fixture manufacturer's recommendation or as high as possible on wall directly below fixtures.

Install fixtures at right angles to, and tightly against, building surfaces, and in proper alignment. Fill gaps between fixtures and building surfaces with white grout. Mounting heights and locations shall be as shown on the Drawings, or, if not shown, as directed by the Architect.

INSULATION INSTALLATION

Clean and dry surfaces prior to application of insulation or adhesives.

Insulate piping, fittings, valves, and strainers. Leave unions exposed. Where insulation terminates, bevel ends of insulation and continue jacket over insulation and secure to pipe. Do not interrupt insulation at hangers, supports, clamps, or penetrations through structure. Fittings shall be finished with "Zeston" or approved equal fitting closures. If fitting closures not available, use 8 oz. canvas dipped in "Seal-Fas".

Attach longitudinal jacket laps and butt strips with factory applied pressure sensitive adhesive. On concealed piping only, outward clinching coated staples at two inch spacing may be used. Cover elbows with one piece polyvinyl chloride covers. Secure with tack fasteners. Tape ends of covers with matching tape on exposed piping. Seal off all cut ends with canvas and Benjamin Foster 30-36.

Install closed cell polyethylene foam per manufacturers instructions.

TESTING AND ADJUSTING

Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction. See Section 15100 for test requirements.

Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

Adjust the system to optimum standards of operation.

CLEANING (FOR POTABLE WATER SYSTEMS.)

Disinfection: The hot and cold water distribution system shall be disinfected prior to being placed in service. The system shall be disinfected within 3 weeks of occupancy in accordance with AWWA C651 or the following requirements:

The piping system shall be flushed with potable water until discolored water does not appear at any of the outlets.

The system shall be filled with a water chlorine solution containing at least 50 parts per million of chlorine. The system shall be valved off and allowed to stand for 24 hours. Or, the system shall be filled with a water chlorine solution containing at least 200 parts per million of chlorine. The system shall be valved off and allowed to stand for 3 hours.

- 1.A.1.a. To prevent reduced service life of system components, disinfection solutions should not stand in the system longer than 24 hours.

Following the standing time, the system shall be flushed with water until the chlorine is purged from the system.

Provide bacteriological sampling and analysis results to the Engineer for review.

WARRANTY

The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

END OF SECTION 15400

SECTION 15600

HEATING, VENTILATION, AND AIR CONDITIONING

GENERAL

DESCRIPTION:

Related Documents:

The other Contract Documents complement the requirements of this Section and apply to this Section.

Division 1 - General Requirements and Section 15100 apply to the Work of this Section.

Where requirements of the Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

Codes and Regulations:

In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.

In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

Included: Work includes, but is not necessarily limited to, the following.

The Work covered by this Specification shall include furnishing labor, material, equipment and services to construct, install and place in operation, the complete Heating, Ventilating and Air Conditioning Systems to the extent as indicated, and as shown on the Drawings and specified herein. The Work covered under this Section shall hereinafter be referred to as the Mechanical System.

A system of temperature controls shall be furnished and installed complete as hereinafter described. Low voltage wiring and conduit, complete with electrical accessories and materials as required for the installation of the temperature control system shall be furnished and installed under this Section of the Contract, but shall conform to the Specification requirements as set forth under Division 16.

Roof Top Gas Heat/Mechanical Cooling A/C Units

Fan Coil Units

Condensing Units

Heat Pump Units

Centrifugal Exhaust Fans and Roof Exhausters

Supply, return, and exhaust duct systems complete with grilles, registers and diffusers.

Filter and Filter Boxes

Duct, Pipe and Equipment Insulation

Space Temperature Controls

Refrigerant Piping

Vibration Isolators

Work Not Included In This Section:

Blocking, framing and wood supports required for the purpose of accommodating the Mechanical System unless specifically called for under this Division. The contractor is responsible for the correct location of such items and shall bear the expenses covering their omission or improper location.

Electrical connections to motors, electric starters, disconnect and over-current protective devices, unless specifically called for by this Section, or unless the equipment is furnished as an integral part of the Mechanical System Equipment, as hereinafter specified or noted on the Drawings.

Line voltage electrical wiring and conduit, except where specifically called for on the Drawings or hereinafter in this Section.

Painting, except when supplied as factory finish, or specifically called for in this Section or on Drawings.

QUALITY ASSURANCE

Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

SUBMITTALS

If the heating and/or air conditioning units are substituted with a different brand than that specified on the Drawings the Title 24 Calculation may have to be re-run. This re-

calculation will cost \$500.00 payable in advance to 3C Engineering, Inc. If the revision is required by the local Building Department to verify the Title 24 Report still complies as originally run.

Comply with pertinent provisions of Architectural Section.

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:

Materials list of items proposed to be provided under this Section including, but not limited to heating, ventilating and air conditioning equipment and mountings, air distribution equipment, ductwork and fittings, flexible ductwork, flue vent pipe, duct specialties, flexible connections, insulation, lining and adhesive, duct joint sealer, temperature controls, piping and accessories.

Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.

Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.

Submittals for entire Project shall be submitted at the same time or may be rejected until all are included in one submittal package.

Submittals shall be bound together in a three-hole folder or a three ring binder or PDF format.

DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.

Acceptance of alternate products by Architect does not change this requirement.

PRODUCT HANDLING

Comply with pertinent provisions of Architectural Sections.

PRODUCTS

HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

Heating, Ventilating, and Air Conditioning Equipment: Equipment shall be as specified on the Drawings. All other equipment shall be pre-approved by the Mechanical Engineer.

It shall be the responsibility of the Contractor to see that any substituted equipment performs similarly to that which is specified and fits in the same area as specified. Cost of any additional Work caused by the substitution of equipment shall be borne by the Contractor.

AIR DISTRIBUTION EQUIPMENT

Grilles, registers and ceiling diffusers and other accessory equipment shown on the Drawings and "Grille, Register and Diffuser Schedule" shall be manufactured by Titus unless shown otherwise.

Any substitutions of the above equipment which may be proposed by the Contractor shall be re-sized to suit his equipment by the proposed manufacturer and submitted in tabular form listing components proposed for each location in the System, identifying each as to location, design, air quantity passing through the devices, pressure drop, noise criteria data, velocities of air leaving the device and "K" flow factors for each item. Manufacturer's data sheets showing dimensions and recommended method of installation for each component must also be included.

RECTANGULAR SHEET METAL DUCTWORK

Rectangular supply, return, outside air and exhaust ducts, single leaf dampers and plenums shall be fabricated from prime grade galvanized steel sheets of lock form quality and shall be constructed in accordance with appropriate tables of the latest ASHRAE "Guide and Data Book" and SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the 2022 CMC.

Transverse Duct Joints shall be made with The Ductmate System. When using The Ductmate System, construction of the duct such as gage, reinforcing, etc. shall be as indicated in the latest addition of the applicable SMACNA standards. With proper data, an equal may be submitted, providing the corners have a downset and corner clips to insure airtight integrity. Testing must be done by a nationally recognized testing laboratory. The standard Ductmate 35 System joint is the equivalent of a SMACNA "J" connection. The Ductmate 25 System joint is the equivalent of a SMACNA "F" connection. The installation of the Ductmate System shall be in accordance with the latest manufacturer's printed Assembly and Installation Instructions.

Each duct or plenum shall be diagonally cross-broken for rigidity.

Duct bends, fittings, transitions, etc. shall be fabricated in accordance with Fabrication Standards as shown on the Drawings or in accordance with latest SMACNA "HVAC Duct Construction Standards" where not shown on Drawings.

Support ducts to joists or similar structural members. Except where indicated otherwise, ducts with a side of 24" or more shall be supported on Ductmate trapeze duct hangers consisting of 2" high x 1-1/2" wide x 18" gauge channel and 3/8" diameter hanger rods hung from support brackets bolted to structural members. See also Special Fabrications as shown on the Drawings. Duct supports shall be eight (8) feet maximum on center.

At branch ducts, provide manually operated dampers of the type and arrangement shown on the Drawings, two gages heavier than the duct (if single leaf type) in which installed, and equipped with locking quadrants and closed end bearings.

Sizes shown on Drawings are net inside dimensions. Enlarge duct to accommodate lining.

ROUND DUCTWORK AND FITTINGS

2-10" w.g. round duct through 61" in diameter shall be United Sheet Metal spiral lockseam unseal duct, or approved equal, manufactured from galvanized steel meeting the ASTM A-527-71 in the following gages:

<u>Diameter</u>	<u>Metal Thickness</u>
3-13"	26 ga.
14-23"	24 ga.

Round duct shall be new and exclusively obtained for this project. Each piece shall be in 20' lengths. Ducts shall be cut to length required with joints only at fitting locations, except on duct runs longer than 20 feet.

Spiral duct and fitting connections, 15" diameter and larger shall be Ductmate Spiralmate round duct connectors. The connector system shall consist of two mating round duct connector flanges roll-formed from hot dipped galvanized steel with an integral sealant and closure ring roll-formed from hot dipped galvanized steel.

Fittings shall be United Sheet Metal galvanized fittings in the following gauges:

<u>Diameter</u>	<u>Metal Thickness</u>
3-13"	24 ga.
14-23"	22 ga.

Section 15600

Spiral duct fittings must be manufactured as separated fittings and shall not be saddle taps, stubs or tap-in fittings tapped into spiral duct, nor may they be dove-tailed tap-ins into pipe or fittings.

Reducers shall occur after a branch tap occurs on the main portion of the fitting. Divided-flow fittings shall be used unless shown otherwise on the Drawings.

Joints on ducts and fittings shall be covered and sealed with 4" wide, 6 oz. canvas saturated with Arabol lagging adhesive, or Hardcast DT tape in conjunction with Hardcast FTA-20, non flammable, non-toxic adhesive, or GlenKote duct sealer or other approved mastic type sealer. Duct tape will not be allowed. Where exposed to weather, paint lagging strips with two coats of silver enamel paint.

All ductwork shall be constructed and supported in accordance with appropriate tables of the latest SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the 2022 CMC. Duct gauges to be in accordance with this section.

At branch ducts, provide manually operated dampers of the type and arrangement shown on the Drawings, two gages heavier than the duct (if single leaf type) in which installed and equipped with locking quadrants and closed end bearings.

FLEXIBLE DUCT

Flexible air duct shall be Hart & Cooley Model F218. Duct shall consist of an inner core having two layers of polyester film encapsulating a steel wire helix surrounded by a blanket of fiberglass insulation and sheathed in a metalized polyester vapor barrier reinforced with fiberglass scrim. All air ducts shall be UL listed under the UL-181 standard as a Class 1 Air Duct also conforming to NFPA standards 90A and 90B. This air duct shall have a certified thermal resistance rating of R-8 in accordance with ASTM C518 at 75°F and carry the ADC "Thermal Performance" seal.

Use only the minimum length required to make the connection. In no case shall any section of flexible duct exceed 5 feet in length.

Use two layers of UL listed 181 duct tape to connect flexible duct to the metal duct if flexible duct does not have S.M. collars.

The number of bends shall not exceed a combined total of 90 degrees. 90 degree bends will not be allowed at diffuser connections.

FLUE VENT PIPE AND FITTINGS

Type B double wall vent pipe with UL label shall be used for gas burning appliances, except gas wall furnaces and gas appliances with power burners. Install per manufacturer's recommendations.

Flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Flues or vents shall terminate as required per current CMC.

Vent cap shall be of the same manufacturer as the flue pipe.

For condensing furnaces: M&G DuraVent PolyPro venting system: Inner pipe a minimum of 2.2mm thick polypropylene pipe. Exterior metal pipe made of galvalume. ULC-S636 gas vent -BH. Class II venting system, installed per manufacturer's recommendations.

DUCT SPECIALTIES

Damper Regulators and Bearings: Duro-Dyne "Specline" SR-Series or approved equal, lever type with matching end bearing. Regulator set shall include rubber gasket between regulator and duct, spring washer between core and housing, wedge pin, dial indicator and handle. Matching end bearing shall be closed end with rubber gasket:

<u>Model</u>	<u>Size</u>
148	10" and Under
388	20" and Under

Section 15600

Access Panels: Access panels shall be located at all points where adjustable mechanisms are installed internal to or on the surfaces of the ductwork. Where adjustable mechanisms are concealed by walls or ceilings, "Elmdor" or approved equal access doors shall be installed. Size shall be suitable for convenient servicing. Tile Walls: Doors and Frame: Stainless Steel. Other areas: recess type to receive ceiling or wall finish in order to provide "Blind Finish".

Fire Dampers: Fire dampers shall be installed where shown on the Drawings and/or required, and shall be of a type approved by the U.L. Laboratories, Inc. and the State of California Fire Marshal. Dampers shall be installed per manufacturer's instructions. Provide access door in duct at each fire damper such that damper is easily accessible.

Volume Dampers:

In rectangular ducts greater than 1.5 sq. ft., provide Pottorff Model CD42, or equal, factory fabricated opposed blade damper, 16 gauge blades, and brass bearings. Blade width shall not exceed six inches.

In rectangular ducts 1.5 sq. ft. and less, provide single leaf dampers as described in Section 15600, 2.3 (a. and g.).

In round ducts 15" in diameter and less, provide shop fabricated galvanized sheet metal plate dampers. Plate shall be 18 gauge or shall be two even gauges heavier than duct; minimum thickness 22 gauge. Provide stiffening beads at 1/3 points in dampers lighter than 18 gauge.

In round ducts 16" and greater, provide Pottorff opposed blade damper Model CD22R or approved equal.

In round ducts 4" – 24" in diameter, above "hard" ceilings, provide DuroZone Cable Operated Damper. Cable length to be between 3 and 15 FT long. Contractor to determine proper length to be use. Cable shall be routed inside the duct to the face of the grille or diffuser. Tuck cable up behind diffuser after balancing.

Provide 20 gauge galvanized sheet metal escutcheon plates at duct penetrations of finished building surfaces. Install tight against surface and securely attached to duct. Continue insulation through openings.

FLEXIBLE CONNECTIONS

Provide fireproof, insulated, non-porous, flexible connections between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connections by zinc coated steel clinch-type drawbands. Flexible connections shall be DuroDyne "Insulfab" or "Insulflex" or approved equal.

Provide a duct support next to each flex connector to prevent any strain on connection.

DUCT SMOKE DETECTORS:

HVAC systems rated at 2000 CFM or greater shall be equipped with a duct smoke detector to automatically shut off the HVAC system if smoke is detected.

The detectors shall be installed in the main supply duct downstream of any filters, in the main return air duct after the last terminal connection and the any exhaust duct after the last terminal before the fan.

The detector shall be System Sensor Innovairflex D4120 4-wire Photoelectric Smoke Detector. Provide with Factory NEMA 4 enclosure if mounted outside.

DAMPER ACTUATOR

Actuators shall be Belimo. Substitutions will not be acceptable. Actuator shall be direct coupled over the shaft, spring return type, unless specified otherwise

ELECTRICAL EQUIPMENT

Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control specified. Mount starter adjacent to equipment. See electrical drawing. Maintain minimum of 3' clearance to front of device.

Motor Starters: Shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

INSULATION

General: Insulation and lining material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L. 723 and shall conform to NFPA 90A and 90B.

Heating and cooling duct and related heating and cooling equipment insulation shall conform to 2022 Building Energy Efficiency Standards, Administrative Regulations, Title 24, Part I, Section 124, except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent.

Unless noted otherwise, insulation shall be Fiberglass, or approved equal material. Application Work shall be performed in accordance with the best accepted practice of the trade and the manufacturer's recommendations. The performance of insulation Work shall be by experienced insulation applicators. Insulation shall be installed after the specified tests have been applied to the piping and duct systems,

and the systems have been inspected and approved. Fiberglass trade names and/or numbers have been used to establish a standard of quality.

External Duct Insulation – Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 3" thick, minimum installed R value of 8.0 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation.

External Duct Insulation – All other locations not listed above: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 2" thick, type 100, minimum installed R value of 6.0 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation

Internal Duct Insulation - Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to all heating and cooling supply and return duct and plenums on roof or where shown on Drawings. Manufacturer shall be Manville

Section 15600

Microlite, or approved equal. Duct Liner shall be Linacoustic R, 2" thick, 1.5 pcf, with a "K" value of 2.2 in. for a total installed "R" value of 8 or greater. Insulation shall withstand velocities of up to 5000 FPM and temperatures up to 250 degrees F.

Internal Duct Insulation – All other spaces not listed above: Shall be applied to all heating and cooling supply and return duct and plenums where shown on Drawings.

Manufacturer shall be Manville Microlite, or approved equal. Duct Liner shall be Linacoustic R, 1- ½" thick, 1.5 pcf, with a "K" value of 2.2 in. for a total installed "R" value of 6 or greater. Insulation shall withstand velocities of up to 5000 FPM and temperatures up to 250 degrees F

Portions of duct receiving Duct Liner shall be completed with transverse joints neatly butted with no gaps or interruptions. The duct liner shall be adhered to the sheet metal with 100% coverage of adhesive and exposed leading edges and transverse joints coated with adhesive. Adhesive shall be a water based product. In addition this shall be secured with mechanical fasteners which shall compress the liner sufficiently in place. The liner shall be cut to assure overlapped and compressed longitudinal corner joints. Application procedures shall comply with the recommendations of the Sheet Metal and Air Conditioning Contractor's National Association's Duct Liner Application Standard, Second Edition.

External Duct Insulation Exposed to Weather: Shall be applied to heating and cooling supply and return ducts and plenums exposed to weather if not noted to be internally insulated. Insulation shall be Knauf Type ASJ, or approved equal, rigid board fiberglass, 3.0 # per cubic foot minimum density, 2" min. thickness, 8.0 min. R value. The board shall be neatly cut and fitted to the surface with joints tightly butted together and against standing seams. The insulation shall be secured to the duct with adhesive and mechanical fasteners starting 3" from butt joints and 18" on center each direction. Vapor-barrier tape shall be then applied over joints, seams, breaks and any penetrations of the insulation vapor barrier jacket. A weather-barrier mastic compound reinforced with fabric or mesh shall be applied as a finish coat. Finish by painting with two (2) coats of aluminum paint.

Ducts: Ducts shall be constructed, installed, sealed and insulated in accordance with the 2022 California State Mechanical Code. The above paragraph(s) shall supersede if more stringent.

TEMPERATURE CONTROLS

Temperature controls shall be furnished as indicated in schematic Drawing on Plans including room thermostats, relays and other necessary combustion, operating and safety controls.

Wiring and Conduit

Control wiring and conduit shall be the responsibility of this section and be installed as follows:

In equipment rooms/attics – Conductors shall be run in conduit. Final connection to equipment shall be flexible conduit.

Concealed in building construction (wall/inaccessible ceilings) - Conductors shall be run in conduit.

Roof mounted/exterior equipment yards – Conductors shall be in conduit. All flexible conduit shall be seal-tite with weatherproof connections. Equipment on grade and detached from the building a distance greater than 36” shall have underground control conduit routed to equipment.

Above accessible ceiling spaces – Control cable will be allowed to be installed without conduit in accessible areas above ceilings as follows:

Cable is an approved type for the application.

Cable is bundled/organized in management devices routed square with building lines (no diagonals) and kept clear of electrical devices (i.e., ballasts, transformers, etc.) that could cause interference.

Conduit sleeves are provided between accessible ceiling spaces (i.e., across soffits, gypboard ceilings, etc.) as required to maintain future access to cable.

Cable routed in accessible ceiling spaces shall comply with EIA/TIA standards for communications cabling. Communication bus wire shall be W183C-2058Y Connect Air, yellow shielded cable.

Electric wiring, conduit and other electric devices required to complete the installation of the temperature control systems shall comply with requirements as set forth in the Electrical Section of this Specification.

After completion of the installation, the Contractor shall adjust thermostats, motors and other equipment provided under this Contract. He shall place them in complete operating condition subject to approval of the Architect.

The Control System herein specified shall be free from defects in workmanship and material under normal use and service. If, within twelve (12) months from date of acceptance by the Architect, any of the equipment herein described is proved to be defective in workmanship or material, it will be adjusted, repaired or replaced free of charge by the Contractor.

The final connections and supervision of control wiring and interlock wiring shall be the responsibility of this Contractor.

The Contractor shall submit to the Architect for approval, the required number of shop drawings of the entire control system before starting Work.

Upon completion of the Work, the Contractor will provide diagrammatic layouts of the Automatic Control Systems specified herein. Layouts shall show control equipment and the function of each item shall be indicated.

The temperature control system shall be installed by persons in the direct employment of the temperature controls manufacturer(s) exclusive contracting representative. The Mechanical Contractor shall not install the temperature controls unless pre-approved by the Mechanical Engineer.

REFRIGERANT PIPING

Refrigerant piping shall be flushed clean with nitrogen and the ends capped prior to installation. Refrigerant piping shall be Type L copper with wrought copper fittings. Use 45% minimum silver brazing alloy with melting point higher than 1100 F. for making the joints.

Insulate refrigerant suction line with 1" thick Owens-Corning Fiberglass or Armstrong Armaflex foamed plastic flexible tubing insulation applied with No. 500 adhesive. Use multiple layers and miter insulation to cover joints and all other items as required to prevent condensation. When piping is outside of building finish with 2 coats of Armstrong Armaflex finish, white in color.

VRV and Heat pump systems: Insulate all refrigerant lines with 3/4" thick Owens-Corning Fiberglass or Armstrong Armaflex foamed plastic flexible tubing insulation applied with No. 500 adhesive. Use multiple layers and miter insulation to cover joints and all other items as required to prevent condensation. When piping is outside of building finish with 2 coats of Armstrong Armaflex finish, white in color.

REFRIGERANT PIPING ACCESSORIES

Stop valves shall be Henry Type 622, 500 psi pressure rating brass, soldered, packless diaphragm, globe shut-off pattern.

Solenoid valves shall be Sporlan Type MA14, 450 psi rating, brass body.

Filter dryer shall be Sporlan "Catch-All" with soldered connections.

EXECUTION

SURFACE CONDITIONS

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

COORDINATION

Coordinate as required with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.

PREPARATION

Holes in concrete:

Provide sleeves, accurately dimensioned and shaped to permit passage of items of this Section.

Deliver such sleeves, with accurate setting drawings and setting information, to the trades providing the surfaces through which such items must penetrate, and in a timely manner to assure inclusion in the Work.

Flashing:

Where items of this Section penetrate the roof, outer walls, or waterproofing of any kind, provide under this Section base flashing and counterflashing required at such penetration.

Provide on each pipe passing through the roof a 4 pound seamless lead flashing and counterflashing assembly.

GENERAL INSTALLATION REQUIREMENTS

Conceal piping, ductwork, and equipment in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect in time to avoid unnecessary Work. Do not cut or notch structural members without specific approval of the Architect.

Follow manufacturer's instructions on items not specifically covered in drawings and specifications. Report discrepancies to Architect for clarification before starting Work.

EQUIPMENT INTERFACE

Provide required shut off valves, unions, and final connections of piping to the Work of this Section.

For electrically operated equipment, verify the electrical characteristics actually available for the Work of this Section and provide equipment meeting those characteristics.

PAINTING

Paint inside of air outlets and connecting plenums with one coat of black paint, or provide all such items factory prepainted.

For roof-mounted equipment, provide factory pre-finish on exposed surfaces.

Touch-up scratches and abrasions to be invisible to the unaided eye from a distance of 5 feet.

INSTALLATION OF DUCTWORK

Ductwork shall be delivered to the Project site with surfaces clean and free of loose dirt and rust. Special care shall be exercised by the Contractor to store the duct in a clean area to prevent the accumulation of dirt prior to installation. Fabricated or partially fabricated duct sections shall not be stored in open fields or on dirt areas surrounding the construction site. Paved areas may be used, if available, provided adequate protection is provided to prevent the accumulation of dirt on duct surfaces. If possible, the Contractor should arrange to deliver duct to the project site and store on the floor of the area in which it is to be installed.

Before installation of ductwork, the Contractor shall inspect each section of duct and wipe internal surfaces clean. At the end of each Work period, or when ends of duct are left installed for future extension, the open ends shall be tightly closed off with a plastic sheet and taped securely to the open end of the duct.

Construct and install sheet metal in accordance with latest SMACNA recommendations. Provide variations in duct size and additional duct fittings as required and approved by the Architect at no extra cost to the owner.

The throat radius of bends shall be 1-1/2 times the width of the duct. Provide turning vanes in any mitered turn greater than 45 degrees.

Transition slopes shall be no less than one to five where space permits.

Abrupt offsets in the duct system greater than 30 degrees will not be allowed.

TEMPERATURE CONTROL INSTALLATION

Install wiring and tubing parallel to walls and floors and securely clipped to structure or mechanical system components. Group parallel runs for neat appearance.

Install room thermostats and other control devices at 48 inches above finished floor unless a lower mounting height is required for access by handicapped.

Install outside air sensor in a location where it is not directly effected by radiation from the sun or any heat generating device or by a conditioned air stream or any other location that would produce a false reading.

Upon completion of the installation calibrate all equipment and adjust controls for proper operation.

REFRIGERANT SYSTEM CHARGING PROCEDURE

Pressurize the system with refrigerant and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.

Provide 1/2" angle type charging and purging valves adjacent to high and low side of the condensing unit to accomplish the procedure described hereinafter. Connect the vacuum pump to both the high and low side of the system. Do Work when ambient air temperature is above 60 degrees F during the evacuation process.

Operate the vacuum pump until the system is evacuated to 2.5 mm Hg absolute. Break the system vacuum with nitrogen or refrigerant.

After the system has been evacuated to 2.5 mm Hg absolute, close the vacuum pump suction valve and stop the pump.

Charge system to required capacity with specified refrigerant.

CONTROL DEVICE IDENTIFICATION LABELS

Thermostats and Exhaust fan switches shall have labels mounted on or just above the control device labled with the equipment being controlled. As an example, for a exhaust fan controlled by a switch the lable would read "EXHAUST FAN # 1" or if a thermostat the label would read "AC-1".

Labels shall be 2" x 1" x 1/8" thick Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.

Labels shall be white with 3/8" high red engraved letters.

Labels shall be attached to the equipment with adhesive.

WARRANTY

The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

MECHANICAL SYSTEM START-UP RESPONSIBILITY

Start up Mechanical Systems, and perform any such Work as may be required to adjust the systems to meet the requirements of the Contract Documents. Air distribution balancing shall be performed in accordance with Article "MECHANICAL SYSTEMS BALANCING".

Install new clean specified filters in equipment containing filters immediately prior to owner occupancy. Contractor to bear all costs for this work.

MECHANICAL SYSTEMS BALANCING

Testing and air balancing shall be performed by an independent balancing company certified by Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), ASHRAE or Testing, Adjusting, and Balancing Bureau (TABB). Testing and balancing shall be performed by a company other than the mechanical system installers/contractor. The name of the firm that the Contractor proposes to engage to perform this Work of balancing the system shall be submitted to the Engineer for approval prior to commencing the Work.

After Systems have been tested as outlined, air and water flow rates shall be balanced, and control devices adjusted. Balance and testing shall not begin until systems have been completed and are in full working order. Upon completion of the balancing operation and prior to final acceptance of the systems, the balancing firm shall submit a report, with six (6) copies, certifying to the proper performance of the system for approval by the Mechanical Engineer.

The following information shall be included in the Air Side Report:

Fan speeds.

Motor current readings and voltage readings.

Air quantities in CFM at supply, return, exhaust terminals, and outside air intakes, both at design value and actual measured value. Test and adjust each terminal to within +10% of design requirements.

Air velocities in FPM at supply, return, and exhaust terminals at design value and actual measured value.

Positive static pressure, negative and total pressures and total air quantities for each fan system.

Equipment nameplate data.

END OF SECTION 15600

SECTION 16100 – GENERAL CONDITIONS FOR ELECTRICAL WORK

PART 1 - ORDINANCE, REGULATIONS, AND CODES

2.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including, General and Supplementary conditions, Divisions 0 and 1, specifications apply to work of this section.

2.2 All work must conform to the requirements which fall within the scope of the regulation in the Codes or under the jurisdiction of any of the governing bodies listed.

- A. The California Code Regulations, Title 19 through 24.
- B. The California Electrical Code as applicable under current state and local regulations (latest edition and supplements).
- C. State Board of Health.
- D. CAL-OSHA Regulations.
- E. Nothing in these Specifications or shown on the plans, shall relieve the Contractor from full compliance with applicable portions of any of the above regulations pertaining to work which he is installing under this Contract.

2.3 PERMITS AND FEES

Pay for and obtain all permits, inspection fees, etc., as required for the completion of all work included in this Contract. Any inspection Certificates required shall be obtained and delivered to the Owner.

2.4 EXAMINATION OF DRAWINGS AND SITE

Before submitting his bid, the Contractor shall carefully examine the Architectural, Structural, Mechanical and Plumbing Drawings for this work, along with the Specifications for same in addition to the drawings and specifications governing the work of this trade. He shall also visit the site of the

proposed construction and familiarize himself with all the site conditions. No subsequent allowances will be made to the Contractor because of his negligence in complying with the above or his alleged inability to understand the requirements.

2.5 CONDUCT OF THE WORK

The Contractor shall maintain on the job a competent foreman or a superintendent at all times to superintend the work.

2.6 CONTRACTOR'S RESPONSIBILITY

The Contractor shall be responsible for the safety and good condition of all materials and equipment until final acceptance by the Owner. He shall erect and maintain suitable barriers, protective devices, lights, and warning signs where required for the protection of the public and employees about the buildings. He shall be fully responsible for any loss or injury to persons or property resulting from his neglect or the carelessness and neglect of his employees.

2.7 SUBMITTALS

- A. Shop drawings of power and signal service and distribution equipment and lighting fixture catalog cuts shall be submitted for approval in seven (7) bound copies.
- B. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor, table of contents and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identical by the mark number as indicated on drawings.
- C. Equipment or material furnished or incorporated in construction without prior approval of the Architect may be rejected and if rejected shall be removed from the structure and replaced with approved equipment or material at the Contractor's expense.

2.8 RECORD DRAWINGS

See General Conditions.

2.9 CATALOG DATA AND OPERATING INSTRUCTIONS

Upon completion of the work in this Contract, the Architect shall be furnished with a complete set of catalog data which describes each piece of equipment installed under this Contract. The catalog shall be bound in a set and shall be clearly labeled as to each item of equipment used.

PART 2 – LOCATIONS

2.1 The work as laid out is to some extent diagrammatic, and the location thereon indicated may be approximate only. The Contractor, therefore, shall install all the equipment, apparatus, conduit runs, and the like as follows:

- A. Adhere to the location indicated as far as possible.
- B. Maintain ample head room in all rooms and passageways, clearance around all apparatus and equipment and under pipelines for unrestricted passage and for easy servicing of all apparatus, equipment, devices, and the like.
- C. Verify the exact locations of all fixtures and other apparatus or devices as indicated on the drawings. In the event these drawings do not sufficiently indicate the locations for all such fixtures, apparatus or devices, the Contractor shall obtain the exact locations from the Architect.

2.2 VERIFICATION OF DIMENSIONS

- A. The Contractor shall, as work progresses, verify the dimensions of the spaces available for the installation of the work and they shall assume full responsibility for the proper location and grading of each portion thereof.
- B. Where the work requires connections to be made to equipment that is furnished and set in place by others, the Contractor shall obtain exact locations and rough-in dimensions from the manufacturer of such equipment and they shall install the connections in a neat and workmanlike manner.

2.3 CUTTING AND PATCHING

- A. This Contractor shall do all cutting patching of the work for the installation of the equipment and materials as approved by the Architect and/or Engineer. All patching shall accurately match the adjoining work.

2.4 BORING

- A. Provide mechanical boring equipment to bore under existing asphalt, concrete, or other surfaces or objects as noted on the drawings. All boring shall be a minimum of 24" under the substrate material unless otherwise authorized by the Architect.

- B. Holes shall be bored not to exceed 1" larger diameter than the largest component remaining in the excavation.
- C. Water or air pressure jetting are not permitted, unless they comply with the following requirements:
 - C.1) All surfaces of the hole can be visually inspected with 6' maximum length.
 - C.2) All objects shall be supported continuously to prevent sagging.
 - C.3) The hole shall be filled with compacted damp sand and inspected by the Project Inspector or Materials Testing Lab Technician.

2.5 FOUNDATIONS AND SUPPORTS

This Contractor shall provide the foundations, supports and hangers, ect. as required to install the equipment as specified or shown on the drawing. All equipment shall be supported, braced and cross-braced in such a manner as to prevent sway and/or lateral movement.

2.6 EXCAVATION AND BACKFILLING

- A. Excavating required for the installation of the work shall be done by this Contractor. Underground lines outside the buildings shall be installed with a minimum cover of 24" except depth of utility services shall comply with respective utility company requirements.
- B. The conduit shall be laid on material described below to afford bearing for the full length of the conduit. Any part of the trench excavated below grade shall be corrected with thoroughly compacted material approved by the Architect.
- C. When the bottom uncovered at subgrade is soft and, in the opinion of the Architect, cannot support the conduit, a further depth shall be excavated and refilled to conduit foundation grade as required by the Architect.
- D. Backfill:
 - D.1) 6" Below, Around, and to 6" Above Conduit: Material shall be sand. Place carefully around and on top of conduit, taking care not to disturb conduit. Consolidate with vibrator.

- D.2) 6" Above Conduit to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture, and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- E. No excavation below the level of, or adjacent to, foundations of footings shall be made except in a manner approved by the Architect.
- F. A red or yellow tracer tape stating "CAUTION ELECTRIC LINE BURIED BELOW" shall be installed 12" above conduit, full length of trench.
- G. Electrical conduit shall not be run in excavations provided for plumbing or heating pipes, unless separated by a minimum of 12 inches.
- H. Verify location of all underground lines with Owner and utility companies before starting excavation. If any utility company facilities are identified and located within the perimeter of the building, the Contractor shall stop work, promptly notify the Architect, and secure his instructions.
- I. Ten (10) days before doing any excavation or trenching, contact "Underground Service Alert," 1-800-642-2444, advise them of work schedule and comply with their recommendations.

2.7 CLEANING UP

- A. The Contractor shall keep the premises free from accumulations of his waste material or rubbish. At the completion of the work, he shall remove all his rubbish, tools, scaffolding and surplus materials from and about the buildings, leaving the premises in a clean condition.
- B. All exterior surfaces of exposed equipment and material shall be thoroughly cleaned of all dirt, cement, plaster and other debris, including the exterior surfaces of all conduit, conduit fittings, conduit hangers, insulation and the like.
- C. All surfaces to be painted shall be carefully wiped or otherwise cleaned; cracks and corners scraped out clean, grease and oil spots removed so that surfaces may receive paint without further preparation.
- D. All fixtures and plated materials shall be thoroughly cleaned and polished.

2.8 DAMAGE BY BREAKS

The Contractor shall be responsible for all damage to any part of the premises caused by breaks in conduit or fixtures furnished and/or installed by him under this specification for a period of one (1) year from date of acceptance of the project by the Owner.

2.9 SITE CONDITIONS

- A. Where existing utilities are shown on the plans, extreme care shall be exercised in excavating near these utilities to avoid any damage thereto, and the Contractor shall be held responsible for any such damage caused by this operation.
- B. The general location and arrangement of conduit, equipment apparatus, etc., as shown in the drawings or herein specified and all installations shall be made in accordance therewith. Information on the drawings relative to existing services is approximate only. Minor deviations required to conform to actual locations shall be made without additional cost to Owner.
- C. Should existing utilities, not shown on the plans, be found during excavations, or identified, the Contractor shall promptly notify the Architect for instructions as to further action. Failure to do so will make the Contractor liable for any damage arising from his operations after discovery of such utilities not shown on the plans. These utilities shall be removed or relocated as directed by the Architect. An equitable adjustment in the Contract will be made for the additional work involved.
- D. The Contractor shall use special precautions where excavations are made in the areas near electrical ducts since they may be high voltage ducts. All such ducts shall be exposed by careful hand excavation so as not to damage the ducts or cause injury to personnel and shall be suitable marked with warning signs, barricades, etc. as required.

2.10 STANDARD PRACTICE

All work not shown in complete details shall be installed in conformance with the best standard practice for the trade.

2.11 INTENT

It is the intention to provide systems that are complete in every respect without further cost to the Owner. Anything not shown in drawings, or indicated in the specifications, but required for complete operating systems shall be included as part of this Contract. This shall include all connections to existing services.

2.12 SPECIAL NOTE

Attention of Contractor is hereby called to all work covered by notes on the drawings. Work covered by notes must be furnished and installed whether it is specifically mentioned in these specifications or not.

2.13 GUARANTEE

Except as otherwise specified, all materials, apparatus equipment furnished and installed under the Electrical Section of this specification shall be new and free from all defects. Should any trouble develop within a period of one (1) year from date of acceptance of the work, due to inferior or faulty material and/or workmanship, the trouble shall be corrected, and material and equipment replaced by the Contractor without expense to the Owner.

2.14 SERVICES

The location of any existing utility services shown on the drawings is approximate and shall be checked by this Contractor for exact location. Refer to "EXCAVATION AND BACKFILLING" for additional requirements.

2.15 LIST OF MATERIALS

Within thirty (30) calendar days after the award of the Contract, the Contractor shall submit seven (7) copies of a complete list of materials to be installed under this Contract, giving, in the case of each item of material to be used, the name of the article. All substitutes must be approved by the Architect as stipulated in Section 01620.

2.16 ACCESS OPENINGS

It shall be the responsibility of the Contractor to provide sufficient and convenient access openings, panels, etc., in the building construction where required for the maintenance of, installation and/or removal of all equipment, or other items of the various systems and equipment.

2.17 PURCHASE ORDER AND ACCEPTANCE

- A. The Contractor shall file with the Architect two (2) certified copies of all purchase orders, for materials, equipment, appliances, and rentals thereof within two (2) weeks from date of Notice to Proceed with the Contract if requested by the Architect.
- B. The Contractor shall file with the Architect two (2) certified copies of acceptance of purchase orders for materials, equipment, and appliances by the manufacturer, distributor, or wholesale house within six (6) weeks from the date of Notice to Proceed with the Contract if requested by the Architect.
- C. Failure to provide same within the stipulated time shall be deemed sufficient cause for the Architect to withhold certificates of payment for work completed or materials and equipment provided by the Contractor or his subcontractors toward the completion of their Contracts.

END OF SECTION 26 6000

SECTION 16200 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary conditions, Divisions 0 and 1 and Section 16100 specifications apply to work of this section.

1.2 SCOPE OF WORK

This portion of the work includes the furnishing of all labor and materials necessary for the complete wiring system to outlets and all equipment shown on the drawings or covered by this Section of the Specifications and other Division 16 sections of the Specifications. In general, the work includes the following:

- A. Complete system of conduits, substructures and equipment for power, telephone and cable television services. The Electrical Contractor shall inform the respective utility companies that the project has been started and confirm that all forms, which are required for the Application for Service, have been completed and submitted to the Utility Company. The Electrical Contractor shall obtain a copy of the approved engineering drawings prior to construction.
- B. Complete system of branch circuit wiring, conduit and distribution equipment for lights, receptacles and power.
- C. Furnish and install lighting panelboards, lamps, lighting fixtures, wall switches, convenience outlets, etc. as shown on drawings.
- D. All hangers, anchors, sleeves, chases and supports for fixtures, all electrical equipment and materials.
- E. Furnish, install and connect wire, conduit and switches, etc. required for other equipment covered by other sections of these Specifications.
- F. All excavating and backfill as required for electrical work.
- G. The patching and repair of all work modified or damaged by the installation of work under this Contract.
- H. Outlet boxes and conduit system for telecommunications (voice and data).
- I. Demolition work.
- J. Terminal cabinets and backboards.
- K. The Contractor shall furnish and install all work necessary to make complete systems, whether or not such details are mentioned in these Specifications or shown on the drawings, but which are necessary in order to make complete working systems, excepting only those portions that are specifically mentioned therein or plainly marked on the accompanying drawings as being installed by other Contractors.

- L. Electrical Contractor must coordinate his work with the work of other trades so as to provide raceways, conductors and outlets in the correct location for the equipment served, including all built-in appliances, mechanical, and signal equipment and connect same. Electrical Contractor must provide power of the correct voltage and phase to each item of equipment.
- M. Before construction starts, the Electrical Contractor shall arrange a coordination meeting with the General Contractor and all other subcontractors supplying equipment that requires electrical connections. All electrical requirements shall be verified and any problems shall be immediately reported to the Architect. Equipment items to verify shall include, but not be limited to: Voltage, amps, phase, location, orientation, space requirements, type of connection, starter and disconnect location and provision, control system operation and requirements, etc.
- N. The above list is given for the convenience of the Contractor and is not considered all-inclusive.

1.3 TEMPORARY CONSTRUCTION POWER

- A. Provide a temporary construction power system that is adequate for this project. Coordinate requirements and details with the General Contractor. All 120V, 15A and 20A receptacles shall have ground fault circuit interrupter protection.

PART 2 - WORK NOT INCLUDED

- 2.1 The furnishing and installation of motors.
- 2.2 Access panels.

PART 3 - MATERIALS

- 3.1 All materials, appliances and equipment except that furnished by the Owner shall be new, bear U.L. Label and of the make, brand or quality specified or as accepted by the Architect as herein provided. This shall also apply to all parts of the work whether or not this particular paragraph is referred to by number.
- 3.2 All apparatus, conduit systems, etc., shall be installed and interconnected so as to form complete systems as herein specified and/or shown on all the accompanying drawings. This Contractor shall furnish and install all work necessary to make complete working systems, excepting only those portions that are specifically mentioned herein or plainly marked on accompanying drawings as being furnished by other contractors.
- 3.3 MAIN SWITCHBOARD
 - A. Dead front, dead rear, floor standing, consisting of underground pull section, main section with main circuit breaker and equipment to accommodate power company's current transformer and meter, distribution section and sub-feed circuit breakers as shown on drawings. Main switchboard shall be as manufactured by Square D, General Electric, Eaton, Siemens or approved equal.

- B. Circuit breakers shall be molded case type, quick-make, quickbreak, with thermal magnetic trip. Size and rating shall be as shown on the drawings. All circuit breakers shall be bolt-on type. Two and three pole breakers shall have integral internal common trip. All circuit breakers, rated 100 amps and larger, shall be equipped with adjustable instantaneous trip settings.
- C. Finish shall be one coat of rust-inhibiting primer and two coats of gray enamel.
- D. Full-size buses shall extend the full height of the distribution section. A copper ground bus shall be provided firmly secured to each vertical section structure and shall extend the entire length of the switchboard.
- E. Section or sections shall be fully bussed with either copper or tin-plated aluminum bussing with all hardware in place for future devices. The bussing shall be braced to withstand the fault current of 50,000A symmetrical minimum. Filler plates as required shall be supplied with two handles on each plate. Sub-feed devices shall be of the types indicated on the drawings and shall be lockable in the "Open" position. A nameplate shall be supplied for each device in each section of each switchboard affixed to the switchboard trim adjacent to device and indicating name of device as shown one line diagram. Black letters shall be minimum $\frac{3}{4}$ " high on white background.
- F. All circuit breakers in main switchboard shall have short circuit current interrupting capacity exceeding the maximum available at service transformer. Contractor shall be responsible for obtaining fault current information from serving Utility Company prior to fabrication of main switchboard. The main switchboard shall have an integrated short circuit current interrupting rating of minimum of 30,000A symmetrical, or greater if indicated on drawings.
- G. Underground pull sections shall be manufactured by the same manufacturer of the switchboard and per the serving Utility Company's requirements.
- H. The Electrical Contractor shall submit three (3) copies of the main switchboard shop drawings to the Serving Utility Company for their approval prior to fabrication of the main switchboard.

3.4 PANELBOARDS

- A. The panelboards shall be constructed in accordance with the standard set up by the Underwriters' Laboratories, Inc., and as manufactured by Square "D", General Electric, Eaton, Siemens or approved equal, and each shall contain the number and type of circuit breakers as indicated on the drawings. All circuit breakers, rated 100 amps and larger, shall be sub-feed type and equipped with adjustable instantaneous trip settings.
- B. The panelboards shall be equipped with a hinged lockable door, piano hinged trim and typewritten circuit directory. All finish in offices, corridors or areas subject to public view shall be prime coat for finish coat by painter. In storage rooms, equipment rooms, etc., finish shall be standard factory gray Hammertone. Provide a flush lock on all panelboards.
- C. Provide an engraved Bakelite nameplate, fastened with screws or rivets to the face of each panelboard, which will identify it.

- D. Any panel with an isolated ground bus shall have a nameplate stating "IG CIRCUITS". Nameplate to be same size and color and adjacent to panel designation nameplate.
- E. Seven copies of detailed construction drawings for the panelboards and terminal cabinets shall be submitted to the Architect for Approval before their construction is started.

3.5 TRANSIENT VOLTAGE SURGE SUPPRESSORS

- A. Surge suppressors shall be Transient Voltage Surge Suppressor (TVSS) AC type, and shall meet or exceed UL 1449, ANSI IEEE C62.41 Categories A, B and C for switchboards and panels and ANSI IEEE C62.41 Categories A and B for duplex receptacles.
- B. Provide TVSS at locations shown on drawings as described below:
 - Main and Distribution Switchboards and Panelboards – Suppression shall be included and factory mounted within the panelboard by the manufacturer of the panelboard, using a direct bus bar connection (cable connection between bus bar and TVSS device is not acceptable). TVSS equipment shall be Square D "XGA" series, G.E. "Tranquell" series, Eaton or approved equal.
 - Duplex Receptacles - Leviton #8380-IG-O or approved equal.

All TVSS equipment shall have built-in diagnostics and shall indicate when the equipment is not providing the intended protection.

3.6 MOTOR CONTROL CENTERS

- A. Not required.

3.7 MAGNETIC STARTERS

- A. Not required.

3.8 TERMINAL CABINETS

- A. Terminal cabinets shall be flush or surface mounted as indicated with hinged doors and lock. The exterior finish to be same as for panelboards. Provide ¾" plywood backing inside of cabinet. Provide proper number of terminals in cabinets as required.
- B. Provide a Bakelite nameplate fastened with screws or rivets to the face of each terminal cabinet, which will identify it.
- C. Provide circuit directory and holder on inside of door with one line for each conductor entering and each conductor leaving cabinet.

3.9 RACEWAYS AND FITTINGS

- A. Shall be as manufactured by Allied Tube and Conduit Corporation, AFC Cable Systems, Inc., Carlon, Cantex, PW Pipe or approved equal.
- B. Galvanized rigid steel conduits (RSC) may be used in all locations.

- C. For underground runs in direct contact with earth, conduit shall be wrapped with PVC tape or shall have factory applied PVC coating.
- D. Galvanized intermediate metallic conduit (IMC) may be used in indoor locations not in direct contact with earth.
- E. Galvanized electrical metallic tubing (EMT) may be used in indoor dry locations in which it is:
 - 1) Not subject to physical damage.
 - 2) Not in direct contact with earth.
 - 3) Not in concrete slabs.
 - 4) Not in hazardous areas.
 - 5) On roof or walk cover when specifically shown on drawings.
 - 6) In masonry walls, not in same cells as rebars.
- F. Non-metallic rigid conduit shall be PVC Schedule 40 and may be used:
 - 1) Underground.
 - 2) Below concrete slab on grade.
 - 3) In concrete slab on floors above grade.
 - 4) In masonry walls, not in same cells as rebars.
- G. Flexible steel conduit may be used in dry locations for final connections to:
 - 1) Motors, transformers and other mechanical equipment, not to exceed 18 inches.
 - 2) Lighting fixtures, not to exceed 72 inches.
 - 3) Facilitate wiring in tight locations, when approved by Engineer.
- H. Flexible aluminum conduit may be used in walls or in attics to facilitate wiring in tight locations, when approved by the Engineer.
- I. Liquidtight flexible steel conduit shall be used in outdoor or wet locations for final connection to motors or other mechanical equipment, not to exceed 18 inches.
- J. Fittings:
 - 1) For rigid and intermediate steel conduits, fittings shall be:
 - Galvanized rigid steel threaded type.
 - Provide insulated grounding bushings at switchboard enclosures and panel enclosures for feeders.
 - 2) For electrical metallic tubing (EMT), fittings shall be:
 - Zinc plated steel set screw type in dry locations.
 - Zinc plated steel compression type for conduits larger than 1", in wet locations and in masonry walls.
 - All connectors shall have an insulated throat.
 - 3) For non-metallic conduits, fittings shall be PVC Schedule 40 type. Use PVC schedule 40 adapters at all boxes and panelboards

- 4) Brush or dauber apply PVC cement.
- 5) For flexible metallic conduits, fittings shall be zinc plated steel/malleable iron squeeze type.
- 6) For liquidtight flexible metallic conduits, fittings shall be zinc plated steel/malleable iron compression type.
- 7) Use of the following is prohibited:
 - Crimp-on, tap-on or indenter type fittings.
 - Spray (aerosol) PVC cement.

3.10 PULL BOXES

- A. Pull Boxes shall meet all code requirements as to size for conduits terminating therein and to thickness of material used in fabrication.
- B. Fabricated sheet steel pull boxes shall be installed only in dry, protected locations and shall be furnished with knockouts and removable screw cover. Box shall be finished with one coat of zinc chromate and a coat of primer sealer and where exposed to public view shall be painted to match the surrounding surface.
- C. Weatherproof sheet steel pull boxes shall be fabricated of code gauge galvanized sheet steel with two coats of rust resistant finish and shall be furnished with gasket and made completely weathertight.
- D. Approved manufacturers for metal boxes are Cooper B-Line, Milbank, Hoffman or approved equal.
- E. Weatherproof concrete pull boxes, junction boxes and telephone boxes shall be manufactured by Christy Concrete Products, Utility Vault or approved equal. All pull boxes shall be H/20 rated and be equipped with H/20 rated galvanized steel checker plate cover with the inscription "Electric, Lighting, Fire Alarm or Signal".

3.11 TIME SWITCHES

- A. Time switch shall be a two circuit digital time clock with photo control input, battery back-up and a surface enclosure. Provide a flush enclosure when indicated. Tork #DGLC (120V) or DGLC-3 (277V) or approved equal.

3.12 OUTLET BOXES

- A. All outlet boxes shall be standard one or two piece galvanized knockout outlet boxes. Raco, Appleton, Thomas and Betts or approved equal.
- B. All outlet box covers, rings or other fittings shall be standard galvanized. Raco, Appleton, Thomas and Betts or approved equal.
- C. No outlet box shall be smaller than four inches (4") square and 1 ½" in depth, except in concrete block construction where Thomas and Betts concrete masonry boxes are approved.

- D. Floor outlets on grade shall be fully adjustable type floor boxes, suitable for use in concrete floors. Wiremold #RFB6E-OG with a Wiremold #8CTC2NKTR Evolution cover assembly. Where floor box is installed in a bare concrete floor, provide a Bare Concrete and Terrazzo ring, Wiremold #RFB6E-CTR with a Wiremold #8CT2NKTR Evolution cover assembly.
Cover shall be die-cast aluminum with nickel finish, unless otherwise noted on drawings. For 120V power, provide an industrial specification grade 20A 125V duplex receptacle with internal duplex receptacle bracket #RFB6DP, quantity as shown on drawings. For data/telephone, provide a decorator style receptacle bracket #RFB6GFI for mounting frame to accept the modular telephone/data jacks, unless otherwise noted on drawings. Any unused device compartments shall be covered with internal blank bracket #RFB6B.
- E. All special outlets shall be as hereinafter specified or as shown on drawings.
- F. Thru boxes are not permitted.
- G. Any unused boxes shall be equipped with a blank cover plate.

3.13 RECEPTACLES

- A. Furnish and install an industrial specification grade 20A, 125 volt, 3 wire grounding type duplex receptacle with one piece brass mounting strap at all receptacle outlets as indicated on drawings. Leviton #5362-W or equal as manufactured by Hubbell, Pass and Seymour, Cooper or other approved manufacturers.
- B. Device color shall be white.
- C. Isolated ground duplex receptacles shall also provide TVSS (Transient Voltage Surge Suppression) as follows: Surge protection 320 Joules hot-neutral, ground-neutral, hot-ground, RFI and EMI noise filtration of 7:1 reduction. A LED shall indicate surge protection unit is in operation. Receptacle shall be 20A, 125V NEMA 5-20R, Leviton #8380-IG-O or approved equal.
- D. G.F.C.I. duplex receptacles shall be provided for 15 and 20 amp 125 volt circuits where required by the C.E.C. #210.8 and #590.6. At indoor locations, provide a Leviton #G5362-00W or equal. At exterior locations, provide weather-resistant type G.F.C.I. duplex receptacles, Leviton #G5362-WTW or equal. At damp locations, provide a diecast weatherproof lockable cover, RACO # 5028-0 or equal. At wet locations, provide a diecast weatherproof "while-in-use" lockable cover, Red Dot #CKSUV or equal.

3.14 LOCAL SWITCHES

- A. Furnish and install industrial specification grade, quiet type toggle switches, 20 AMP rated 120/277V AC only, controlling wall and ceiling outlets as indicated on the drawings. Leviton #1221-2W or equal as manufactured by Hubbell, Pass and Seymour, Cooper or other approved manufacturers.
- B. Where two or more switches are in proximity they shall be ganged in the same box and they will be set under one plate. Switches controlling lights and/or outlets on emergency power shall be kept entirely independent of all other switches not on emergency power by mounting in a separate box.
- C. Special receptacles or switches shall be as noted on drawings.

- D. Where key switches are noted on the drawings, provide Leviton #1221-2KL.
- E. Device color shall be white.
- F. When a switch is used as a disconnecting means, it shall be mounted in a readily accessible location.

3.15 WALL PLATES

- A. All wall plates for electrical outlets and devices shall be smooth stainless steel, non-magnetic type 302S.
- B. All telephone outlet plates shall be blanked plates, same as device plates.

3.16 CONDUCTORS (Wire)

- A. All wire installed in this contract shall be of a standard manufacturer as approved by the National Board of Fire Underwriters and be of the size as indicated on the drawings. All wire shall bear the Underwriters' label and shall be brought to the job in unbroken packages and approved by the Job Inspector before it is installed.
- B. All power conductors #10 AWG and smaller shall be type THWN copper, unless otherwise noted. All conductors #8 AWG and larger shall be type THWN-2 copper, unless otherwise noted.
- C. All underground conductors in a 480V or 480/277 volt power system shall be type XHHW-2 copper, unless otherwise noted.
- D. Number 12 AWG wire shall be the smallest gauge wire used, except for signal circuits, which shall be as shown on plans or as specified under other sections of these specifications.
- E. All wire #8 AWG gauge or larger shall be stranded.
- F. The neutral conductor of all lighting feeders shall be of the same size as the phase conductors.
- G. Splices on all wire less than #8 gauge shall be with insulated spring connectors Ideal "Wing Nuts", 3M "Scotchlok", or equal.
- H. Splices in wires #8 gauge and larger shall be made with crimp on solderless connector, 3M Scotch, Burndy or equal. Connectors to switches or bus bar shall be made with one piece lugs for all wires, sized for conductors as shown on plans.
- I. Each branch circuit shall be marked with the circuit number at the panel and at the first outlet nearest the panel. E-Z Code Markers (Thomas and Betts) or equal shall be used to label the circuits.

3.17 LIGHTING FIXTURES

- A. This Contractor shall submit for approval seven (7) portfolios with full description and manufacturer data sheets of all fixtures (including ballasts and lamps), that he proposes to use.
- B. This Contractor shall furnish and install all lighting fixtures and lamps as indicated on the Electrical Drawings and in accordance with these specifications.
- C. This Contractor shall be held responsible for the complete equipment of all fixture outlets with fixtures of the proper design as shown.
- D. All fixtures shall be securely anchored to prevent any possible chance of their falling.
- E. Continuous runs of fixtures shall be installed straight and true.
- F. Recessed fixtures shall be complete with plaster frames, supporting brackets and hanger wires.
- G. Stem lengths shall be adjusted to meet conditions where required. Furnish aligners to ensure vertical alignment (ball aligner).
- H. Electrical Contractor shall coordinate outlets with Acoustic Tile Contractor and other trades and locate outlets in center or at intersections of acoustical tile in all acoustical tile ceilings.
- I. Recessed fixtures in t-bar ceilings shall be attached to t-bar ceiling with integral t-bar clips, two at each end of fixture.
- J. When the light fixture is equipped with an integral emergency battery pack, the light fixture shall be connected so that it is controlled via the room light switch and is automatically energized when power has fails.

3.19 PHOTO CONTROL

- A. Paragon or equal, adjustable type.

3.20 MOTOR DISCONNECTS

- A. Disconnects shall be fused safety switches with dual element fuses. Heavy Duty rated with quick-make, quick-break operating mechanism. Fuse rating shall comply with motor manufacturer's recommendations. Switch shall be UL listed. Disconnects shall have an external operating handle, lockable in the open or closed position.
- B. Disconnect switches shall be located so as not to obscure any part of the HVAC unit's nameplate data.
- C. Each disconnect switch shall have an engraved Bakelite nameplate identifying the panel and circuit number that feeds the motor. Nameplates shall comply with specifications for "Identification of Switches and Apparatus".

3.21 DRY TYPE TRANSFORMERS

- A. Not required.

3.22 TELEPHONE CABLES

- A. When telephone cables are indicated on drawings, they shall be Category 3, 24 AWG, unshielded twisted pairs with 4 pairs minimum, COMMSCOPE #3504 or equal. If in a plenum, use plenum rated cable, COMMSCOPE #35N4 or equal.

PART 4 - EXECUTION AND INSTALLATION

4.1 CONDUIT SYSTEMS

- A. A concealed conduit system shall be installed for all interior wiring including controls. Conduit shall be run continuous between outlets, etc., and with the minimum number of bends.
- B. PVC 40, galvanized rigid steel wrapped with PVC tape or galvanized rigid steel with factory applied PVC coating shall be used for underground runs.
- C. Where underground conduit cannot be run below building footings and the Contractor shall provide PVC-80 sleeves through the footings (Contractor shall obtain approval for all sleeve sizes and locations with the Structural Engineer before installation).
- D. All conduit shall be delivered to the site of construction in their original bundles. Each length of conduit shall bear the label of the National Board of Fire Underwriters. All conduit subjected to rough usage while on the job before installation and not acceptable to the Architect shall be removed from the premises upon notice.
- E. Conduit installed in masonry walls shall be rigid steel galvanized conduit, PVC or EMT, not in same cell as re-bars.
- F. The joints in all conduits installed under concrete slabs on the ground, or underground, or exposed to the weather, shall be made liquid and gas-tight. All underground conduit outside of the buildings shall be buried to a depth of not less than 24" below finish grade. Utility services shall comply with utility company requirements. Two or more conduit runs installed in a common trench shall be separated horizontally by at least four inches (4"). Electrical conduit runs installed in a common trench with other utility lines shall be separated horizontally from such lines by at least twelve inches (12"). Provide a detectable warning tape, 12" above the top of the conduit and the full length of trench.
- G. Changes in direction shall be made with conduit elbows or long radius bends made on the job. Where two or more conduits are grouped in exposed locations, the sweeps shall be struck from the same center forming concentric arcs.
- H. All joints in conduit shall be made with standard coupling. In making joints, conduits must be truly and accurately cut and threaded (where applicable) with straight thread, smoothly reamed and squarely butted. All conduit shall be kept corded and dry during construction, using plastic caps or conduit pennies held in place with conduit bushings. Should dirt or moisture collect in any conduit, the Contractor shall swab them out to the satisfaction of the Architect.

- I. Conduits ending at the motors shall be carried as close as possible to the terminal blocks making allowance for the movement of the motors when they are equipped with slide rails. The connection between the conduit terminals on the motor and the conduit shall be made with liquid-tight flexible conduit using the proper fittings.
- J. All conduits where they enter panel enclosures, pull boxes, or outlet boxes shall be secured in place by galvanized locknut inside of box.
- K. Where conduits are run exposed, they shall be installed straight and true with reference to the adjacent construction.
- L. Any conduit installed under building shall be under the slab. The top of any conduit below floor slab shall be a minimum of 4" below the bottom of the concrete slab.
- M. All boxes for bracket outlets shall be equipped with a 3/8" "No-Bolt" fixture stud. These boxes shall be so set that when in place the fixture shall be at right angles to the ceiling or walls.
- N. All empty conduit shall be equipped with a nylon pull rope continuous from outlet-to-outlet or end-to-end.
- O. Flexible conduit will be permitted for connecting lighting fixtures to junction boxes.
- P. Flexible connections in outdoor and damp locations shall be flexible liquid-tight metal conduit or non-corrosive seamless metallic tubing with watertight connections.
- Q. Install roof jacks for this construction in accordance with other sections of this Specification.
- R. The maximum allowed length of flex conduit at equipment connections is 18".
- S. Expansion joints for conduit shall be provided where required to compensate for thermal expansion and contraction.
- T. At all sub-panels and terminal cabinets, stub two 1"C and two 3/4"C into the accessible attic space. If the attic space is not accessible, stub conduits to a location as directed by Architect or Engineer. Provide additional conduit stubs when indicated on the drawings.
- U. Support conduits on roof with pre-fabricated pipe supports (B-Line "Dura-Blok Series" or equal), spaced 8 ft. O.C. maximum. Minimum clearance from roof to framing channel shall be 4". Framing channel length shall be as required plus 50% spare length. Installation shall comply with manufacturer's recommendations.
- V. Any conduit entering underground pull boxes shall be sealed to prohibit water from entering the conduit. Conduits with conductors shall be sealed with a sealing compound after all conductors have been installed. All spare (empty) conduits shall be identified with either the "origination" or "destination" (example: to pull box 150' to the south, from Main Switchboard, etc.). The contractor shall use a scrap piece of 3/4" PVC conduit, approximately 5" in length and tie the nylon pull string thru it. Write the description on the conduit using an indelible/permanent marker.

4.2 OUTLETS

- A. In general, the locations of electrical outlets shall be as shown on the drawings; however, the Contractor shall make any changes necessary to suit conditions on the job or rearrangement of built-in fixtures and equipment as directed by the Architect or his representative.
- B. The Contractor shall study the general building plans with relation to spaces surrounding each outlet in order that his work may fit the work of others and that when fixtures or other equipment are installed they will be symmetrically located according to room layout. Refer all conflicts and discrepancies promptly to the Architect.

4.3 OUTLET BOXES

- A. Outlets for concealed wiring shall be flush with the finished wall or ceiling surfaces. Pull boxes, junction boxes and all others to which no fixture or device is to be attached, shall be fitted with blank cover plates and painted to match surroundings. In order to reduce noise transmission between rooms, outlet boxes shall not be installed back to back. Where outlets are side by side and faced into opposite rooms, the boxes shall be at least 6" apart, except in fire rated walls space boxes at least 24" apart. If the boxes are connected together, the connection shall be flexible and shall have openings packed with fiberglass.
- B. The Electrical Contractor shall inform himself of wall thickness throughout the building and shall provide outlet boxes of suitable depth that can be flush mounted and yet will be deep enough to contain the particular apparatus involved. Location of exposed pull or junction boxes will be subject to the Architect's approval.
- C. Outlets from which lights are suspended shall have approved 3/8" fixture studs fastened through from back of box. All outlet boxes and particularly those supporting fixtures shall be securely anchored in place in an approved manner. Support outlet boxes and fixtures in acoustic ceiling areas from building structures, not from acoustic ceilings. All lighting fixture outlets shall be coordinated with mechanical, architectural, or other equipment to eliminate conflicts and provide a workable, neat installation.
- D. Where more than one switch occurs at the same location, use multiple gang outlet boxes covered by a single plate; provide box partitions as required by the C.E.C. Switches controlling lights and/or outlets on emergency power shall be kept entirely independent of all other switches not on emergency power by mounting in a separate box.
- E. Outlet box extensions shall be UL listed and shall be attached to box with threaded metal screws. "Flash guards" are not permitted to be used as box extensions.

4.4 LOCATIONS OF OUTLETS

- A. The Architect reserves the right to make reasonable changes in the indicated locations before work is roughed in without additional charge to the Owner.
- B. Where wainscot occurs at the 4'-6" level, the switch shall be mounted lower in the wainscot as near the 4'-0" level as possible, but in no case, shall the switch be partially in the wainscot and partially in the wall. It shall be the Electrical Contractor's responsibility to verify all door swings. Switches, unless specifically noted, shall be on

the strike side of the door. If switch is indicated on hinged side of door, verify location with Architect.

4.5 CONDUCTOR IDENTIFICATION AND INSTALLATION

- A. The drawings indicate the arrangement of outlets on each branch circuit and the circuit tags show the number of the circuit, and the board to which it will be connected.
- B. Circuits indicated with the same numbers shall be connected to the same breaker on the panelboard.
- C. All feeders and branch circuits shall be tagged in all pull boxes and in the gutters of all panels to which they connect.
- D. All wiring shall be done in identified neutrals.
- E. No wire shall be installed until all work of other contractors that might cause injury to the said wire has been completed. Care shall be used to pull wires to insure that no damage occurs to the insulation. A wire lubricant shall be used for pulling in wires.
- F. In making the connection of all branch circuits to the terminals of switches, base plugs, etc., the wires shall be looped around the binding screws or be fitted with connecting lugs. At the ceiling outlets, this Contractor shall leave not less than 6" of free ends on each wire for connections to the fixtures.
- G. No splices shall be permitted except in outlet boxes, and in panelboard gutters.
- H. Switches and receptacles shall be securely fastened to the outlet box. Where the outlet box covers are back of the finished walls the switch or receptacle shall be built out from the same with washers so that it is rigidly held in place to the box. The floating of any switch or receptacle will not be permitted.
- I. All signal and communications conductors shall be identified in terminal cabinets as to type of system e.g.: clock, bell, fire alarm, etc. and location of other end of conductor by room number or name as directed by Owner. Identification shall be by numbers at terminal strips and a numbered directory in cardholder inside terminal cabinet.
- J. Fire alarm system cabling and wiring shall be color-coded as follows:
 - Initiating Devices: - Addressable cable, red jacket.
 - Signaling Devices: - Black and Red wires for horns, strobes or horn strobes.
 - Speaker cable, blue jacket for speakers.
- K. All power wiring size #6 AWG and smaller, shall be factory color-coded. For larger than #6, mark conductors on each end and at all junction and/or pull boxes with a 1" band of colored pressure-sensitive plastic tape. For isolated ground wires, mark with a 1" band of green tape, followed by a 1" band of yellow tape, followed by a 1" band of green tape. Colors for each phase and the neutral shall be consistent throughout the system. Color code shall be as follows:

WIRE

120/208V

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Equip. Ground	Green
Iso-Ground	Green w/Yellow stripe

The white or gray conductor shall be the neutral at each outlet. All switches shall be installed in "hot" leg. On all lighting circuits the switch leg shall be purple from switch to fixture. All travelers from switch to switch on 3 and 4-way switches shall be pink. This color code shall be followed by Contractor for all fixture whips except for factory-manufactured whips. When factory manufactured whips are used, color code shall apply to all wiring except the factory whip.

- L. Conductors having white, gray or green covering shall not be used to indicate other than neutral or grounding. This limitation applies to all power, lighting, and control circuits.
- M. Installation of conductors shall be made in a neat and workmanlike manner to meet Code requirements and shall be run continuous without weld, splice or joint between boxes. Do not install wires in conduit unless the entire system of conduit and outlet boxes is permanently in place. All conductors shall be pulled using a UL approved wire lubricant.
- N. Make all terminations at motors using 3M Series 5300 Motor Lead/Cable Splicing Kits. Make connections per 3M written installation procedures.
- O. On all bolted electrical connections, the Contractor shall use Belleville washers.
- P. All wiring to be neatly bundled and tied with nylon cord or plastic straps.
- Q. When approved by the Electrical Engineer, splices in underground pull boxes shall be made with crimp on compression connectors and insulated with heat shrink sleeves or with splice kits listed by the manufacturer for wet locations. Wire nuts are not permitted. Cables and/or conductors for fire alarm and signals systems shall not be spliced.

4.6 GROUNDING

- A. The conduit system supports, cabinets, switchboards, etc., and neutral conductors must be permanently and effectively grounded, accordance with Title 24 of the California Code of Regulations. The neutral shall only be grounded at the main service location unless specifically noted otherwise on the drawings or required by the California Electrical Code.
- B. This Contractor shall exercise every precaution to obtain good contacts at all panel boxes, pull boxes, etc.: where it is not possible to obtain good contacts, the conduits shall be bonded around the boxes with a #6 AWG gauge conductor with ground clamps.
- C. All equipment cases, motor frames, etc. shall be completely grounded to satisfy applicable code requirements.

- D. At each building, the interior hot and cold water piping and the interior aboveground gas piping shall be bonded to the building service equipment per C.E.C. #250.104.
- E. Do not use underground gas piping as a grounding electrode.
- F. Pull a green equipment ground conductor in all power conduits, both metallic and non-metallic.
- G. Pull a separate isolated ground wire to isolated ground receptacles, insulated green with yellow stripe, in addition to the equipment ground conductor.
- H. Isolated ground conductor shall begin at the isolated ground bus in the panel in the building served and shall not be connected to any neutral conductor or any item not isolated from the system ground. All isolated ground circuits shall have a separate neutral conductor (not used for more than one circuit). The isolated ground conductor cannot extend upstream from the building served.
- I. Each disconnect switch shall have a ground connector (lay in wire type) which shall be used for grounding the disconnect enclosure. The ground wire shall continue and be connected to the enclosure of the equipment served.
- J. Where there is more than one building supplied from a common service, provide a grounding electrode at each building per C.E.C. #250.32.
- K. At each telephone backboard and/or data backboard, provide a power distribution block (one pole with two primary openings and six secondary openings) and mount at + 18" A.F.F. unless otherwise noted. Run $\frac{3}{4}$ "C - 1 #6 AWG to the ground bar of the nearest panel or the ground bus of the main switchboard. Power distribution block shall be Square D #LBA 163206 or equal.

4.7 MOUNTING HEIGHTS OF EQUIPMENT

Unless otherwise specified elsewhere or shown on the plans, the following mounting shall apply:

- A. Panelboards: 6'-0" top of box
- B. Disconnect Switches: 4'-0" to center line
- C. Contactors: 4'-0" to center line

4.8 IDENTIFICATION OF SWITCHES AND APPARATUS

All switchboard circuits, externally operated switches and apparatus used for the operation of or control of circuits, appliances, or equipment shall be properly identified with an engraved Bakelite nameplates, 1" x 3", black letters on white background. All such nameplates shall be of the self-adhesive type and attached onto the apparatus by screws or rivets. Card holders in any form are not acceptable.

4.9 EARTHQUAKE PROOFING OF LIGHT FIXTURES

- A. Fixtures weighing more than 50 pounds shall be supported independently of the outlet box.
- B. Pendant type fixtures shall be designed so that they may swing horizontally in any direction a minimum of 45 degrees from the vertical. Pendant shall have ball aligner at

top, and swivel connection at fixture. If there is an obstruction within the 45 swing of the fixture the Contractor shall provide a State approved restraint to keep fixture from swinging into the obstruction.

- C. All fixtures mounted in or on suspended ceilings shall be fastened to the ceiling-framing members in accordance with C.E.C. #410.36(B). Recessed fixtures in t-bar ceilings shall be provided with integral t-bar clips, one near each corner to attach it to the t-bar ceiling frame.
- D. Recessed fixtures in T-bar ceilings shall be attached to the building structure above with #12 Ga. slack safety wire at two diagonal corners of each fixture (two wires per fixture).

4.10 FIRE RATED AREAS

- A. Where light fixtures, conduit, cabinets, or boxes penetrate fire rated ceilings, walls or floors provide a fire rated enclosure or fire stop. Rating of enclosure or fire stop shall match or exceed rating of area penetrated. Verify location of fire rated areas with architectural drawings and with General Contractor.
- B. Where outlet boxes are recessed on opposite sides of a fire rated wall, boxes shall be separated by a horizontal distance of at least 24 inches. Where the wall opening for a steel electrical outlet box exceeds 16 sq. inches in area, or an aggregate of more than 100 sq. inches for any 100 sq. feet of wall or partition area, fire stopping is required.
- C. Penetrations in walls, floors or ceilings requiring protected openings shall be fire-stopped.
- D. Fire-stopped shall be of an approved material, securely installed and be in conformance with the 2019 C.B.C., Section 714.3.1 and 714.3.2.
- E. All required fire-stopping and joint sealants as a result of the work in Divisions 16 is the responsibility of each individual trade.

PART 5 - COORDINATION

5.1 HEATING, AIR CONDITIONING, PLUMBING AND OTHER MECHANICAL WORK

- A. The Mechanical Contractor shall furnish equipment such as motors, starters, thermostats, wiring diagrams, etc. However, the Electrical Contractor shall be responsible for furnishing and installing of all fused disconnect switches, conduits, wire, fittings, etc. for power connections.
- B. Install all electrical equipment where it is not already installed as a part of a unit furnished by the Equipment Contractor. (See drawings of respective contractors).
- C. The Electrical Contractor shall furnish fused disconnect switches for pumps, motors and air conditioning and handling units, if they are not furnished by others. Fuses shall be dual element, rating per equipment manufacturer's recommendations. Disconnects shall comply with requirements for "Motor Disconnects" as specified earlier in this section.
- D. All disconnect switches (whether provided with unit or by Contractor) shall have a circuit identification engraved nameplate as specified under "Motor Disconnects".

- E. Thermal overload protection shall be furnished for all motors where such protection is not included as a part of another contract.
- F. All motor outlets, disconnect switch locations and control outlets shown on the plans are approximate only. Verify exact location of same with Equipment Contractor.
- G. All line and low voltage controls, including conduits, outlets, wiring and connections shall be furnished and installed by the Mechanical Contractor. (Division 15).
- H. Furnish and install a weather-resistant duplex receptacle with ground fault circuit interrupter protection within 25 ft. of all rooftop H.V.A.C. units. Provide a diecast weatherproof "while-in-use" lockable cover, Red Dot #CKSUV or equal.
- I. Coordinate with General Contractors, Mechanical Contractors and equipment suppliers before bid is submitted and again before rough-in is started to verify that all systems are complete and all components are provided including starters, disconnects, relays, solenoids, control conduit and wire, etc.

PART 6 - MISCELLANEOUS

6.1 MISCELLANEOUS EQUIPMENT

- A. Contractor shall be responsible for electrical hook up and connections to all electrical equipment whether furnished by this Contractor or others, including wiring, conduit, disconnects, circuit breakers etc., even if not shown on drawings. Verify all locations and requirements with equipment supplier before rough-in.
- B. When there are fire sprinklers, the Electrical Contractor shall connect bell, flow and tamper switches and other electrical devices as required by Sprinkler Contractor and local and state fire marshal. Verify requirements with General Contractor before bid.

6.2 INTERRUPTION OF SERVICE

- A. Interruption of service in existing buildings shall not be made at a time which will inconvenience the Owner. Before making any final connections to the existing buildings or doing any other work that will interrupt the service, the Contractor shall consult with the Owner and schedule the work at Owner's convenience even if it is necessary to make such connections after regular working hours.
- B. This Contractor shall do all rerouting and reconnecting of existing electrical facilities made necessary by this construction. Care shall be taken not to disrupt existing facilities. If any facilities are disrupted, this Contractor shall replace or repair them at his expense and to the satisfaction of the Architect.

6.3 CHANGES

- A. Electrical Contractor shall consider the number of outlets for electric equipment shown on plans as final, but the Architect reserves the right to shift same, within reason, to a location and position which will meet more completely final requirements.

6.4 GUARANTEE AND TESTS

- A. All electrical equipment testing and related costs shall be included in the Contractor's bid.
- B. Contractor shall obtain approval from the Architect of proposed independent testing agencies before any testing is started.
- C. Equipment of all kinds installed by this Contractor shall be tested to determine whether it fulfills the requirements of these specifications. The Contractor shall furnish all labor necessary to adjust the operation of the apparatus and make the connections for the tests. After the tests have been completed, the Contractor shall restore all connections, apparatus, etc., to their original condition.
- D. Should any piece of apparatus or any material or work fail in any of these tests, it shall be immediately removed and be replaced with new material by this Contractor at his expense and the portion of the work replaced be again tested by the Contractor.
- E. All circuit breakers, 100 amps or more, shall be tested by an independent testing agency in accordance with NETA specifications and a report submitted to the Architect. Any circuit breaker that does not pass the test shall be replaced.
- F. The entire installation shall be free from short circuits and improper grounds. Panels and circuits shall be tested for grounds and shorts. Each individual circuit shall be tested at the panel with the equipment connected for proper operation. Ground tests shall meet the requirements of the California Electrical Code. Upon completion of the work, a final inspection by the Architect and other interested authorities shall be conducted. This Contractor shall guarantee to repair or replace at his expense any material or equipment that develops defects or is determined not to be in conformance with the plans and specifications, during a period of one year after work is accepted by the Owner.
- G. The grounding electrode system at the main electrical service equipment shall be tested by an independent testing agency in accordance with the three point fall of potential method as specified in IEEE Standard 81-1983. Maximum ground resistance shall be 25 OHMS. A copy of the test report shall be submitted to the Architect and Engineer of record.
- H. All feeder cables #2 and larger shall be tested for insulation resistance. Test report must include number of cable per phase & type of cable insulation.
- I. Three copies of test report shall be submitted to Electrical Engineer prior to the final job walk.
- J. The independent testing agency performing the above mentioned tests shall be NETA or NICET certified or approved by the electrical engineer.

6.5 GROUND FAULT SYSTEMS TEST PROCEDURE

VISUAL AND MECHANICAL INSPECTION:

Inspect for physical damage and compliance with plans and specifications.

Inspect neutral main bonding connection and ensure bond is clearly marked per CEC.

Set pickup and time delay settings in accordance with the Coordination Study Recommendations.

6.6 ELECTRICAL TESTS

- A. Measure system neutral insulation resistance to ensure no shunt ground paths exist. Remove neutral-ground disconnect link. Measure neutral insulation resistance and replace link.
- B. Measure main ground resistance using fall-of-potential per IEEE Standard 81.

6.7 TEST PARAMETERS

- A. System neutral insulation shall be a minimum of one hundred (100) ohms.

6.8 DEMOLITION

- A. Remove and/or relocate electrical facilities as required to clear areas for new construction.

END OF SECTION 16200

SECTION 16620 – STANDBY POWER GENERATOR SYSTEM

PART 1 - ORDINANCE, REGULATIONS, AND CODES

1.1 General

1.1.1 References and Standards

The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards below:

- CSA C22.2 No14
- CSA 282
- CSA 100
- EN61000-6
- EN55011
- FCC Part 15 Subpart B
- ISO8528
- IEC61000
- UL508
- UL2200
- UL142
- Designed to allow for installed compliance to NFPA 70, NFPA99 and NFPA 110
- San Joaquin Valley Air Pollution Control District (SJVAPCD)

1.2 Related Sections

1.2.1 Division 3 - Concrete

1.2.2 Division 15 - Mechanical

1.3 Work Included

1.3.1 Installation

The work includes supplying and installing a complete integrated generator system. The system consists of a diesel generator set with related component accessories and automatic transfer switches specified under a separate section.

1.3.2 Fuel System

The CONTRACTOR shall provide a full tank of diesel fuel for the completion of all testing.

1.3.3 System Test

A complete system load test shall be performed after all equipment is installed. Guidelines in the Start-up Section.

1.3.4 Requirements, Codes and Regulations

The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified.

1.4 Substitution

Proposed deviations from the specifications shall be treated as follows:

1.4.1 Substitution Time Requirement

Requests for substitutions shall be made a minimum of ten (14) days prior to bid date. Manufacturers catalog data shall accompany each request and authorized acceptance shall be addenda only.

1.4.2 Substitution Responsibility

The power system has been designed to the specified manufacturer's electrical and physical characteristics. The equipment sizing, spacing, amounts, electrical wiring, ventilation equipment, fuel, and exhaust components have all been sized and designed around CATERPILLAR supplied equipment. Should any substitutions be made, the CONTRACTOR shall bear responsibility for the installation, coordination and operation of the system as well as any engineering and redesign costs, which may result from such substitutions.

1.5 Submittals

Engine-generator submittals shall include the following information:

1. Factory published specification sheet.
2. Manufacturer's catalog cut sheets of all auxiliary components such as battery charger, control panel, enclosure, etc.
3. Dimensional elevation and layout drawings of the generator set, enclosure and transfer switchgear and related accessories.
4. Weights of all equipment.
5. Concrete pad recommendation, layout and stub-up locations of electrical and fuel systems.
6. Interconnect wiring diagram of complete emergency system, including generator, switchgear, day tank, remote pumps, battery charger, control panel, and remote alarm indications.
7. Engine mechanical data, including heat rejection, exhaust gas flows, combustion air and ventilation air flows, fuel consumption, etc.
8. Generator electrical data including temperature and insulation data, cooling requirements, excitation ratings, voltage regulation, voltage regulator, efficiencies, waveform distortion and telephone influence factor.
9. Generator resistances, reactances and time constants.
10. Generator locked rotor motor starting curves.
11. Manufacturer's documentation showing maximum expected transient voltage and frequency dips, and recovery time during operation of the generator set at the specified site conditions with the specified loads.
12. Manufacturer's and dealer's written warranty.

1.7 System Responsibility

1.7.1 Generator Set Distributor

The completed engine generator set shall be supplied by the Manufacturer's authorized distributor only.

1.7.2 Requirements, Codes and Regulations

The equipment supplied and installed shall meet the requirements of NEC and all-applicable local codes and regulations. All equipment shall be new, of current production. There shall be one source responsibility for warranty; parts and service through a local representative with factory trained service personnel.

1.7.3 Automatic Transfer Switch

The automatic transfer switch(es) specified in another section shall be supplied by the generator set distributor in order to establish and maintain a single source of system responsibility and coordination.

1.8 Warranty

1.8.1 Two Year Standby (ISO 8528-1: ESP) Generator Set Warranty

The manufacturer's standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall be limited to 500 hours annually for the system warranty by both the manufacturer and servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

1.9 Parts and Service Qualifications

1.9.1 Service Facility

The engine-generator supplier shall maintain 24-hour parts and service capability within 100 miles of the project site. The distributor shall stock parts as needed to support the generator set package for this specific project. The supplier must carry sufficient inventory to cover no less than 80% parts service within 24hrs and 95% within 48 hours.

1.9.2 Service Personnel

The dealer shall maintain qualified factory trained service personnel.

1.9.3 Product Support

1.9.3.1 Preventive Maintenance Agreement

The authorized Caterpillar dealer shall provide a preventive maintenance agreement using qualified factory trained service personnel, for a period of 1-year minimum. The dealer shall provide genuine Caterpillar parts and filters, shall provide all recommended fluids, dealer labor, travel labor and travel mileage to complete the suggested preventive maintenance as defined in the manufacturer's Operation and Maintenance Manual.

1.9.3.3 Standby Generator Set Extended Service Coverage

Extended Service Coverage shall be provided for a period of 5 years, and shall include no deductible. Extended Service Coverage provides for 100 percent of usual and customary parts and labor costs for failures due to defects in materials and workmanship to the "as shipped consist" from the factory, excluding filters, fluids, vee belts, hoses, power take-offs, paint, batteries and clutches. Platinum Extended Service Coverage provides for a rental power unit due to unscheduled failures causing unexpected downtime to the customer in excess of 48 hours from the time of diagnoses. All repairs will be performed by factory trained dealer service personnel, and allows for repairer travel and mileage for all repairs up to 8 hours and 320 miles per incident.

PART 2 Product Specifications

2.1 General Requirements

2.1.1 Genset Requirements

The generator set shall be Standby Duty rated at 300.0 ekW, 375.0 kVA, 1800 RPM, 0.8 power factor, 208 V, 3-Phase, 60 hertz, including radiator fan and all parasitic loads. Generator set shall be sized to operate at the specified load at a maximum ambient of 110F (43.3C) and altitude of 500.0 feet (152.4 m).

Standby Power Rating:

Power is available for the duration of an emergency outage

Average Power Output = 70% of standby power

Load = Varying

Typical Hours/Year = 200 Hours

Maximum Expected Usage = 500 hours/year

Typical Application = Standby

2.1.2 Material and Parts

All materials and parts comprising the unit shall be new and unused.

2.1.3 Engine

The engine shall be diesel fueled, four (4) cycle, water-cooled, while operating with nominal speed not exceeding 1800 RPM. The engine will utilize in-cylinder combustion technology, as required, to meet applicable EPA non-road mobile regulations and/or the EPA NSPS rule for stationary reciprocating compression ignition engines.

Additionally, the engine shall comply with the State Emission regulations at the time of installation/commissioning.

Actual engine emissions values must be in compliance with applicable EPA emissions standards per ISO 8178 – D2 Emissions Cycle at specified kW / bHP rating. Utilization of the “Transition Program for Equipment

Manufacturers” (also known as “Flex Credits”) to achieve EPA certification is not acceptable. The in-cylinder engine technology must not permit unfiltered exhaust gas to be introduced into the combustion cylinder.

Emissions requirements / certifications of this package: EPA T3

2.1.3.1 Engine Governing

The engine governor shall be a electronic Engine Control Module (ECM) with 24-volt DC Electric Actuator. The ECM shall be enclosed in an environmentally sealed, die-cast aluminum housing which isolates and protects electronic components from moisture and dirt contamination. Speed droop shall be adjustable from 0 (isochronous) to 10%, from no load to full rated load. Steady state frequency regulation shall be +/- 6 RPM. Speed shall be sensed by a magnetic pickup off the engine flywheel ring gear. A provision for remote speed adjustment shall be included. The ECM shall adjust fuel delivery according to exhaust smoke, altitude and cold mode limits. In the event of a DC power loss, the forward acting actuator will move to the minimum fuel position.

2.2 Generator

2.2.1 Generator Specifications

The synchronous three phase generator shall be a single bearing, self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling. The generator shall meet performance class G2 of ISO 8528. The excitation system shall enable the alternator to sustain 300% (250% for 50Hz) of rated current based on the 125C (Class H) or 105C (Class F) rise rating for ten seconds during a fault condition and shall improve the immunity of the voltage regulator to non-linear distorting loads. The excitation system shall be of brushless construction and be independent of main stator windings (either permanent magnet or auxiliary windings).

2.2.2 Voltage Regulator

2.2.2.1 Digital Voltage Regulator

The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain generator output voltage within +/- 0.25% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage, or operating in single phase sensing mode. The voltage regulator shall include a VAR/Pf control feature as standard. The regulator shall provide an adjustable dual slope regulation characteristic in order to optimize voltage and frequency response for site conditions. The voltage regulator shall include standard the capability to provide generator paralleling with reactive droop compensation and reactive differential compensation.

The voltage regulator shall communicate with the Generator Control Panel via a J1939 communication network with generator voltage adjustments made via the controller keypad. Additionally, the controller shall allow system parameter setup and monitoring, and provide fault alarm and shutdown information through the controller. A PC-based user interface shall be available to allow viewing and modifying operating parameters in a windows compatible environment.

2.2.3 Motor Starting

Provide locked rotor motor starting capability of 817.9 skVA at 30% instantaneous voltage dip as defined per NEMA MG 1. Sustained voltage dip data is not acceptable.

2.3 Circuit Breaker

2.3.1 Circuit Breaker Specifications

Provide a generator mounted 100% circuit breaker, molded case, Qty.() ___ amp trip, 3 pole, NEMA 1/IP22. Breaker shall utilize a solid state trip unit. The breaker shall be UL/CSA Listed and connected to engine/generator safety shutdowns. Breaker shall be housed in an extension terminal box which is isolated from vibrations induced by the generator set. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker.

2.4 Controls – Generator Set Mounted

Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control shall provide all operating, monitoring, and control functions for the generator set. The control panel shall provide real time digital communications to all engine and regulator controls via SAE J1939.

2.4.1 Environmental

The generator set control shall be tested and certified to the following environmental conditions.

1. -40°C to +70°C Operating Range
2. 95% humidity non-condensing, 30°C to 60°C
3. IP22 protection for rear of controller; IP55 when installed in control panel
4. 5% salt spray, 48 hours, +38°C, 36.8V system voltage
5. Sinusoidal vibration 4.3G's RMS, 24-1000Hz
6. Electromagnetic Capability (89/336/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC, BS EN 50081-2, 50082-2)
7. Shock: withstand 15G

2.4.2 Functional Requirements

The following functionality shall be integral to the control panel.

1. The control shall include a 33 x 132 pixel, 24mm x 95mm, positive image, transfective LCD display with text based alarm/event descriptions.
2. Audible horn for alarm and shutdown with horn silence switch
3. Standard ISO labeling
4. Multiple language capability
5. Remote start/stop control
6. Local run/off/auto control integral to system microprocessor
7. Cooldown timer
8. Speed adjust
9. Lamp test
10. Push button emergency stop button
11. Voltage adjust
12. Voltage regulator V/Hz slope - adjustable

13. Password protected system programming

2.4.3 Digital Monitoring Capability

The controls shall provide the following digital readouts for the engine and generator.

All readings shall be indicated in either metric or English units

Engine

1. Engine oil pressure
2. Engine oil temperature
3. Engine coolant temperature
4. Engine RPM
5. Battery volts

Generator

1. Generator AC volts (Line to Line, Line to Neutral and Average)
2. Generator AC current (Avg and Per Phase)
3. Generator AC Frequency
4. Generator kW (Total and Per Phase)
5. Generator kVA (Total and Per Phase)
6. Generator kVAR (Total and Per Phase)
7. Power Factor (Avg and Per Phase)
8. Total kW-hr
9. Total kVAR-hr
10. % kW
11. % kVA
12. % kVAR

2.4.4 Alarms and Shutdowns

The control shall monitor and provide alarm indication and subsequent shutdown for the following conditions. All alarms and shutdowns are accompanied by a time, date, and engine hour stamp that are stored by the control panel for first and last occurrence:

Engine Alarm/Shutdown

1. Low oil pressure alarm/shutdown
2. High coolant temperature alarm/shutdown
3. Loss of coolant shutdown
4. Overspeed shutdown
5. Overcrank shutdown
6. Low coolant level alarm
7. Low fuel level alarm
8. Emergency stop depressed shutdown
9. Low coolant temperature alarm
10. Low battery voltage alarm
11. High battery voltage alarm
12. Control switch not in auto position alarm
13. Battery charger failure alarm

Generator Alarm/Shutdown

1. Generator Over Voltage
2. Generator Under Voltage
3. Generator Over Frequency
4. Generator Under Frequency
5. Generator Overcurrent

Voltage Regulation (available only with adjustable voltage regulator)

1. Loss of excitation alarm/shutdown
2. Instantaneous over excitation alarm/shutdown
3. Time over excitation alarm/shutdown
4. Rotating diode failure
5. Loss of sensing
6. Loss of PMG

2.4.5 Inputs and Outputs

Programmable Digital Inputs

The Controller shall include the ability to accept eight (8) total with six (6) programmable digital input signals. The signals may be programmed for either high or low activation using programmable Normally Open or Normally Closed contacts.

Programmable Relay Outputs

The control shall include the ability to operate eight (8) total with six (6) programmable relay output signals, integral to the controller. The output relays shall be rated for 2A @ 30VDC and consist of six (6) Form A (Normally Open) contacts and two (2) Form C (Normally Open & Normally Closed) contacts.

Programmable Discrete Outputs

The control shall include the ability to operate one (1) discrete output, integral to the controller, which is capable of sinking up to 300mA.

2.4.6 Maintenance

All engine, voltage regulator, control panel and accessory units shall be accessible through a single electronic service tool. The following maintenance functionality shall be integral to the generator set control:

1. Engine running hours display
2. Service maintenance interval (running hours or calendar days)
3. Engine crank attempt counter
4. Engine successful starts counter
5. 20 events are stored in control panel memory
6. Programmable cycle timer that starts and runs the generator for a predetermined time. The timer shall use 14 user-programmable sequences that are repeated in a 7-day cycle. Each sequence shall have the following programmable set points:
 - a. Day of week
 - b. Time of day to start
 - c. Duration of cycle

2.4.7 Remote Communications

Remote Communications

The control shall include Modbus RTU communications as standard via RS-485 half duplex with configurable baud rates from 2.4k to 57.6k.

Remote Monitoring Software

The control shall provide Monitoring Software with the following functionality

1. Provide access to all data and events on generator set communications network
2. Provide remote control capability for the generator set
3. Ability to communicate via Modbus RTU or remote modem

2.4.8 Local and Remote Annunciation

Local Annunciator (NFPA 99/110, CSA 282)

Provide a local, control panel mounted, annunciator to meet the requirements of NFPA 110, Level 1.

1. Annunciators shall be networked directly to the generator set control
2. Local Annunciator shall include a lamp test pushbutton, alarm horn and alarm acknowledge pushbutton
3. Provide the following individual light indications for protection and diagnostics
 - a. Overcrank
 - b. Low coolant temperature
 - c. High coolant temperature warning
 - d. High coolant temperature shutdown
 - e. Low oil pressure warning
 - f. Low oil pressure shutdown
 - g. Overspeed
 - h. Low coolant level
 - i. EPS supplying load
 - j. Control switch not in auto
 - k. High battery voltage
 - l. Low battery voltage
 - m. Battery charger AC failure
 - n. Emergency stop
 - o. Spare
 - p. Spare

Remote Annunciator (NFPA 99/110, CSA 282)

Provide a remote annunciator to meet the requirements of NFPA 110, Level 1.

1. The annunciator shall provide remote annunciation of all points stated above and shall incorporate ring-back capability so that after silencing the initial alarm, any subsequent alarms will sound the horn.
2. Ability to be located up to 800 ft from the generator set

2.5 Cooling System

The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories. The cooling system shall be sized to operate at full load conditions and 110 F* ambient air entering the room or enclosure (If an enclosure is specified). The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.

2.6 Fuel System

2.6.1 Fuel System

The fuel system shall be integral with the engine. In addition to the standard fuel filters provided by the engine manufacturer, there shall also be installed a primary fuel filter/water separator in the fuel inlet line to the engine. All fuel piping shall be black iron or flexible fuel hose rated for this service. No galvanized piping will be permitted. Flexible fuel lines shall be minimally rated for 300 degrees F and 100 psi.

2.6.2 Fuel Sub Base Tank

Provide a double wall sub-base tank constructed to meet all local codes and requirements. A fuel tank base of 24 hour capacity shall be provided as an integral part of the enclosure. It shall be contained in a rupture basin with 110% capacity. The tank shall meet UL142 standards. A locking fill cap, a mechanical reading fuel level gauge, low fuel level alarm contact, and fuel tank rupture alarm contact shall be provided.

2.7 Exhaust System (Indoor Installations Only)

2.7.1 Silencer

A critical grade silencer, companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished and installed according to the manufacturer's recommendation. Mounting shall be provided by the contractor as shown on the drawings. The silencer shall be mounted so that its weight is not supported by the engine nor will exhaust system growth due to thermal expansion be imposed on the engine. Exhaust pipe size shall be sufficient to ensure that exhaust backpressure does not exceed the maximum limitations specified by the engine manufacturer.

2.8 Starting System

2.8.1 Starting Motor

A DC electric starting system with positive engagement shall be furnished. The motor voltage shall be as recommended by the engine manufacturer.

2.8.2 Jacket Water Heater

Jacket water heater shall be provided and shall be sized to insure that genset will start within the specified time period and ambient conditions.

2.8.3 Batteries

Batteries - A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Battery voltage shall be compatible with the starting system.

2.8.4 Battery Charger

Battery Charger - A current limiting battery charger shall be furnished to automatically recharge batteries. The charger shall be dual charge rate with automatic switching to the boost rate when required. The battery charger shall be mounted on the genset package or inside the genset enclosure/room.

2.9 Enclosure

2.9.1 Attenuated Enclosure (Standard Sound optional)

The complete diesel engine generator set, including generator control panel, engine starting batteries and fuel oil tank, shall be enclosed in a factory assembled, sound attenuated enclosure mounted on the fuel tank base.

1. A weather resistant, sound attenuated enclosure of steel with electrostatically applied powder coated baked polyester paint. The enclosure shall have a resulting sound level of 72_dba @_23_ft with the genset running under full load. It shall consist of a roof, side walls, and end walls. Fasteners shall be either zinc plated or stainless steel.
2. Enclosure Sound Attenuation: Acoustical foam shall be provided between all supports and inside doors and sound baffles on air intake and air discharge.

2.10 Air Quality Control Standards

2.10.1 Air Quality Control Standards

The complete diesel engine generator set shall be in compliance with the current SJVAPCD local requirements for air quality control. Contractor shall verify current standards with SJVACPD and obtain all necessary permits

for the installation and operation of the generator system.

PART 3 Execution

3.1 Installation

Install equipment in accordance with manufacturer's recommendations, the project drawings and specifications, and all applicable codes.

3.2 Start-Up and Testing

Coordinate all start-up and testing activities with the Engineer and Owner. After installation is complete and normal power is available, the manufacturer's local dealer shall perform the following:

Perform a 2 hour load bank test at a 1.0 PF at full nameplate rating. Loadbank, cables and other equipment required for this test to be supplied by the genset supplier.

3.3 Operation and Maintenance Manuals

Provide two (2) sets of operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

3.4 Training

3.4.1 On-Site Training

Provide on-site training to instruct the owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, and emergency service procedures.

SECTION 16621 – AUTOMATIC TRANSFER SWITCHES

PART 1 – GENERAL

PART 1 GENERAL

1.01 Scope

- A.** Furnish and install automatic transfer switches (ATS) with number of poles, amperage, voltage, withstand and close-on ratings as shown on the plans. Each automatic transfer switch shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.

1.02 Codes and Standards

The automatic transfer switches and controls shall conform to the requirements of:

- A.** UL 1008 - Standard for Transfer Switch Equipment
- B.** CSA certified to CSA 22.2 No. 178 – 1978 Automatic Transfer Switches
- C.** IEC 60947-6-1 Low-voltage Switchgear and Controlgear; Multifunction equipment; Automatic Transfer Switching Equipment
- D.** NFPA 70 - National Electrical Code
- E.** NFPA 99 - Essential Electrical Systems for Health Care Facilities
- F.** NFPA 110 - Emergency and Standby Power Systems
- G.** IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- H.** NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches
- I.** International Standards Organization 9001:2008
- J.** UL 508 Industrial Control Equipment

1.03 Acceptable Manufacturers

Automatic transfer switches shall be ASCO 7000 Series. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid. Alternate bids must list any deviations from this specification.

PART 2 PRODUCTS

2.01 Mechanically Held Transfer Switch

- A.** The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators which include overcurrent disconnect devices, linear motors or gears shall not be acceptable. The switch shall be mechanically interlocked to ensure only two possible positions, normal or emergency.
- B.** All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.

- C. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
- D. All main contacts shall be silver composition. Switches rated 800 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
- E. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
- F. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.
- G. Where neutral conductors must be switched as shown on the plans, the ATS shall be provided with fully rated overlapping neutral transfer contacts. The neutrals of the normal and emergency power sources shall be connected together only during the transfer and retransfer operation and remain connected together until power source contacts close on the source to which the transfer is being made. The overlapping neutral contacts shall not overlap for a period greater than 100 milliseconds. Neutral switching contacts which do not overlap are not acceptable.
- H. Where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.

2.02 Microprocessor Controller

- A. The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.
- B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to $\pm 1\%$ of nominal voltage. Frequency sensing shall be accurate to $\pm 0.2\%$. The panel shall be capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.
- C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.
- D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.
- E. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
 1. EN 55011:1991 Emission standard - Group 1, Class A
 2. EN 50082-2:1995 Generic immunity standard, from which:

EN 61000-4-2:1995	Electrostatic discharge (ESD) immunity
ENV 50140:1993	Radiated Electro-Magnetic field immunity
EN 61000-4-4:1995	Electrical fast transient (EFT) immunity
EN 61000-4-5:1995	Surge transient immunity
EN 61000-4-6:1996	Conducted Radio-Frequency field immunity

2.03 Enclosure

- A. The ATS shall be furnished in a Type 3R enclosure unless otherwise shown on the plans.
- B. All standard and optional door-mounted switches and pilot lights shall be 16-mm industrial grade type or equivalent for easy viewing & replacement. Door controls shall be provided on a separate removable plate, which can be supplied loose for open type units.

PART 3 OPERATION

3.01 Controller Display and Keypad

- A. A four line, 20 character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:
 1. Nominal line voltage and frequency
 2. Single or three phase sensing
 3. Operating parameter protection
 4. Transfer operating mode configuration (Open transition)

All instructions and controller settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

3.02 Voltage, Frequency and Phase Rotation Sensing

- A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored, with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified):

<u>Parameter</u>	<u>Sources</u>	<u>Dropout / Trip</u>	<u>Pickup / Reset</u>
Undervoltage	N&E,3φ	70 to 98%	85 to 100%
Overvoltage	N&E,3φ	102 to 115%	2% below trip
Underfrequency	N&E	85 to 98%	90 to 100%
Overfrequency	N&E	102 to 110%	2% below trip
Voltage unbalance	N&E	5 to 20%	1% below dropout

- B. Repetitive accuracy of all settings shall be within ± 0.5% over an operating temperature range of - 20°C to 60°C.
- C. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad or remotely via serial communications port access.

- D. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or CBA).
- E. Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases, frequency, and phase rotation.
- F. The controller shall include a user selectable algorithm to prevent repeated transfer cycling to a source on an installation which experiences primary side, single phase failures on a Grounded Wye – Grounded Wye transformer which regenerates voltage when unloaded. The algorithm shall also inhibit retransfer to the normal (utility) source upon detection of a single phasing condition until a dedicated timer expires, the alternate source fails, or the normal source fails completely and is restored during this time delay period. The time delays associated with this feature shall be adjustable by the user through the controller keypad and LCD.

3.03 Time Delays

- A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.
- B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.
- C. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
- D. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
- E. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:
 1. Prior to transfer only.
 2. Prior to and after transfer.
 3. Normal to emergency only.
 4. Emergency to normal only.
 5. Normal to emergency and emergency to normal.
 6. All transfer conditions or only when both sources are available.
- F. The controller shall also include the following built-in time delays for optional Closed Transition and Delayed Transition operation:
 1. 1 to 5 minute time delay on failure to synchronize normal and emergency sources prior to closed transition transfer.
 2. 0.1 to 9.99 second time delay on an extended parallel condition of both power sources during closed transition operation.
 3. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.
- G. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which

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shall be adjustable in .01 second increments.

- H. All time delays shall be adjustable by using the LCD display and keypad or with a remote device connected to the serial communications port.

3.04 Additional Features

- A. A three position momentary-type test switch shall be provided for the **test / automatic / reset** modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal.
- B. A SPDT contact, rated 5 amps at 30 VDC, shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
- C. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact closed, when the ATS is connected to the emergency source.
- D. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).
- E. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.

The following features shall be built-in to the controller, but capable of being activated through keypad programming or the serial port only when required by the user:

- F. Provide the ability to select “commit/no commit to transfer” to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.
- G. An Inphase monitor shall be provided in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The inphase monitor shall be specifically designed for and be the product of the ATS manufacturer. The inphase monitor shall be equal to ASCO Feature 27.
- H. The controller shall be capable of accepting a normally open contact that will allow the transfer switch to function in a non-automatic mode using an external control device.
- I. **Engine Exerciser** - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine, the user shall be able to:
 - 1. Enable or disable the routine.
 - 2. Enable or disable transfer of the load during routine.
 - 3. Set the start time, .
 - time of day
 - day of week
 - week of month (1st, 2nd, 3rd, 4th, alternate or every)

4. Set the duration of the run.

At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.

The following feature shall be built - into the controller, but capable of being activated through keypad programming or the communications interface port.

Note: The transfer switch will operate in a non-automatic mode with this feature activated.

J. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad or serial port.

K. **System Status** - The controller LCD display shall include a "System Status" screen which shall be readily accessible from any point in the menu by depressing the "ESC" key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For example,

***Normal Failed
Load on Normal
TD Normal to Emerg
2min15s***

Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.

L. **Self Diagnostics** - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed..

M. **Data Logging** – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:

1. Event Logging

1. Data and time and reason for transfer normal to emergency.
2. Data and time and reason for transfer emergency to normal.
3. Data and time and reason for engine start.
4. Data and time engine stopped.
5. Data and time emergency source available.
6. Data and time emergency source not available.

2. Statistical Data

1. Total number of transfers.
2. Total number of transfers due to source failure.
3. Total number of days controller is energized.
4. Total number of hours both normal and emergency sources are available.

N. **Communications Module** – Shall provide remote interface module to support monitoring of vendor's transfer switch, controller and optional power meter. Module shall provide status, analog parameters, event logs, equipment settings & configurations over embedded webpage and open protocol. Features shall include:

1. Email notifications and SNMP traps of selectable events and alarms may be sent to a mobile device or PC.

2. Modbus TCP/IP, SNMP, HTTP, SMTP open protocols shall be simultaneously supported.
3. Web app interface requiring user credentials to monitor and control the transfer switch supporting modern smart phones, tablets and PC browsers. User will be able to view the dynamic one-line; ATS controls status, alarms, metering, event logging as well as settings.
4. Secure access shall be provided by requiring credentials for a minimum of 3 user privilege levels to the web app, monitor (view only), control (view and control) and administrator (view, control and change settings). 128-Bit AES encryption standard shall be supported for all means of connectivity.
5. Shall allow for the initiating of transfers, retransfers, bypassing of active timers and the activating/deactivating of engine start signal shall be available over the embedded webpage and to the transfer switch vendor's monitoring equipment.
6. An event log displaying a minimum of three hundred (300) events shall be viewable and printable from the embedded webpages and accessible from supported open protocols.
7. Four (4) 100 Mbps Ethernet copper RJ-45 ports, five (2) serial ports, Termination dip-switches and LEDs for diagnostics.
8. DIN rail mountable.

This option shall be equivalent to ASCO accessory 72EE2

- O. External DC Power Supply** – An optional provision shall be available to connect an external 24 VDC power supply to allow the LCD and the door mounted control indicators to remain functional when both power sources are dead. This option shall be equivalent to ASCO accessory 1G.

****Note Spec Writer:** The following section is optional and should be deleted if not required.*

- P. Power Meter** – (This feature shall be equal to ASCO accessory 135L, or feature bundle accessory 150*).

The Power Meter shall conform to the requirements of:

1. UL 3111-1-Electrical Measuring and Testing Equipment
2. CAN/CSA-C22.2 No. 23-M89-CSA Safety Requirements for Electrical and Electronic Measuring and Test Equipment
3. The Power Meter shall be capable of operating without modification at a nominal frequency of 45 to 66Hz.
4. The Power Meter shall be rated for an operating temperature of -4°F to 158°F and a storage temperature of -22°F to 176°F. and shall be rated for an 85% non-condensing, relative humidity.
5. The Power Meter shall accept inputs from industry standard instrument transformers (120 VAC secondary PT's and 5A secondary CT's). Direct phase voltage connections, 0 to 600VAC nominal, shall be possible without the use of PT's.
6. The Power Meter shall accept single, 3 phase, or three & four wire circuits. A fourth CT input shall be available to measure neutral or ground current.
7. The Power Meter shall contain a built-in discrete contact to wire an ATS 14A auxiliary contact to indicate switch position.
8. The Power Meter shall accept AC voltage from the sensing lines for operation. Additional provisions shall be provided for external DC voltage input range 9-36 VDC with a nominal of

24 VDC.

9. The Power Meter shall be equipped with a continuous duty, long –life, 4 line x 20 character green backlit LCD
10. All setup parameters required by the Power Meter shall be stored in non- volatile memory and retained in the event of a control power interruption.
11. The Power Meter shall be flush mountable on a surface.
12. The Power Meter enclosure shall be sealed to IP-51 (NEMA 1) and The faceplate shall be sealed to IP-65 (NEMA 4). All push buttons shall be sealed tact switches.
13. The Power Meter shall send, when prompted, information to a central location equipped with a manufacturer supplied critical power management system or 3rd party monitor through manufacturer supplied communication modules. All 3rd party monitor must utilize industry standard open protocols Modbus/RTU.Modbus/TCP or SNMP.
14. An embedded RS-485 port will be provided which will enable communication at 9600, 19.2K, 38.4K, or 57.6K baud. DIP switches will be provided on the RS-485 port allowing a user to select 2-wire or 4-wire communication as well as the option to activate a terminating resistor on the port.
15. The Power Meter shall help facilities comply with NEC 220. It shall provide Maximum Demand calculations for the past 24 months, as per standards with 15 minute averages.
16. The following data will be available on the display and Modbus registers of the Power Meter:
 - Line-to-neutral voltages (V_{AN} , V_{BN} , and V_{CN})
 - Line-to-neutral voltage average (V_{AVE})
 - Line-to-line voltages (V_{AB} , V_{BC} , and V_{CA})
 - Line-Line voltage average (V_{LAVE})
 - Current on each phase (I_A , I_B , and I_C)
 - Current on the neutral conductor (I_N)
 - Average current (I_{AVE})
 - Active power, KW per phase and total (W_A , W_B , W_C , and W_T)
 - Apparent power, KVA per phase and total (V_{AA} , V_{AB} , V_{AC} , and V_{AT})
 - KWHours importing, exporting and net (KWH_{IMP} , KWH_{EXP} , and KWH_{NET})

- KVARHours leading, lagging and net (KVARH_{LEAD}, KVARLAG, and KVARHNET)
 - Power factor (PF)
 - Signal Frequency (Hz)
 - Digital Input
17. The Power Meter shall offer an LCD which can display no less than nine different languages.
18. Displaying each of the metered values shall be done through the use of menu scroll buttons. There will be an escape button which will be used to take the user back to the previous page or to cancel a setting change. Pressing escape no more than three times will return the user to the home screen.
19. For ease of operator viewing, the display can be configured to remain on continuously, with no detrimental effect on the life of the Power Meter.
20. The display's contrast shall be configurable in intervals of 10% (ranging 0%-100%).
21. Setup of a system requirements shall be allowed from the front of the Power Meter.

4.01 AT5 Remote Annunciator

General

Provide and install AT5 Remote Annunciators for monitoring and control of automatic transfer switches remotely over Ethernet.

A. Hardware Specifications

The AT5 Remote Annunciator shall be listed to cUL-60950-1 and UL 1008 and include the following features and ratings:

- *User-configured labels with AT5 names and power sources*
- *Dual 10/100 Base-T auto sensing and auto crossover Ethernet ports*
- *LED indication of source acceptability, switch position, common alarm, time delay and Ethernet link activity*
- *Push button for transfer/retransfer control operations and time delay bypass*
- *Push buttons for Alarm Silence and Lamp Test*
- *Key lock to enable and disable the transfer push button*
- *Audible and visual alarm to indicate Communication Error AT5 Locked Out Failure to Synchronize Extended Parallel and any of the 8 user-configured discrete inputs*
- *Programmable watchdog timer that can generate a system reset upon timeout (minimum 1 sec)*
- *Factory reset capability*
- *100 ms power ride-through*

B. Software Specification

The ATS Remote Annunciator shall contain embedded web pages accessible via various web browsers with the following capabilities:

- *Configuration for protocol and communications management with the ability of auto discovering transfer switches on network*
- *Ability to create and print customized labels for ATS names and power sources*
- *The ability to choose a continuous or periodic audible alarm with customizable interval time*
- *View detailed packet status counters i.e. transmitted received and dropped packets with the ability to reset counters*
- *ATS source name configuration page which allows users to configure power source names and print labels*
- *Upgrade firmware from Ethernet network without interrupting equipment operation*

C. Communications

Dual 10/100 Base-T (RJ-45) Ethernet ports are provided to support TCP/IP communications for up to eight automatic transfer switches via individual remote connectivity modules or daisy-chained serial modules into a single Connectivity Module. Additional features include:

- *Supports Full Duplex Flow Control (IEEE 802.3x)*
- *3.3V power supply with 5V I/O tolerance*
- *Supports 3 LEDs to indicate traffic link speed and collision*

D. Mounting

The ATS Remote Annunciator is suitable for:

- *Surface mounting using mounting screws studs*
- *Flush Mount from behind a cutout section (Enclosure Door Mounting)*
- *Flush Mount from the front of a cutout section (Enclosure Door Mounting)*

E. Power Supply

The ATS Remote Annunciator shall be capable of accepting 24VDC, 120 VAC or 240 VAC power source.

F. Environmental

The ATS Remote Annunciator shall have an Ambient Operating Temperature range of -4 ° to 158 ° F (-20 ° to +70 ° C) @ 5~85% humidity and Ambient Storage Temperature of -40 ° to 185 ° F (-40 ° to 85 ° C).

PART 5 ADDITIONAL REQUIREMENTS

5.01 Withstand and Closing Ratings

- A. The ATS shall be rated to close on and withstand the available RMS symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans.
- B. The ATS shall be UL listed in accordance with UL 1008 and be labeled in accordance with .025 or .050 seconds, time based ratings, or appropriate short time rating(s) as applicable. ATSs which are not tested and labeled with .025 or .050 time based ratings, or appropriate short time rating(s) and have series, or specific breaker ratings only, are not acceptable.

5.02 Tests and Certification

- A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.
- B. The ATS manufacturer shall be certified to ISO 9001:2008 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001:2008

5.03 Service Representation

- A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.
- B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

SECTION 16721 - FIRE-ALARM SYSTEM

PART 1 - GENERAL

0.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

0.2 REFERENCES

- A. National Fire Protection Association Codes and Standards (NFPA):
 - 1. NFPA 70 – National Electrical Code (NEC)
 - 2. NFPA 72 – National Fire Alarm and Signaling Code
 - 3. NFPA 90A – Installation of Air-Conditioning and Ventilating Systems
 - 4. NFPA 101 – Life Safety Code
 - 5. NFPA 13 – Installation of Sprinkler Systems
 - 6. NFPA 25 – Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

- B. Underwriters Laboratories Inc. (UL): Equipment shall be approved by UL for its intended purpose, listed as power limited for the following standards as applicable.
 - 1. UL 864 – Control Units and Accessories for Fire Alarm Systems
 - 2. UL 268 – Smoke Detectors for Fire Alarm Systems
 - 3. UL 268A – Smoke Detectors for Duct Application
 - 4. UL 268B – Video Image Smoke Detectors
 - 5. UL 521 – Heat Detectors for Fire Protective Signaling Systems
 - 6. UL 464 – Audible Signaling Appliances
 - 7. UL 38 – Manual Signaling Boxes for Fire Alarm Systems
 - 8. UL 217 – Single and Multiple Station Smoke Alarms
 - 9. UL 346 – Waterflow indicators for Fire Protective Signaling Systems
 - 10. UL 1971 – Signaling Devices for the Hearing-Impaired
 - 11. UL 1481 – Power Supplies for Fire Protective Signaling Systems
 - 12. UL 1711 – Amplifiers for Fire Protective Signaling Systems
 - 13. UL 1635 – Digital Alarm Communicator System Units
 - 14. UL 2572 – Standard for Mass Notification Systems

- C. Factory Mutual
 - 1. FM 3010 – Approval Standard for Fire Alarm Signaling Systems
 - 2. FM 3150 - Audible Notification Appliances for Automatic Fire Alarm Signaling
 - 3. FM 3210 - Heat Detectors for Automatic Fire Alarm Signaling (with addendum)
 - 4. FM 3230 - Smoke Actuated Detectors for Automatic Fire Alarm Signaling
 - 5. FM 3232 - Video Image Fire Smoke Detectors for Automatic Fire Alarm Signaling

- D. Local Authorities Having Jurisdiction (AHJ).
- E. Local and State Building Codes: California Fire Code (latest edition)
- F. Code of Federal Regulations (CFR).
- G. Americans with Disabilities Act (ADA).
- H. International Organization for Standardization (ISO).

0.3 **SYSTEM DESCRIPTION**

- A. Provide new standalone Fire Alarm Control Panel Fike FCP-75 Series or Equal. Provide programming and adjustments to control panel as necessary for new components and devices as shown in drawings.
 - 1. Main fire alarm control panel located as shown on design documents.
 - 2. Local operating consoles (LOCs) located at primary and secondary entrances, as shown on design documents.
 - 3. Intelligent addressable smoke detectors, heat detectors, manual pulls, duct detectors, FAAST detectors, etc., located as shown on design documents.
 - 4. Intelligent addressable monitor modules to monitor sprinkler system waterflow(s) and valve supervisory switch(s), as indicated on design documents.
 - 5. Provide network interface connection of system panel(s) to the fire alarm system, as indicated on design documents. Interface shall allow peer-to-peer communication between control panels.
 - 6. Audible notification appliances, located as shown on design documents.
 - 7. Provide synchronized visual appliances.
 - 8. Install remote NAC/Power supplies, as indicated on design documents.
 - 9. Provide digital cellular communicator system and programming for monitored system.
 - 10. Provide for future network connection to direct wired, node-to-node, peer-to-peer network operations.
- B. The system shall comply in all respects with: all pertinent codes, rules, regulations and laws adopted by the local AHJ; the requirements specified herein; manufacturer's recommendations; and system listings and approvals.
- C. Provide all related installation labor, wiring, conduit, back boxes, pull boxes, splices boxes, and other related installation material for a complete and operational system.
- D. The installing contractor shall secure all permits for installation, construction, and inspections including all associated costs.
- E. All patching, painting and fire stopping associated with installation of the detection and alarm system shall be included as part of the base project proposal.

- F. Provide all system commissioning, testing (pre-test for owner prior to AHJ acceptance testing), AHJ acceptance testing, and any additional technical and engineering labor required for a functional system.
- G. The installing contractor shall provide all shop drawings and record (as-built) documentation.

0.4 **DEFINITIONS**

- A. General: Definitions contained in NFPA 72 shall apply to fire alarm terms used in this Section.
- B. FM: FM Global (Factory Mutual)
- C. FPE: Fire Protection Engineer
- D. Furnish: To supply the stated equipment and materials.
- E. Install: To set in position, connect, or adjust for use.
- F. Provide: To furnish and install the stated equipment or materials.
- G. DACT: Digital Alarm Communicator Transmitter.
- H. dB: Decibel, a unit for measuring the relative loudness of sounds.
- I. DIGITAL ADDRESSABLE FIRE ALARM SYSTEM: An addressable fire alarm system employing a digital peer-to-peer protocol where detectors allow for configurable sensitivity settings.
- J. FACP: Fire Alarm Control Panel.
- K. FAXP: Fire Alarm Expansion Panel
- L. FCC: Fire Command Center
- M. FCS: Fire Command Station.
- N. LED: Light-emitting diode.
- O. LOC: Local Operating Console
- P. NICET: National Institute for Certification in Engineering Technologies.
- Q. NFPA: National Fire Protection Association
- R. NRTL: Nationally Recognized Testing Laboratory
- S. UL: Underwriters Laboratories
- T. AHJ: Authority Having Jurisdiction

- U. ASD: Air Sampling Detector
- V. ADA: Americans with Disabilities Act

0.5 **PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to California Building Code requirements.
 - 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."
- B. Pathway Survivability: The pathway survivability requirements outlined in NFPA 72 shall apply to notification and communication circuits and other circuits necessary to ensure the continued operation of the emergency communication system when used for partial evacuation and relocation.

0.6 **SUBMITTALS**

- A. General Submittal Requirements:
 - 1. Submit electronic set in PDF format or six (6) complete sets of submittals. Partial submittals will not be accepted and will be returned without review.
 - 2. Submittals shall be approved by A/E Team and Owner or his or her designated representative.
 - 3. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified fire-alarm technician, Level IV minimum.
 - c. Licensed or certified by authorities having jurisdiction.
- B. System Description: Submit a detailed description of the system as it shall operate for this specific project. General system descriptions from the catalog cut sheets and copies of portions of the systems Installation, Operation and Maintenance manual will not be acceptable.
- C. Product Data: Submit manufacturer's catalog data with printed logo or trademark for each type of product to be provided as part of this project. Catalog data shall indicate the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. Proposed equipment shall be subject to the approval of the Owner or his or her designated representative.
- D. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work if differing from that shown on the design documents.
 - 1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.

2. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 3. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
 4. Include control panel wiring and interconnection schematics.
 5. Include fire alarm signaling-service equipment rack or console layout, grounding schematic and single-line connection diagram.
 6. Include / verify floor plans to indicate final outlet locations of each addressable device including device address.
 7. Include complete system riser diagram.
 8. Include fire alarm system operational matrix as referenced by NFPA 72. The matrix shall illustrate all input/output events in association with initiation devices. Matrix shall include system supervisory and trouble output functions.
- E. Qualification Data:
1. Installing contractor shall have successfully installed fire alarm systems of the same scope, comparable size, and complexity on previous projects. The owner reserves the right to reject any system components for which evidence of a successful prior installation performed by the contractor cannot be provided.
 2. The contractor shall have in-house engineering and project management capability consistent with the requirements of the project. Qualified and approved representatives of the system manufacturer shall perform the detailed engineering design of the fire alarm system including creation of all panel and equipment drawings, submittals, and operating manuals.
 3. The contractor is responsible for retaining the services of a qualified, factory trained and certified representative/technician who is experienced in the installation and operation of the type of system specified herein. The representative shall be licensed in the State if required by law. The representative shall supervise the installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The representative shall provide the required instruction to the owner's personnel in the operation and maintenance of the system.
 4. Installers unable to comply with the provisions of Qualification Data shall present proof of engaging the service of a subcontractor qualified to furnish the required services.
- F. Field quality-control reports.
- G. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.

3. Record copy of site-specific software.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals.
5. Manufacturer's required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at fire-alarm control unit.

H. Software and Firmware Operational Documentation:

1. Site-specific software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files. Provide two copies – one to be maintained at the FACP and the other with the owner's representative. Any changes to the program shall be updated on both copies.
3. Device address list.

- I. Incomplete submittals shall be returned without review, unless prior approval is received from the project Architect/Engineer.

0.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. ISO 9001 Certified.
2. AS 9100 Certified.

B. Installer Qualifications: The installer shall be regularly engaged in the business of installing, maintain and service fire alarm systems.

1. Installation shall be by personnel certified by NICET as fire-alarm technician.
2. Installation shall be supervised by personnel certified by NICET as fire-alarm Level IV technician.
3. Installation Company shall be licensed by local or state licensing entity.
4. Installation Company shall be insured in accordance with the General Conditions of the project and design documentation.
5. Installation Company shall provide Performance and Payment Bond(s) in accordance with the General Conditions of the project and design documentation.
6. Personnel shall be trained and certified by manufacturer for installation of equipment required for this Project. Personnel shall be recertified every two years by the fire alarm equipment manufacturer through an authorized factory training and recertification program.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of an existing 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.
- E. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL.

0.8 **PROJECT CONDITIONS**

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
 - 1. Notify Owner no fewer than SEVEN Working Days in advance of proposed interruption of fire-alarm service.
 - 2. Do not proceed with interruption of fire-alarm service without Owner's written permission.

0.9 **SEQUENCING AND SCHEDULING**

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Once the new system is installed, tested, and accepted by the Owner or his or her representative, remove labels from new equipment and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, carefully remove existing disconnected fire-alarm equipment and package, label, and turn over to the Owner. Remove all unused wire, conduit, and boxes. Damaged surfaces shall be restored to finishes to match surrounding walls/ceiling/floors.
- C. New Fire Alarm Installation: for new installation maintain a clean, proper safe work environment per OSHA and local AHJ requirements.
- D. As new equipment is installed, label it "NOT IN SERVICE" or other approved methods of marking until it is accepted.
- E. Remove labels from new equipment when put into service.
- F. Protective dust covers shall remain on all new detectors until final construction cleanup is completed.

0.10 **WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace devices / components of the digital addressable fire alarm system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year, for systems not certified and covered, Five years, for systems certified and covered under manufacturer's maintenance service agreement signed by an authorized Installer 120 days from date of Substantial Completion.
2. The contractor performing the warranty services shall be qualified and listed to maintain the UL system certification for the completed system.

0.11 SERVICE AND PREVENTATIVE MAINTENANCE

- A. Service: Manufacturer's shall provide for multiple factory authorized service companies to provide post-installation service in the service area of the project. Service companies shall provide for 24/7/365 Emergency Service capabilities. Local service companies shall carry significant stock to perform emergency repairs of the system including but not limited to fire alarm control panel components and field devices.
- B. Factory Service Support: Manufacturer shall provide in house factory technical support for authorized factory service companies. Service helpdesk shall be available during normal business hours. On-call service support available 24/7.
- C. Advance Replacement Support: Manufacturer shall provide advance replacement of control panel components in the event it is determined by the manufacturer's technical support helpdesk technician that the field issue is related to a hardware defect or anomaly, and cannot be repaired in the field without replacement of the part. The advance replacement will be sent overnight on the day of the service call for next day delivery without delay or need for return authorization to minimize system downtime and fire-watch requirements.
- D. Preventive Maintenance: The manufacturer authorized service company shall provide as part of the contract a comprehensive maintenance program in compliance with NFPA and manufactures requirements. A separate line item for the Preventive Maintenance Contract shall be provided as indicated on the Bid Documents to the Owner.

0.12 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. All types of Initiating Device Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
 2. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but no fewer than 1 unit of each type.
 3. Keys and Tools: One extra set for access to locked and tamper-proofed components.
 4. Audible and Visual Notification Appliances: 1 of each type installed.
 5. Fuses: 1 of each type installed in the system.

PART 2 - PRODUCTS

0.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Fike system, or a comparable product.
- B. Manufacturer must show proof of having been engaged in the manufacturing and sale of fire alarm systems for over ten years.
- C. Alternative manufacturer's must be submitted to and approved by the Owner or his authorized representative within 15 days prior to bid opening. Alternates will only be considered if the following requirements are met:
 - 1. The supplier shall furnish a complete description of proposed alternate system performance methods with three (3) copies of working drawings to provide evidence that the proposed alternate system is equal or superior to the system operation stated in this specification. Such evidence shall be submitted to the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
 - 2. Supplier of alternate equipment shall submit a list from the alternate manufacturer on the manufacturer's letterhead indicating the names and addresses of all authorized suppliers in the area. Proprietary products will not be considered.
 - 3. Supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections, where the proposed system complies fully with the paragraph as written placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.
- D. The supplier shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply with the requirements of these specifications. Equipment and components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.

0.2 **SYSTEMS OPERATIONAL DESCRIPTION**

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
 - 1. Addressable manual alarm stations.
 - 2. Addressable photoelectric smoke detectors.
 - 3. Addressable combination photoelectric smoke and heat detectors.
 - 4. Addressable duct smoke detectors.
 - 5. Addressable heat detectors.
 - 6. Automatic sprinkler system water flow via addressable interface.
 - 7. Verified automatic alarm operation of smoke detectors.
- B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
 2. Identify alarm and specific initiating device at fire-alarm control unit, connected network control panels, off-premises network control panels and remote annunciators.
 3. Transmit an alarm signal to the remote alarm receiving station.
 4. Activate alarm voice evacuation notification system.
 5. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 6. Close smoke dampers in air ducts of designated air-conditioning duct systems.
 7. Record events in the system memory.
 8. Record events by the system printer.
 9. Transmit system status to building management system.
 10. Display system status on the Graphic Event Management System.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch via addressable interface.
 2. User disabling of zones or individual devices.
 3. Fire pump off-normal via addressable interface.
 4. Addressable Duct Smoke Detectors.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at fire-alarm control unit.
 4. Ground or a single break in fire-alarm control unit internal circuits.
 5. Abnormal ac voltage at fire-alarm control unit.
 6. Break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
 10. Loss of communication with any addressable detectors, input modules, relays, control modules, remote annunciators, printer interfaces, or Ethernet modules.
 11. Loss of communication with any panel on the network.
- E. System Alarm, Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators and Record the event on system printer.
1. Identify alarm, trouble or supervisory signal and specific device initiating the event at fire-alarm control unit, connected network control panels, off-premises network control panels and remote annunciators.
 2. Transmit an alarm, trouble or supervisory signal to the remote alarm receiving station.
 3. Transmit system status to building management system (Field Server).
 4. Display system status on the Graphic Event Management System (if existing).

0.3 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:
1. The main control panel or remote control panel(s) is new and shall be programmed as required to support the proposed devices / components, complying with UL 864, 9th edition and UL 2572, 1st edition. Listed and labeled by an NRTL.
 2. The control panel(s) shall include all required hardware, software and site-specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any applications can be configured, and modified using software provided by a single supplier.
 3. Addressable initiation devices that communicate device identity and status.
 - a. Smoke detectors shall additionally communicate sensitivity setting.
 - b. Temperature detectors shall communicate the sensitivity range of the device.
 - c. Detectors shall be capable of being programmed for Alarm Verification, State Control, and Positive Alarm Sequence modes of operation.
 4. Addressable control devices for operation of notification appliances, sprinkler solenoids and other mechanical equipment.
 5. Addressable devices shall operate on standard wire; no special twist or shield shall be required.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display shall show alarm, supervisory, and trouble events without operator intervention, component status messages and the programming and control menus. Alarm events shall take precedence over all other system inputs and shall always be displayed first in the order received.
1. Annunciator and Display: Liquid-crystal, 4 line(s) of 20 characters, minimum. Backlit when active.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
 3. Status LEDs: Ten (10) LEDs provide the system operator with instant indication of system status.
 4. Panel Mounted Annunciator Control Modules for operation of auxiliary control functions or supplemental annunciation of connected devices and systems.
 5. Panel Mounted Switch/Annunciator Cards for UL 1711/2572 Voice Evacuation and MNS.
- C. Circuits:
1. Signaling Line Circuits
 - a. Wired in Class B configuration.
 - b. When wired Class B, device Isolators shall be used for all T-Tap branch circuits, or when an SLC Loop services multiple fire zones or building floors.
 - c. Devices must communicate peer-to-peer.

- d. Capable of supporting up to 254 addressable devices in any combination of detectors and/or modules. Only those listed in this specification.
- e. Supervised and power-limited.
- f. May use standard wire. Twisted-shielded wire is optional.

2. Notification Appliance Circuits:

- a. Wired in Class B configuration.
- b. Generate synchronization signal for Gentex and System Sensor notification appliances.
- c. Silenceable or Non-Silenceable.
- d. Rated 2 Amps @ 24 Vdc maximum.
- e. Supervised and power-limited.

D. System Software and Programming Utility: The fire alarm control panel shall be programmable from a laptop program utility with minor program changes also available via front panel (password protected). The laptop program utility shall be a common program utility regardless of panel size and configuration. The program utility shall provide for a simple table/spreadsheet format. The utility shall provide cut and paste functionality to speed programming of common points and functions. The utility shall provide for archival of system programming, off-site editing and reports. The utility shall provide for system diagnostics to assist in the set up and troubleshooting of the system during acceptance testing or service calls. The control panel shall be able to upload the current system configuration without the need for the software utility to have a previous copy. The fire alarm control panel and software utility shall be password protected to prevent unauthorized changes, downloading or uploading of system configuration. The software shall provide for reports to assist in battery calculations and historical system/device data and error checking.

E. System devices shall be programmable from the fire alarm control panel, via front panel menus or from the laptop software utility, a handheld programmer device or an Infrared Program Tool.

F. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions. Mount as directed by local AHJ.

0.4 **PANEL NETWORKING**

A. Peer-to-Peer Networking: Existing Network; provide provisions for future connection to existing network; update programming as necessary and confirm network interface modules at each control panel to allow participation in a peer-to-peer network in a single contiguous property. Comply with UL S2203.

0.2 **SYSTEM ANNUCIATORS**

A. General Requirements:

1. Existing annunciators shall be updated with any necessary changes to programming to support the proposed devices / components.

0.3 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. New DACT, with cellular connection to be verified in proper operation. Coordinate with owner for monitoring services as required.

0.4 ADDRESSABLE SMOKE DETECTORS

A. General Requirements:

1. Detectors shall be two-wire type, operating at 24 Vdc, nominal.
2. Provide non-isolator type detectors with bases at the locations shown on the drawings.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Integral Visual-Indicating Light: Two Tri-color LED type indicating lights shall be programmed independently or to follow detector status.
6. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity.
7. Drift Compensation: Detectors shall provide the ability to automatically adjust the low and high alarm thresholds to account for dust/dirt accumulation in the detector chamber.
8. Alarm Verification: Detectors shall provide the ability to delay the detector's automatic responses to an alarm for 0 - 60 seconds while the system/device verifies the alarm situation. Output devices programmed for alarm verification will turn ON until silenced. Upon expiration of the verification delay, if the detector is still sensing smoke above its alarm threshold, the system will go into alarm.
9. Pre-Alarm Levels: Detectors shall provide two levels of pre-alarm (1 & 2) to provide early warning of a fire event. Output devices programmed for pre-alarm will turn ON until silenced.
10. Acclimate: Detector shall provide the ability to observe the operating environment over a one-hour period and then adjust its alarm threshold to suit the environment. Not available if day/night sensitivity settings are used.
11. Day/Night Sensitivity: Detectors shall provide two different sensitivity levels that will be utilized based upon time of day and day of the week.
12. Device Summing: Detectors shall provide the ability to participate in detection groups, providing a group summing alarm, based upon a combined obscuration level for up to 8 detectors of equivalent device type.
13. Walktest: Detectors shall provide the ability to participate in panel walktest.
14. Detectors address shall be programmable from the control panel, a handheld programmer and or a remote IR Programming tool.

15. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system.

B. Photoelectric Smoke Detectors: Comply with UL 268.

1. Intelligent spot type smoke detector that utilizes light obscuration principle to detect smoke.
2. Listed for open area protection coverage.
3. Tri-color LEDs to indicate detector status.
4. Remote LED Annunciator: Configurable to follow the detector LED or independently controlled.
5. Remote Output Control: Configured to control the output settings for connected sounder or relay base.
6. Dual pre-alarm threshold settings between 0.5 – 4% obscuration per foot.
7. Dual alarm threshold settings between 1.3 – 3.6% obscuration per foot.
8. Dual drift compensation settings (Trouble and Warning) set between 50 – 100%.

0.5 ADDRESSABLE HEAT DETECTORS

A. General Requirements: Comply with UL 521.

1. Detectors shall be two-wire type.
2. Provide non-isolator type detectors at the locations shown on the drawings.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Integral Visual-Indicating Light: Two Tri-color LED type indicating lights shall be programmed independently or to follow detector status.
6. Detector shall support the use of a relay or remote LED indicator.
7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity.
8. Alarm Verification: Detectors shall provide the ability to delay the detector's automatic responses to an alarm for 0 - 60 seconds while the system/device verifies the alarm situation. Output devices programmed for alarm verification will turn ON until silenced. Upon expiration of the verification delay, if the detector is still sensing smoke above its alarm threshold, the system will go into alarm.
9. Pre-Alarm Levels: Detectors shall provide two levels of pre-alarm (1 & 2) to provide early warning of a fire event. Output devices programmed for pre-alarm will turn ON until silenced.
10. Day/Night Sensitivity: Detectors shall provide two different sensitivity levels that will be utilized based upon time of day and day of the week.
11. Walktest: Detectors shall provide the ability to participate in panel walktest.
12. Detectors shall be programmable from the control panel, a handheld programmer and or a remote IR Programming tool to set address, detector operating parameters.

13. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system.
14. Dual alarm threshold settings actuated by either a fixed temperature of 190 deg F or a rate of rise that exceeds 15 deg F (8 deg C) per minute between 135 and 174 deg F (57 - 79 deg C), unless otherwise indicated.
15. Dual pre-alarm threshold settings between 70 and 190 deg F (21 - 88 deg C).

0.1 ADDRESSABLE DETECTOR BASES

A. General Requirements: Comply with UL 268.

1. Two-wire type operating at 24 Vdc, nominal.
2. Field Wiring: Bases shall provide screw terminals with clamping plate for connection to building wiring.
3. Provide for compatibility with non-isolator type detectors.
4. Detector Mounting: Base shall provide twist-lock feature for securing compatible detector to base.
5. All bases shall support remote LED functions as required or indicated on the design documents.

B. Standard Base:

1. Base shall be provided for all installation locations unless noted otherwise.
2. Base shall be available in a 6" (15.5 cm) diameter flangeless option to provide a finished appearance.
3. Base shall mount directly to a 3½", 4" square and 4" octagon boxes (with or without plaster ring), or a single gang box, minimum 1½" (38 mm) deep.

C. Relay Base:

1. Base shall be provided at locations indicated on the Drawings.
2. Base shall mount directly to a 3½", 4" square and 4" octagon boxes, minimum 1½" (38 mm) deep.
3. Base shall provide relay functions that follow the detector or programmed to follow independent control from the fire alarm control panel. The relay shall be rated at 2 A @ 30 Vdc.
4. Base shall be powered from the SLC Loop. Relay bases that require separate 24 Vdc power sources shall be installed as to supervise the power via additional power supervision relays and addressable modules. No more than 4 relay bases requiring separate power shall be connected to a single power circuit.

D. Sounder Base:

1. Base shall be provided at locations indicated on the Drawings.
2. Base shall mount to a 4" square box minimum 1½" (38 mm) deep.
3. Base shall provide audible functions that follow the detector or programmed to follow independent control from the fire alarm control panel.

4. Base shall receive a dedicated 24 Vdc power source that is installed and supervised by an end of line relay and addressable monitor module. No more than 15 sounder bases shall be powered from a single power circuit.
5. Base shall provide a minimum 85 db audible signal. The signal shall be programmed from the control panel to annunciate a tone pattern of constant on; slow; fast; temporal; walk-test; alert; action.

0.2 ADDRESSABLE INTERFACE MODULES

A. General Requirements:

1. Comply with CSFM; operating at 24 Vdc, nominal.
2. Modules shall be two-wire type.
3. Provide non-isolator type modules.
4. Module Mounting: Module and associated electronic components shall be mounted to a standard electrical box with sufficient depth to permit all connections and wire. Provide terminals in the module for connection to building wiring.
5. Integral Visual-Indicating Light: LED type light indicating module status.
6. Modules shall be digital-addressable type, individually monitored at fire-alarm control unit for change of status: alarm condition, supervisory condition or activation of output.
7. Modules shall be programmable from the control panel, a handheld programmer and or a remote IR Programming tool to set address, module operating parameters.

B. Monitor Module:

1. Module shall be provided to connect one (1) supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to any of the fire alarm control panel's SLCs.
2. Module IDC circuit shall be wired Class B.
3. Module provides and LED that shall flash under normal condition, indicating that the module is operational and is communicating with the control panel. Module will illuminate solid to indicate active state.
4. Module Mounting: Shall mount directly to a 4" square or 2-gang electrical box with a minimum depth of 2 1/8" (54 mm).

C. Mini Monitor Module:

1. Module shall be provided to connect one (1) supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to any of the fire alarm control panel's SLCs.
2. Module IDC circuit shall be wired Class B.
3. Module provides and LED that shall flash under normal condition, indicating that the module is operational and is communicating with the control panel. Module will illuminate solid to indicate active state.
4. Module Mounting: Shall fit within the device to be monitored, the devices backbox, or mounted in an approved enclosure.

D. Dual Monitor Module:

1. Module shall be provided to connect two (2) supervised IDC zones of conventional alarm initiating devices (any N.O. dry contact device) to any of the fire alarm control panel's SLCs.
 2. Module IDC circuits shall be wired Class B.
 3. Module provides and LED that shall flash under normal condition, indicating that the module is operational and is communicating with the control panel. Module will illuminate solid to indicate active state.
 4. Module shall utilize only one (1) SLC Loop address.
 5. Module Mounting: Shall mount directly to a 4" square or 2-gang electrical box with a minimum depth of 2 1/8" (54 mm).
- E. Zone Interface Monitor Module:
1. Module shall be provided to connect one (1) supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device) to any of the fire alarm control panel's SLCs.
 2. Module IDC circuit shall be wired Class B.
 3. Module shall receive 24 Vdc power from the fire alarm control panel or from a supervised, UL listed remote power supply.
 4. Module Mounting: Shall mount directly to a 4" square or 2-gang electrical box with a minimum depth of 2 1/8" (54 mm).
- F. Control Module:
1. Module shall be provided to supervise and control the operation of one (1) conventional notification appliance circuit via any of the fire alarm control panel's SLCs. Circuit supervision is provided during normal operation only.
 2. Module NAC circuit is suitable for Class A or Class B operation.
 3. Module shall receive 24 Vdc power from the fire alarm control panel or from a supervised UL listed remote power supply.
 4. Only compatible with 24 Vdc powered, polarized notification appliance devices shall be connected to the module.
 5. Module shall be provided to control fire suppression solenoids (sprinkler), or provide operation of masterbox interface for Local Energy Type Auxiliary fire alarm system using added series solenoid diode/resistor.
 6. Module Mounting: Shall mount directly to a 4" square or 2-gang electrical box with a minimum depth of 2 1/8" (54 mm).
- B. Relay Module:
1. Module shall be provided to control building HVAC systems and other building functions.
 2. Module provides two (2), single operation, form C (DPDT) relay contacts capable of being connected to a dry set of contacts for control of building functions.
 3. Module provides a single non-supervised input for positive indication of the status of the controlled device. The input shall not require an additional address from the SLC Loop. Modules that do not provide the positive input feedback point shall be provided with a separate addressable input monitor module for current or future use.

4. Module Mounting: Shall mount directly to a 4" square or 2-gang electrical box with a minimum depth of 2 1/8" (54 mm).

0.2 NOTIFICATION APPLIANCES

A. General Requirements:

1. Furnished by the same manufacturer, unless alternates are approved by the Owner or their authorized representative.
2. Acceptable Manufacturer: System Sensor, Gentex, Wheelock.
3. Listed and labeled by an NRTL and shall be compatible with the fire alarm control panel.
4. Connected to notification appliance signal circuits or addressable control modules, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
5. 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.
6. Audible Devices: Capable of driving code three temporal patterns and user definable four-second pattern.
7. All notification appliances shall be furnished with red finish.
8. Lens Color: Strobes used for fire evacuation shall have a CLEAR lens with the word "FIRE" imprinted on the device. Strobes used for mass notification events shall have an AMBER lens with the word "ALERT" imprinted on the device.

B. Chimes: Comply with UL 464

1. Shall be powered from a non-coded notification appliance circuit output rated for 24 Vdc regulated.
2. Shall provide five (5) different field-selectable tones and two (2) different volume settings.
3. Optional integral strobe complying with UL 1971 and ADA.
4. Mounting: Wall mounted unless noted otherwise on design documents. If ceiling mounted appliances are to be used, they shall be listed and rated for that application.
5. Low-Level Output: Vibrating type, 75-dBA minimum rated output.
6. High-Level Output: Vibrating type, 81-dBA minimum rated output.

C. Alarm Notification Appliances: Comply with UL 464

1. Electric-vibrating-polarized type, 24 Vdc; with provision for housing the operating mechanism behind a grille.
2. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
3. Powered from a coded or non-coded notification appliance circuit rated for 24 Vdc regulated.
4. Optional integral strobe complying with UL 1971 and ADA. Strobe available in multiple candela rating (field selectable).

- D. Speakers: All speakers shall operate on 25 or 70 VRMS and with field selectable output taps from 0.5 to 2 Watts. Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3 m). Frequency response shall be a minimum of 400 HZ to 4000 HZ. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.
- E. Visible Notification Appliances: Complying with UL 1971.
 - 1. Xenon or LED strobe lights with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 - 2. Rated Light Output as indicated in drawings.
 - a. 15/30/75/110 cd, selectable in the field.
 - 3. Mounting: Wall mounted unless otherwise indicated.
 - 4. Powered from a non-coded notification appliance circuit rated for 24 Vdc regulated.
 - 5. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 6. Flashing shall be synchronized with other units in accordance with NFPA 72.
 - 7. Strobe Leads: Factory connected to screw terminals.
 - 8. Mounting Faceplate: Factory finished red.
- F. Combination Alarm/Visual Notification Appliances:
 - 1. Shall comply with all requirements as listed above for individual units and be approved as a single unit by a NRTL.

0.2 REMOTE POWER SUPPLY

- A. Integral with new panel; not applicable to project

PART 2 - EXECUTION

0.1 EQUIPMENT INSTALLATION

- A. Install all system devices (i.e., panels, remote displays, detectors, pull stations, etc.) at location shown on the design documents and in accordance with the manufacturer's recommendations.
- B. System components shall be located and installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code (NEC), local and state regulations, and other requirements adopted by the local authorities having jurisdiction (AHJ).
- C. Equipment Mounting: Fasten fire alarm equipment and electrical boxes to structural members or metal supports attached to structure or to concrete surfaces.

1. Install fire-alarm control unit on wall with LCD display not more than 66 inches (1680 mm) above the finished floor. Install control unit in an area that is readily accessible with sufficient room to allow easy installation and maintenance.
 2. Do not install system components in areas that are not capable of maintaining a nominal room temperature of 0-49°C (32-120°F), with a relative humidity of 93 percent.
 3. All components shall be mounted to or in an approved electrical box. Boxes shall be installed plumb and secured firmly in position.
 4. Install fire-alarm control unit in an area that is readily accessible with sufficient room to allow easy installation and maintenance.
 5. Do not install system components where they may be subjected to any of the following conditions: excessive vibration, dust, moisture, electromagnetic interference, and radio frequency interference.
 6. Do not recess mount system components in fire-rated walls unless steps are taken to maintain the fire rating of the wall where penetrations are made.
 7. Junction boxes shall be painted red and a label indicating "Fire Alarm" shall be applied to the box.
- D. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
1. Connect new equipment to existing control panel in existing part of the building.
 2. Connect new equipment to existing monitoring equipment at the supervising station.
 3. Expand, modify, and supplement existing [control] [monitoring] equipment as necessary to extend existing [control] [monitoring] functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- E. Smoke- or Heat-Sensor Spacing:
1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed 30 feet.
 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
 5. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.
 6. Lighting Fixtures: Locate detectors no closer than 12 inches (300 mm) from any part of a lighting fixture.
 7. Dust covers shall remain in place on all newly installed detectors until just prior to acceptance testing.
 8. Where detector indicating LED is not visible from the floor, a remote indicating lamp shall be installed.
- F. Heat Detectors in Elevator Machine Rooms and Shafts for Elevator Shutdown: Comply with NFPA 72 and ANSI A17.1. Install heat detectors within 24 inches (610 mm) of each sprinkler

head. Detector shall have both a lower temperature rating and a higher sensitivity as compared to the sprinkler.

- G. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- H. Audible Alarm-Indicating Devices: Install wall mounted appliances with tops above the finished floor not less than 96 inches (2.43 m) and below the finished ceiling no less than 6 inches (150 mm). Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. If combination audible/visual appliances are used, the devices shall be installed in accordance with the visual alarm requirements.
- I. Visible Alarm-Indicating Devices: Install wall mounted appliances such that the entire lens is not less than 80 inches (2.03 m) and not greater than 96 inches (2.43 m) above the finished floor.
- J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

0.2 CONDUCTORS

- A. All electrical wiring shall be UL Listed and installed in compliance with the requirements of NFPA 70, National Electrical Code, including but not limited to Article 760, Fire Alarm Systems.
 - 1. Conductors shall be identified as shown on the drawings with wire markers at all terminal points. Attach permanent wire markers within two (2) inches of the wire termination. Marker legends shall be visible.
 - 2. A consistent color code for fire alarm systems conductors shall be used to allow rapid identification of circuit types. Color code shall be submitted to the Owner for approval prior to wire installation.
 - 3. Wire gauge of circuit conductors shall be installed according to the installation drawings prepared for the project.
 - 4. All splices shall be made using solderless connectors. All connectors shall be installed in conformance with the manufacturer's recommendations.
 - 5. Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.
 - 6. Wiring within panel enclosures shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.
- B. At all "T" Taps or when the SLC Loop serves more than one floor, or more than one smoke or fire zone, provide Isolator Device to provide SLC Loop Isolation to that area, T Tap or Floor so that a short will only disable that area. Up to 50 devices are permitted after an Isolation Device.

0.3 FIRE STOPPING

- A. Contactor shall seal all holes caused by penetrating conduit, piping, or other penetrations which pass through floors, walls, or ceilings. Firestop penetrations through floor slabs, fire-rated walls, shafts, or any fire-rated assembly in accordance with Section 078413, Penetration Firestopping.

0.4 **SYSTEM SEQUENCE OF OPERATION**

- A. The system shall function and operate in accordance with NFPA and local AHJ requirements. Refer to System Sequence of Operation Matrix on the fire alarm drawings.

0.5 **CONNECTIONS TO BUILDING SYSTEMS**

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet (1 m) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Smoke dampers in air ducts of designated air-conditioning duct systems.
 - 2. Supervisory connections at valve supervisory switches.

0.6 **IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

0.7 **GROUNDING**

- A. Ground fire-alarm control unit and associated circuits. Install a ground wire from main service ground to fire-alarm control unit. If shielded cabling is utilized in the installation, attach the drain at the panel and connect through or insulate at junction boxes or devices, then leave open and insulated at the last device.

0.8 **FIELD QUALITY CONTROL**

- A. Field tests shall be witnessed by AHJ Inspector.

- B. Manufacturer's Field Service: Engage a factory-authorized service representative to install, inspect, test, and adjust components, assemblies, and equipment installations, including connections, in compliance with NFPA 72 inspection, testing, and maintenance requirements.
- C. 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.
- D. Tests and Inspections:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 - 3. A written acceptance test procedure (ATP) for testing of the fire alarm system and associated control functions shall be prepared by the project engineer in accordance with NFPA 72 and this specification.
 - 4. The contractor shall be responsible for the performance of the ATP, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and programming.
 - 5. A program matrix shall be prepared by the installing contractor referencing each system input to every output function affected as a result of a system event.
 - 6. The acceptance inspector shall use the system record drawings in combination with the documents identified in this specification during the testing procedure to verify operation of the fire alarm system as programmed. In conducting the ATP, the inspector shall request demonstration of any or all input and output functions. The items to be tested shall include, but are not limited to the following:
 - a. Test all wire runs for continuity, short circuits and ground faults before system is energized. Resistance, current and voltage reading shall be made as work progresses.
 - b. Test system wiring to demonstrate correct system response and correct subsequent system operation in the event of opens, shorts, ground faults, and primary power or secondary battery disconnect.
 - c. 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.
 - d. Test audible appliances for the private operating mode according to manufacturer's written instructions.

- e. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 - f. Test system message display at the control panel, remote annunciator(s), graphic display(s), and control panel history log for each system input.
 - g. Test system off-site reporting functions for correct transmission of system inputs and trouble signals.
 - h. Test system battery voltages and charging currents.
7. Factory authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections. All items found at variance with the drawings or this specification during testing or inspection shall be corrected.

0.9 **DOCUMENTATION**

A. System documentation shall be furnished to the Owner and shall include but is not limited to the following:

- 1. System record drawings (AS-BUILTS) and wiring details including one set of reproducible masters and drawings on a CD ROM in a DXF format, suitable for use in a CAD drafting program.
 - a. On a daily basis, the contractor's superintendent shall record AS-BUILT condition on a set of record drawings maintained at the job site.
 - b. Record drawings shall show the final installed location of all devices and equipment. Device addresses shall be listed next to each device.
 - c. Record drawings shall show complete wiring connections between all device and equipment.
 - d. Two (2) sets of record drawings shall be available prior to and for use in the final acceptance test.
- 2. Three (3) copies of system operation, installation and maintenance manuals.
- 3. System operation matrix showing interaction of all input signals with output commands.
- 4. System test reports showing voltage, current and resistance readings taken during the installation, initial testing and acceptance testing phases of the system installation.
- 5. System configuration files on CD ROM.

0.10 **DEMONSTRATION**

A. Engage a factory-authorized service representative to demonstrate to Owner or Owner's maintenance personnel the features and normal operation of the fire-alarm system including but not limited to the following:

1. Training on the receipt, handling and acknowledgement of system events.
 2. Training on the system operation including manual control of output functions from the system control panel.
 3. Training in the testing of the system including logging of detector sensitivity, field test of devices, and response to common troubles.
 4. The total training requirement shall be a minimum of two (2) hours, but shall be sufficient to cover all items specified.
- B.** The training session shall include reference to the documentation package created for the Project by the Installer, including, but not limited to, the Owner's manual, record drawings, and site-specific software information.

END OF SECTION 283100

SECTION 16950 - SHORT CIRCUIT & PROTECTIVE DEVICES COORDINATION STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions, Divisions 0 and 1 and Sections 16100 and 16200 Specifications apply to work of this section.

1.2 DESCRIPTION

- .A Provide a short-circuit and protective device coordination study for the electrical distribution system. The intent of these studies are to verify that the specified and supplied equipment are properly rated, correctly applied, and within industry and manufacturer's tolerances.
- .B The short circuit study shall include all portions of the electrical distribution system from the normal and alternate sources of power throughout the distribution system down to the smallest protective device. The short circuit study shall consider operation during normal conditions, alternate operations, emergency power conditions, and any other operations which could result in maximum fault conditions.
- .C The coordination study will determine the correct settings for the protective devices which will minimize the damage caused by an electrical fault and allow for selective coordination between the devices. The coordination study shall include the closest upstream utility protective device down to the panelboard main, branch, or feeder circuit breakers. The coordination study shall consider operation during normal conditions, alternate operation, and during emergency power conditions.

1.3 DATA COLLECTION FOR THE STUDIES

- A. The contractor shall provide the required data for preparation of the study. This includes obtaining all required short circuit, X/R and impedance data from the serving utility company. The Engineer performing the system studies shall furnish the contractor with a listing of the required data immediately after the award of the contract.
- B. The contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to release of the equipment for manufacturing.

1.4 QUALIFICATIONS

- .A The Contractor shall have the coordination study prepared by qualified consultant. The consultant shall be a Registered Professional Electrical Engineer (licensed in California) who has at least ten (10) years of experience in performing power system studies.
- .B The short circuit and coordination study shall be performed using the EasyPower or ETAP for Windows computer software package.

1.5 SUBMITTALS

- .A The contractor shall submit the system studies within 30 days after the electrical equipment submittals have been received for review by the engineer. The electrical submittals will be

reviewed but will not be approved until the power system studies have been received and reviewed.

- .B Submit six (6) bond copies of the power system studies.

PART 2 - EXECUTION

2.1 IMPEDANCE ONE LINE DIAGRAM

- .A Create an impedance One Line Diagram. All electrical equipment and wiring to be protected by the overcurrent devices installed under this project and each location where the fault current will be calculated shall be shown. Clearly show, on the One Line Diagram, the schematic wiring of the electrical distribution system.
- .B Show reference nodes on the One Line Diagram referring to a formal report which shall include the following specific information:
 - .1 X/R ratios, utility contribution, and short circuit values (asymmetrical and symmetrical) at the bus of the main service, and all downstream equipment containing overcurrent devices.
 - .2 Transformer kVA and voltage ratings, percent impedance, X/R ratios, and wiring connections.
 - .3 Voltage at each bus.
 - .4 Identifications of each bus.
 - .5 Conduit material, feeder sizes, and length.

2.2 SHORT CIRCUIT STUDY

- .A Pertinent data, rationale employed, and assumptions in developing the calculations shall be incorporated in the introductory remarks of the study.
- .B The study shall be in accordance with applicable ANSI and IEEE Standards.
- .C Determine the available 3 phase short circuit and ground fault currents at each bus. Incorporate the motor contribution in determining the momentary and interrupting ratings of the protective devices.
- .D Present the data determined by the short circuit study in a table format which shall include:
 - .1 Node & Device identification.
 - .2 Operating voltage.
 - .3 Type of Protective device. (i.e. fuse, molded case circuit breaker...)
 - .4 Device short circuit rating.
 - .5 Calculated maximum short circuit current, 3 phase or ground fault, asymmetrical and symmetrical, and X/R ratio.

- .6 De-rate the devices where the tested X/R ratio is less than the calculated X/R ratio. (maximum fault current multiplied by MF.)
- .7 Comments section indicating any equipment found to be underrated.

2.3 PROTECTIVE DEVICE COORDINATION STUDY

- .E All requirements of the current California Electrical Code shall be adhered to.
- .F The coordination study shall include the closest upstream utility protective device down to the panelboard main, branch, or feeder circuit breakers. Prepare the coordination curves to determine the required settings of protective devices to assure selective coordination.
- .G The phase and ground overcurrent protection shall be included, as well as settings for all other adjustable protective devices.
- .H Graphically illustrate on log-log paper that adequate time separation exists between devices. Sufficient curves shall be used to clearly indicate the coordination achieved between devices. Reasonable coordination intervals and separation of characteristic curves shall be maintained. Plot the specific time-current characteristics of each protective device in such a manner that the upstream devices will be clearly depicted on the sheet.
- .I The plots shall include complete titles, representative One Line Diagram and legends, associated power company's relays or fuse characteristics, and complete parameters of transformers. There shall be a maximum of eight protective devices per sheet.
- .J The following specific information shall also be shown on the coordination curves:
 - .1 Device identifications.
 - .2 Time and current ratio for curves.
 - .3 Fuse, circuit breaker, and relay curves, showing complete operating bands of low-voltage circuit breaker trip curves.
 - .4 Cable damage curves.
 - .5 ANSI transformer magnetizing inrush and withstand curves per ANSI C37.91 and transformer damage curves.
 - .6 Motor starting curves
 - .7 Significant maximum symmetrical or asymmetrical short circuit cutoff point.
 - .8 Electric utility's relays and/or fuses including manufacturer's minimum melt, total clearing, tolerance.
 - .9 Medium voltage equipment relays.
 - .10 Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
 - .11 Low voltage equipment circuit breaker trip devices, including manufacturers tolerance bands.

- .12 Pertinent transformer full-load currents at 100 and 600 percent.
- .13 Ground fault protective device settings.
- .14 Other system load protective devices for largest branch circuit and feeder circuit breaker in each motor control center and panelboard.
- .K Develop a table to summarize the settings selected for the protective devices. Include in the table the following:
 - .1 Device identification.
 - .2 Current transformer ratio, relay tap, time delay, and instantaneous pickup.
 - .3 Circuit breaker sensor rating, long-time, short-time, and instantaneous settings, and time bands.
 - .4 Fuse rating and type.
 - .5 Ground fault pickup and time delay

PART 3 - ANALYSIS

Analyze the short circuit calculations and highlight any equipment that is determined to be underrated as specified or not coordinated. Propose approaches to effectively protect any equipment found to be underrated

After developing the coordination curves, highlight areas lacking coordination. For each sheet, present a technical evaluation with a discussion of any recommended compromises for best coordination.

PART 4 - REPORT

The results of the power system study shall be summarized in a final report. The report shall include the following sections:

- .A Introduction, executive summary and recommendations, assumptions, impedance One Line Diagram and copies of the project One Line Diagram.
- .B Tabulations of equipment ratings versus calculated short circuit values and X/R ratios, and commentary regarding same.
- .C Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
- .D Copies of the manufacturers time current curves for the devices studied and plotted on the time current curves.
- E. CD with system model/data base files from the software used in the study.

PART 5 - FIELD SETTINGS

- A. This contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The setting shall be in accordance with the approved Short Circuit and Protective Device Coordination Study.

- B. Necessary field setting of devices and adjustments and minor modifications to equipment to accomplish conformance with the approved Short Circuit and Protective Device Coordination Study shall be carried out by the contractor at no additional cost to the owner.

END OF SECTION 26 0573

SECTION 16951 - ARC FLASH HAZARD STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions, Divisions 0 and 1 and Sections 16100 and 16200 Specifications apply to work of this section.

1.2 DESCRIPTION

.A Provide an Arc Flash Hazard Study for the electrical distribution system shown on the One Line Diagram. The intent of the Arc Flash Hazard Study is to determine hazards that exist at each major piece of electrical equipment shown on the One Line drawing. This includes switchgear, switchboards, panelboards, motor control centers, PDUs, UPS, ATSS, and transformers. The study shall include creation of Arc Flash Hazard Warning Labels. The labels shall be printed on self-adhesive color nylon or vinyl die cut stock. The electrical contractor shall provide and install the labels.

Example of Arc Flash Warning Label

.B The Arc Flash Hazard Study shall include the electrical distribution system equipment shown on the One Line Diagram. Use the data from the Fault/Coordination Study from Specification Section 26 0573 to perform the Arc Flash Hazard Study. The Arc Flash Hazard Study shall consider operation during normal conditions alternate operations, emergency power conditions, and any other operations, which could result in maximum arc flash hazard.

1.3 QUALIFICATIONS

.A The Contractor shall have the study prepared by a Registered Professional Electrical Engineer (licensed in the State of California) who has at least ten (10) years of experience in performing power system studies.

.B The arc flash hazard study shall be performed using EasyPower or ETAP for Windows computer software packages.

1.4 SUBMITTALS

.A The contractor shall submit the Arc Flash Hazard Study and arc flash warning labels at least 30 days prior to energizing the electrical equipment.

.B Submit three (3) copies of the power systems study and (1) set of warning labels.

PART 2 - EXECUTION

2.1 SHORT CIRCUIT STUDY

.A Perform a Short Circuit Study as specified in Section 26 0573.

2.2 PROTECTIVE DEVICE COORDINATION STUDY

- .A Perform a Protective Device Coordination Study as specified in Section 26 0573.

2.3 ARC FLASH HAZARD STUDY

- .A Perform an Arc Flash Hazard Study using data from the completed Short Circuit and Protective Device Coordination Studies.
- .B Pertinent data, rationale employed, and assumptions in developing the calculations shall be incorporated in the introductory remarks of the study.
- .C The study shall be in accordance with applicable NFPA 70E, OSHA 29-CFR, Part 1910 Sub part S and IEEE 1584 Standards.
- .D Determine the following
 - .1 Flash Hazard Protection Boundary
 - .2 Limited Approach Boundary
 - .3 Restricted Boundary
 - .4 Prohibited Boundary
 - .5 Incident Energy Level
 - .6 Required Personal Protective Equipment Class
 - .7 Type of Fire Rated Clothing
- .E Produce an Arc Flash Warning label listing items 1 – 7 above. Also, include the bus name and voltage. The labels shall be printed on self-adhesive color nylon or vinyl die cut stock.
- F. Produce Arc Flash Evaluation Summary Sheet listing the following additional items:
 - .1 Bus Name
 - .2 Upstream Protective Device Name, Type, and Settings
 - .3 Bus Line to Line Voltage
 - .4 Bus Bolted Fault
 - .5 Protective Device Bolted Fault Current
 - .6 Arcing Fault Current
 - .7 Protective Device Trip / Delay Time
 - .8 Breaker Opening Time

- .9 Solidly Grounded Column
- .10 Equipment Type
- .11 Gap
- .12 Arc Flash Boundary
- .13 Working Distance
- .14 Incident Energy
- .15 Required Protective Fire Rated Clothing Type and Class

PART 3 - ANALYSIS

Analyze the Short Circuit and Protective Device Coordination, and Arc Flash Hazard calculations and highlight any equipment, which is determined to be underrated or causes an abnormally high incident energy calculation. Propose approaches to reduce the energy levels. The proposed major corrective modifications shall be taken, under the advisement of the Engineer and the Contractor will be given further instructions.

PART 4 - REPORT

The results of the power system study shall be summarized in a final report. The report shall include the following sections:

- .A Introduction, executive summary and recommendations, assumptions and a reduced copy of the One Line Diagram.
- .B Arc Flash Evaluations Summary Spreadsheet.
- .C Bus Detail Sheets.
- .D Arc Flash Hazard Warning Labels printed on self-adhesive color nylon or vinyl die cut stock.
- .E CD with system model and database file from the software used in the study.

END OF SECTION 26 0574

**SOILS INVESTIGATION
NEW MORGUE LOCATED AT 1225 SOUTH "O" STREET
TULARE, CA.**

Submitted to:

TULARE COUNTY CAPITAL PROJECTS

March 03, 2023

Submitted by:

DC Inspections

March 03, 2023

Tulare County Capital Projects
Mr. Andres Enciso
5961 South Mooney Blvd.
Visalia, Ca. 93277

SUBJECT: Soils Investigation for Proposed New Morgue at 1225 South "O" Street Tulare, Ca.

Dear Mr. Enciso:

At your authorization and request, we have performed a Soils Investigation for the proposed new Morgue. The accompanying report presents the results of our soil investigation for the subject project. The report describes our study, findings, conclusions, and recommendations for use in design by the project consultants. It is the client's responsibility to see that all parties to the project, including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety, including the Additional Services and Limitations sections.

We appreciate the opportunity to be of service. If you have questions regarding the information contained in this report, please contact our office.

Respectfully submitted,
DC Inspections, Inc.



Daniel Cervantez
Registered Civil Engineer
RCE No. 75530



TABLE OF CONTENTS

1.0 INTRODUCTION..... 1
2.0 PURPOSE..... 1
3.0 SCOPE..... 2
4.0 SITE LOCATION AND HISTORY.....2
5.0 PROPOSED DEVELOPMENT.....3
6.0 INVESTIGATION PROCEDURES.....3
7.0 CONCLUSIONS..... 4
8.0 SITE PREPARATION..... 5
9.0 SURFACE DRAINAGE..... 6
10.0 FOUNDATION RECOMMENDATIONS..... 6-7
11.0 LATERAL EARTH PRESSURE AND FRACTIONAL RESISTANCE..... 8
12.0 INTERIOR CONCRETE SLAB-ON-GRADE..... 9
13.0 ADDITIONAL SERVICES..... 10
14.0 CHANGED CONDITIONS AND LIMITATIONS..... 10-11

APPENDICES

APPENDIX A	LABORATORY ANALYSIS
APPENDIX B	UNIFIED SOIL CLASSIFICATION CHART AND TESTHOLE BORING LOGS
APPENDIX C	SITE LOCATION MAP AND TESTHOLE BORING MAP, AERIAL PHOTOS
APPENDIX D	SUGGESTED EARTHWORK SPECIFICATION

**SOIL INVESTIGATION FOR
NEW MORGUE LOCATED AT
1225 SOUTH O STREET
TULARE, CA**

1.0 INTRODUCTION

This report presents the results of a geotechnical engineering investigation for the proposed new commercial building located at 1225 South O Street Tulare, Ca. The contents of this report include the purpose of the investigation and the scope of services provided. Finally, the report provides an evaluation of the findings, general conclusions, and related recommendations. The appendices contain the maps, log of borings and the results of the laboratory testing.

2.0 PURPOSE

The purpose of the investigation was to conduct a field exploration and laboratory testing program, evaluate the data collected during the field and laboratory portion of the investigation and provide the following:

2.1 A description of the general subsurface soil and groundwater conditions encountered;

2.1.1 Soil profile type, site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters in accordance with the 2019 California Building Code;

2.1.2 Assessment of liquefaction and seismic settlement potential;

2.1.3 Recommendations for earthwork construction, including site and subgrade preparation, and engineered fill;

2.1.4 Recommendations for temporary excavations, trench excavation, trench backfill and excavation stability;

2.1.5 Foundation design parameters for the structure including soil bearing capacity, minimum footing depth, and lateral resistance;

2.1.6 Estimates of static and seismic settlement for foundation design;

2.1.7 Recommendations for utility pipe bedding and backfill;

2.1.8 Test hole logs and laboratory test results;

3.0 SCOPE

The scope of services is based on our experience on similar projects. The intent of this investigation is also to meet the requirements of the 2019 California Building Code, as related to geotechnical investigations.

4.0 SITE LOCATION AND HISTORY

The project site is located at 1225 South O Street Tulare, Ca with a latitude of 36.19522 degrees north and a longitude of -119.340423 degrees west. No previous reports of geotechnical investigations, compaction testing or environmental studies conducted for this site were provided for review during this investigation. If available, these reports should be provided for review and consideration for this report.

5.0 PROPOSED DEVELOPMENT

Based on information obtained, the proposed development will include be a new 6,805sqft building. The building will consist of wood and masonry framed construction supported on conventional reinforced concrete footings. The floor will be an on-grade concrete slab with a continuous perimeter concrete footing. Maximum anticipated wall and column loads will be about 2 kips per lineal foot and 20 kips, respectively. Appurtenant construction will include concrete flat work, and underground utilities. No grading plan was available at the time of this report.

6.0 INVESTIGATION PROCEDURES

The investigation consisted of a field exploration and laboratory testing program. The details of the the exploration and testing program are presented in the following section.

6.1 The field exploration consisted of excavating 3 test holes. Test holes were extended to a depth of ten feet maximum depth explored.

6.2 Relatively undisturbed soil samples for laboratory test were obtained by driving sample tube into undisturbed soil. The samples were retained in brass rings.

6.3 Continuous logs of the soils encountered in the test hole were recorded. The field soil classification was in accordance with the Unified Soils Classification System and consisted of particle size, color, and other distinguished features of the soil.

6.4 Test hole locations are approximate as shown on the site map. Elevation of the test hole were not measured as part of this investigation.

7.0 CONCLUSIONS

Based on data collected during the field exploration and the laboratory testing program, our geotechnical experience in the vicinity of the project site, and our understanding of the anticipated construction, the following general conclusions are presented.

7.1 The site is considered suitable for the proposed development with regards to supporting the anticipated construction, provided the recommendations contained in this report are followed and the foundation system can be designed to accommodate the anticipated settlements.

7.2 In general, the near surface soils encountered predominantly consisted of loose to dense sandy silt, underlain by very loose to dense silty sand and sands to a depth of 10' the maximum depth explored.

7.3 Expansive clay was not encountered in the upper 24" at the site, no special mitigation is required.

7.4 The site is not near an active known fault, and surface rupture does not apply.

7.5 Due to the nearly flat terrain, there is no risk of land slides.

7.6 Groundwater was not encountered in our exploration boring. Therefore, there is no liquefaction potential and lateral spreading has a very low potential to occur at the site. It should be noted that groundwater level fluctuates due to

variations in precipitation, land use, irrigation, and other factors. The evaluation of these factors is beyond our scope of services.

8.0 Site Preparation

8.1 Building Area Preparation: The area to be developed should be stripped of all vegetation, organic topsoil, cleared of surface and subsurface obstructions including irrigation and utility line along with any miscellaneous debris. **The proposed Building pad should be over excavated four feet below existing ground surface or two foot below the bottom of footing whichever is deeper.** Over-excavation should extend a minimum of five feet beyond the perimeter of the building. The onsite soils are acceptable for you as engineered fill, Engineered fill is required it should be compacted as outline in the following sections.

8.2 Engineered Fill Material: The onsite soils will be suitable for use as engineered fill material, provided they are non-expansive, free from organics, debris. Engineered soil placed at the site should be moisture conditioned to near optimum moisture and compacted to at least 90% of the maximum dry density as determined by ASTM D1557. No lift should exceed eight inches uncompacted.

8.3 Utility Trench Backfill: The underground utilities should be installed according to the manufacturer's recommendations. Underground utility lines should have no less than 12 inches of cover. A minimum of six inches of compacted sand bedding under the pipe, and pipe envelope extending six inches above the pipe, should be provided. The remaining backfill material may consist of native soil, or import material as described in this report. Utility trench backfill should be placed and compacted in accordance with the requirements for engineered fill.

8.3 Import Fill Material: If required soil should be non-recycled, non-expansive and granular in nature with the following acceptance criteria recommended.

Percent Passing 3- Inch Sieve	100
Percent Passing No. 4 Sieve	85-100
Percent Passing No. 200 Sieve	10-40
Expansion Index	Less than 16
R-Value (pavement only)	Minimum 50

9.0 Surface Drainage

9.1 Surface runoff from natural and graded areas should be controlled. Final grading around the structure should be such that there is positive and enduring drainage away from the foundations. For landscape areas without concrete flat slabs, a minimum five percent positive fall away from building perimeter to at least five feet is recommended.

10.0 Foundation Recommendations

10.1 Provided the site preparation procedures presented in this report are preformed, conventional spread footings, bearing in compacted or undisturbed native soil at a minimum depth of 12 inches below grade may be used for supporting the structural loads of the proposed structure.

10.2 Column spread footings may be sized according to a net bearing pressure of 2,500 pounds per square foot (psf). Wall footings may be sized according to a net bearing pressure of 2,000 pounds per square foot (psf), provided they are a minimum of one foot wide.

10.3 The recommended bearing pressure applies to combined dead and sustained live loads and may be increased by one third (1/3) to include transient loads due to wind and seismic effects.

10.4 Based on a column load of 60 kips, a total footing settlement on the order of 1.5 inch is anticipated. Differential settlement between two adjacent isolated footings is expected to be about 1/2 inch.

10.5 The building should be designed to allow differential movement equivalent to an angular distortion of 1/600. For structural design, a Modulus of Subgrade Reaction k- value of 100 pounds per cubic inch may be used

10.6 The proposed structure should be designed with construction specifications and structure properties to withstand the anticipated or probable effects of seismic ground motion, if a seismic event was to occur. The latitude is 36.19522 degrees and the longitude is -119.340423 degrees at the approximate center of the site. Probabilistic values of ground motion corresponding to various levels of seismic hazards have been established by CGS and USGS base on ASCE 7-16. Based on the new procedure in Section 1613 of 2019 California Building Code (CBC), the seismic design parameters are provided as follows.

SEISMIC DESGIN PARAMETERS 2019 CBC		
<u>Property</u>	<u>Symbol</u>	<u>Value</u>
Occupancy Category		III
Site Class		D
Mapped Acceleration Short Periods	S_s	0.607
Mapped Acceleration At 1 Second Periods	S_1	0.234
Site Coefficient	F_a	1.314

Design Spectral Acceleration Parameter	S_{MS}	0.798
Design Spectral Acceleration Parameter	S_{DS}	0.532
Mapped Maximum Considered Earthquake MCE_G	PGA	0.265
Maximum Considered Earthquake MCE_G	PGA_M	0.354

11.0 Lateral Earth Pressure and Fractional Resistance:

For structures subject to lateral pressures from native soils and backfill at the Site, the following values are recommended:

LATERAL EARTH PRESSURE	
Lateral Pressure and Condition	Equivalent Fluid Pressure, pcf
Active case, drained	45
At-rest case, drained	60
Passive case, drained	360

11.1 Design values assume level, drained granular backfill. Pressures due to surcharge loads from adjacent footings, traffic, etc., should be analyzed separately. The upper one foot of soil of the adjacent grade should not be used in the passive pressure computation. A coefficient of friction of 0.40 may be used between subgrade soil and concrete footings. Vertical soil loads may be calculated based on soil bulk density of 120 pounds per cubic foot.

11.2 The foregoing equivalent fluid pressures and fractional coefficients represent ultimate soil values, and a safety factor consistent with design conditions should be included. A minimum safety factor of 1.5 against lateral sliding is recommended if the sliding is resisted only by fractional resistance. When combined passive and fractional resistance is used, we recommend a minimum safety factor of 2.0. For lateral stability against seismic loading, we recommend a minimum safety factor of 1.1.

12.0 Interior Concrete Slab-On-Grade:

Interior concrete slab-on-grade floors may be placed on compacted native soil or engineered fill. Concrete should be formulated with Type II cement. A damp-proofing system should be used beneath the slab-on-grade floors that would be covered with floor coverings. The damp-proofing system should consist of a vapor retarder with a minimum thickness of 10 mills and a water vapor transmission rate less than 0.3 grains/sq.ft./hr. per ASTM E-96, Method B. The vapor retarder should have sufficient strength to resist the rigors of construction. Splices and perforations should be properly sealed. Two inches of clean sand should be placed between the vapor retarder and the concrete slab to protect the vapor retarder during construction and to aid in curing the concrete

13.0 Additional Services:

The review of plans and specification and field observation by DC Inspections, Inc., are an integral part of the conclusions and recommendations made in this report. These are vital elements and extensions of this geotechnical engineering investigation.

We recommend that the contract drawings and specifications pertaining to earthwork and foundations be made available to DC Inspections, Inc., to verify that they are consistent with our recommendations contained in this report. We recommend that DC Inspections, Inc., be retained to provide consultation and testing services during site preparation and grading, and foundation construction phases of the project. This would include observation and testing of the earthwork to assure compliance with this report recommendations and code requirements.

CHANGED CONDITIONS AND LIMITATIONS

Findings of this report are valid as of the present. However, changes in proposed construction such as structure type, design loads, and location may invalidate the report. Also, site conditions and applicable standards may change. Therefore, this report should be reviewed to determine its applicability considering changed conditions or after a substantial lapse of time between the preparation of our report and the start of work at the site (two years or more).

The analyses and recommendations submitted in this report are based upon the data obtained from the exploratory test pits. The samples obtained and tested, and the observations made, are assumed to be representative of the site soils. The report does not reflect variations which may occur between borings. The validity of the recommendations contained in this report is also dependent upon the prescribed testing and observation program during the site preparation and construction phases. Our firm assumes no responsibility for construction compliance with these design concepts and recommendations unless we have

been retained to perform observation and review during site preparation, grading, and foundation construction.

DCI, Inc., has prepared this report for the exclusive use of the client noted on the cover page and the project design consultants. The report has been prepared in accordance with generally accepted practices by reputable geotechnical engineers practicing in this or a similar locality at the time the report was written. No other warranties, either expressed or implied, are made as to the professional advice provided under the terms of this agreement and included in this report.

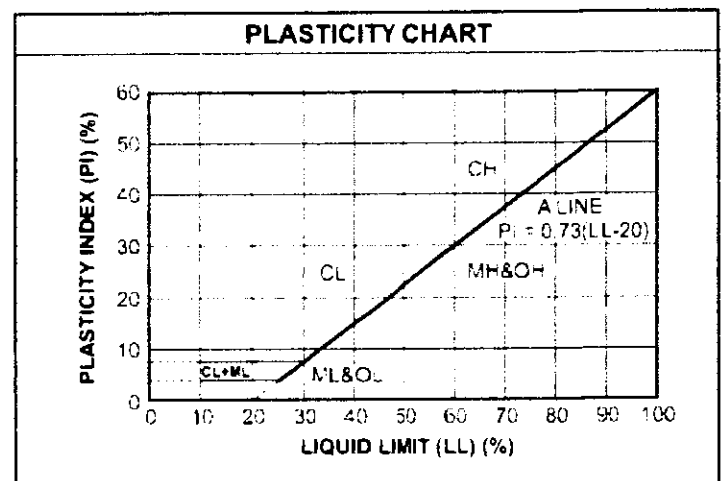
UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART	
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)	
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)
	GW Well-graded gravels, gravel-sand mixtures, little or no fines
	GP Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)
	GM Silty gravels, gravel-sand-silt mixtures
	GC Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)
	SW Well-graded sands, gravelly sands, little or no fines
	SP Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)
	SM Silty sands, sand-silt mixtures
	SC Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)	
SILTS AND CLAYS Liquid limit less than 50%	ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH Inorganic clays of high plasticity, fat clays
	OH Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA	
GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4, $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3
GP	Not meeting all gradation requirements for GW
GM	Atterberg limits below "A" line or P _L less than 4
GC	Atterberg limits above "A" line with P _L greater than 7
	Above "A" line with P _L between 4 and 7 are borderline cases requiring use of dual symbols
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4, $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3
SP	Not meeting all gradation requirements for GW
SM	Atterberg limits below "A" line or P _L less than 4
SC	Atterberg limits above "A" line with P _L greater than 7
	Limits plotting in shaded zone with P _L between 4 and 7 are borderline cases requiring use of dual symbols

Determine percentages of sand and gravel from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse grained soils are classified as follows:

Less than 5 percent: GW, GP, SW, SP
 More than 12 percent: GM, GC, SM, SC
 5 to 12 percent: Borderline cases requiring dual symbols





TESTHOLE BORING LOG

Testhole No. 1	Page No. 1	Project No. 23074	Date: 2/13/23	Logged by: B.B.
Testhole location: Located at 1225 O Street Tulare, Ca			Equipment: Mini Excavator, Hand Auger With 2.5" drive tube sampler	
APN: N/A		Notes: See Location Map		

Water	Graphic Log	Blow Counts	Depth (ft.)	Soil Classification	Material Description	Dry Density (pcf)	Moisture Content (%)	Additional Observations
			0'		0-2" <u>Organics</u>			Very Loose 1'-4'
				SP	2"-4" <u>Sand</u> : Yellowish brown fine to medium grained sand			
			5'	ML	4"-5" <u>sandy Silt</u> ; Dark brown moist; fine to coarse grained sand fractions			
				SP	5'-10' <u>Sand</u> ; Strong yellowish brown fine to medium grained sand fractions			
			10'					
			15'					
			20'					
			25'					
					Terminated drilling at 10'			



TESTHOLE BORING LOG

Testhole No. 2	Page No. 1	Project No. 23074	Date: 2/13/23	Logged by: B.B.
Testhole location: Located at 1225 O Street Tulare, Ca			Equipment: Mini Excavator, Hand Auger With 2.5" drive tube sampler	
APN: N/A		Notes: See Location Map		

Water	Graphic Log	Blow Counts	Depth (ft.)	Soil Classification	Material Description	Dry Density (pcf)	Moisture Content (%)	Additional Observations
			0'		0-2" <u>Organics</u>			DRY TUBE SAMPLE AT 12"
				SM	2"-1.5' <u>silty Sand</u> ; Yellow brown dry; fine to medium grained sand fractions	100.2	2.1	
			5'					
				SP	1.5'-10' <u>Sand</u> ; Yellowish brown fine to medium grained sand fractions			
			10'					
			15'					
			20'					
			25'					
					Terminated drilling at 10'			



TESTHOLE BORING LOG

Testhole No. 3	Page No. 1	Project No. 23074	Date: 2/13/23	Logged by: B.B.
Testhole location: Located at 1225 O Street Tulare, Ca			Equipment: Mini Excavator, Hand Auger With 2.5" drive tube sampler	
APN: N/A		Notes: See Location Map		

Water	Graphic Log	Blow Counts	Depth (ft.)	Soil Classification	Material Description	Dry Density (pcf)	Moisture Content (%)	Additional Observations
			0'		0-2" <u>Organics</u>			
			5'	ML	2"-5" <u>sandy Silt</u> ; Dark brown dry; fine to medium grained sand fractions			Concrete pipe at 28" BEG
				SP	5'-8" <u>Sand</u> ; Yellowish brown fine to medium grained sand fractions			
			10'					
			15'					
			20'					
			25'		Terminated drilling at 8'			



Vicinity Map

Tulare County Morgue

1225 South O Street Tulare, Ca





Boring Location Map

Tulare County Morgue

1225 South O Street Tulare, Ca.

● Approximate Location of Testhole



Laboratory Compaction Curve

Project Number: 23074

Project Name: Tulare County Morgue

Date: 03/1/2023

Location: B2

Depth: 0-12"

	1	2	3	4
Weight of moist specimen & mold	3806.8	3888.3	3933.9	4090.8
Weight of Compacted Mold	1994.5	1994.5	1994.5	1994.5
Weight of Moist Specimen	1812.3	1893.8	1938.5	2096.3
Volume of Mold	.333	.333	.333	.333
Wet Density, lbs/ cu. ft.	120.0	125.4	128.4	129.8
Moisture				
Weight of wet sample	300	300	300	300
Weight of dry sample	281.4	276.1	271.0	263.7
Moisture content %	6.6	8.7	10.7	13.8
Dry Density lbs/cu. Ft.	112.6	115.4	116.0	114.1

Maximum Density lbs./ cu. Ft.	116.1
Optimum Moisture Content	10.5 %

DC INSPECTIONS, INC.

EXPANSION INDEX

Project Number: 23074

Project Name: Tulare County Morgue

Date: 02/28/2023

Location: B3

Depth: 12"-24"

Specific Gravity	2.7
Dry Density of Soil, pcf	112.2
Moisture Content, %	9.0
Degree of Saturation, %	48.4
Final Moisture Content, %	14.2

Expansion Index	4
-----------------	---

EXPANSION POTENTIAL TABLE	
EXP. INDEX	POTENTIAL EXP.
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
> 130	Very High

DC INSPECTIONS, INC.

SIEVE ANALYSIS

Project Number: 23074

Project Name: Tulare County Morgue

Date: 02/21/2023

Location: B3

Depth: 18"-24"

WET WEIGHT	500.0
DRY WEIGHT	480.1
MOISTURE CONTENT	4.1%

Sieves Size	% Passing	Specification
1"	100	
¾"	100	
½"	100	
3/8"	100	
#4	99.2	
#8	90.2	
#16	84.3	
#30	77.6	
#50	73.1	
#100	64.3	
#200	58.9	

Soil Classification	ML
---------------------	----

DC INSPECTIONS, INC.

SIEVE ANALYSIS

Project Number: 23074

Project Name: Tulare County Morgue

Date: 02/21/2023

Location: B2

Depth: 0-12"

WET WEIGHT	500.0
DRY WEIGHT	489.0
MOISTURE CONTENT	2.1%

Sieves Size	% Passing	Specification
1"	100	
¾"	100	
½"	100	
3/8"	100	
#4	98.3	
#8	84.1	
#16	75.3	
#30	70.1	
#50	68.4	
#100	48.3	
#200	33.9	

Soil Classification	SM
---------------------	----

DC INSPECTIONS, INC.

SIEVE ANALYSIS

Project Number: 23074

Project Name: Tulare County Morgue

Date: 02/24/2023

Location: B2

Depth: 18"-24"

WET WEIGHT	500.0
DRY WEIGHT	489.2
MOISTURE CONTENT	2.2%

Sieves Size	% Passing	Specification
1"	100	
¾"	100	
½"	100	
3/8"	100	
#4	100	
#8	100	
#16	100	
#30	88.2	
#50	62.2	
#100	25.8	
#200	6.9	

Soil Classification	SP
---------------------	----

DC INSPECTIONS, INC.

APPENDIX D

SUGGESTED EARTHWORK SPECIFICATIONS

1.0 GENERAL

1.1 SCOPE

These specifications and plans include all earthwork pertaining to site rough grading including, but not limited to, furnishing all labor and equipment necessary for cleaning, grubbing, and stripping; and any other work necessary to bring ground elevation to the lines and grades shown on the project plans.

1.2 PERFORMANCE

It shall be the responsibility of the Contractor to complete all earthwork in accordance with project plans and specifications. No variance from plans and specifications shall be permitted without written approval of the Engineer-of-Record, hereinafter referred to as the "Soils Engineer." Earthwork shall not be considered complete until the "Engineer" has issued a written statement conforming substantial compliance earthwork operations to these specifications and to project plans.

The Contractor shall assume sole responsibility for job site conditions during the course of earthwork operations on the project, including safety of all

persons and preservations of all property; this requirement shall apply continuously and not be limited to normal working hours. The Contractor shall defend, indemnify, and hold harmless the Owners, Engineer, and Soil Engineer from any and all liability and claims, real or alleged, arising out of performance of earthwork on this project, except from liability incurred through sole negligence of the Owner, Engineers, or Soil Engineers.

2.0 DEFINITIONS

2.1 EXCAVATION

Excavation shall be defined within the context of these specifications as earth material excavated for the purpose of constructing fill embankment; grading the site to elevations shown on the project plans, or placing underground pipelines, conduits, or other subsurface utilities or minor structures.

Excavations shall be made true to the lines shown on project plans and to within plus or minus one-tenth (0.1) of a foot, of grades shown on the accepted site grading plans.

2.2 ENGINEERED FILL

Engineered fill shall be construed within the body of these specifications as soil or soil-rock mixtures placed to rise the grade of the site or to backfill excavations and upon which the soil Engineer has performed sufficient tests and has made sufficient observation during placement to enable him to issue a written statement confirming substantial conformance of the work to project earthwork specifications.

2.3 ON-SITE MATERIAL

On-site material is earth material obtained in excavation made on the project site.

2.4 IMPORTED MATERIAL

Imported material is earth material obtained off the site, hauled in, and placed as fill.

2.5 “COMPACTION” – OR – “COMPACTED”

Whenever expressed or implied within the context of these specifications shall be interpreted as compaction to specified percentage of the maximum density obtainable by Test Method ASTM D1557 (Method A).

2.6 GRADING PLANE

The Grading Plane is the surface of the basement material upon which the lowest layer of sub-base, base, pavement, surfacing, or other specific layer, is placed.

3.0 SITE CONDITIONS

The contractor shall visit the site, prior to bid submittal, to determine existing soil and topographic conditions, and the nature of materials that may be encountered during the course of the work under this contract and make his own interpretation of the contents of the Preliminary Soils Report as they pertain to said conditions.

The Contractor shall assume all liability under the contract for any loss sustained as a result of variations which may exist between specific soil boring locations or changed conditions resulting from natural or man-made circumstances occurring after the date of the Preliminary Field Investigations.

4.0 CLEARING AND GRUBBING

4.1 CLEARING AND GRUBBING

Clearing and grubbing shall consist of removing all debris such as metal, broken concrete, trash, vegetation growth and other biodegradable substances, from all areas to be graded.

Existing obstructions below shall be removed in accordance with the following procedure:

4.1.1 SLABS AND PAVEMENT

Shall be completely removed. Asphaltic or Portland cement, concrete fragments may be used in engineered fills provided they are broken down to a maximum dimensions of six (6") inches and thoroughly dispersed within a friable soil matrix. Engineered fill containing said fragments should not be placed above the elevation of the bottom of the lowest structure footing.

4.1.2 FOUNDATIONS

Existing at the time of grading shall be removed to a depth not less than two (2) feet below the bottom of the lowest structure footing.

4.1.3 BASEMENTS, SEPTIC TANKS

Buried concrete containers of similar construction located within areas destined to receive pavements, structures, or engineered fills should be completely removed and disposed of off the site. Basements, septic tanks, etc., situated outside structures, or structural fill areas shall be disposed of by breaking an opening in bottom to permit drainage, and by breaking walls down to not less than two (2) feet below finished subgrade.

4.1.4 BURIED UTILITIES

Buried utilities such as sewer, water and gas lines or electrical conduits to remain in service shall be re-routed to pass no closer than four (4) feet to the outside edge of proposed exterior footings of structures. Lines to be abandoned shall be completely removed to minimum depth of two (2) feet below finished building pad grade.

4.1.5 ROOT SYSTEMS

Root systems shall be completely removed to a minimum depth of two (2) feet below the bottom of the lowest structure footing or to two (2) feet below finished subgrade, whichever depth is lower. Root systems deeper than the elevation indicated above shall be excavated to allow no roots larger than two (2) inches in diameter.

4.1.6 CAVITIES

Cavities resulting from clearing and grubbing or cavities existing on the site as a result of man-made or natural activity shall be backfilled with earth materials placed and compacted in accordance with Sections 5.3 and 5.4 of these specification.

4.1.7 PRESERVATION OF MONUMENTS, CONSTRUCTION STAKES, PROPERTY CORNER STAKES

Preservation of monuments, construction stakes, property corner stakes, or other temporary or permanent horizontal or vertical control reference points shall be the responsibility of the contractor. Where these markers are disturbed, they shall be replaced at the contractor's expense.

5.0 SITE GRADING

Site grading shall consist of excavation and placement of fill to lines and grades shown on the project plans and in accordance with project specifications and recommendations of the Preliminary Soils Report.

5.1 AREAS TO RECEIVE FILL

5.1.1 Surface to receive fill shall be scarified to a depth of at least six (6) inches or as recommended until the surface is free from ruts, hummocks or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

5.1.2 After the area to receive fill has been cleared and scarified, it shall be moistened and compacted to a depth of a least six (6) inches in accordance with specifications for compacting fill material in Paragraph 5.4, below.

5.2 EXCAVATION

5.2.1 Excavation shall be cut to elevations plus or minus 0.1 foot of the grades shown on the accepted plans.

5.2.2 When excavated material is to be used in engineered fill, the excavation shall be made in a manner to produce as much mixing of the excavated materials as practicable.

5.2.3 When excavations are to be backfilled and where surfaces exposed by excavation are to support structures or concrete floor slabs, the exposed surfaces shall be scarified, moistened and compacted as stated above for areas to receive fill. Over excavation below specified depth will not eliminate the requirement for exposed surface compaction.

5.3 FILL MATERIALS

5.3.1 Materials obtained from on-site excavations will be considered satisfactory for construction of on-site engineered fill unless otherwise stated in the Soils Report or Foundation Investigation. If unexpected pockets of poor or weak materials are encountered in excavations and they cannot be up-

graded by mixing with other materials or by other means, they may be rejected by the Soils Engineer for use in engineered fill.

5.3.2 When imported fill materials are necessary to bring the site up to planned grades, no materials shall be imported prior to its approval and acceptance by the Soils Engineer.

5.3.3 The Soils Engineer shall be given notice of the proposed source of imported materials with adequate time allowance for his testing of the proposed materials. The time required for testing will vary with different types of materials, job conditions and ultimate function of filled areas. Under best conditions, the time requirement will not be less than 48 hours.

5.4 PLACING, SPREADING, AND COMPACTION FILL MATERIAL

5.4.1 The fill material shall be placed in layers which, when compacted, shall not exceed six (6) inches in thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer. Increased thickness of layers may be approved by the Soil Engineer when conditions warrant.

5.4.2 All fills shall be placed in level layers; layers shall be continuous over the area of any structural unit, and all portions of the fill shall be brought up simultaneously within the area of any structural unit. When import material

is used, it must be placed so its thickness is as uniform as possible within the area of any structural unit.

5.4.3 When materials are to be excavated and replaced in a compacted condition, segmented, or leap-frogging or cut-fill operation within the area of any structural unit will not be permitted unless the method is specifically described by the Soils Engineer.

5.4.4 When the moisture content of fill material is below the lower limit specified by the Soils Engineer, water shall be added until the moisture content is as specified; and when it is above the upper limit specified, the material shall be aerated by blading or other satisfactory methods until the moisture content is as specified.

5.4.5 After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than ninety-two (92) percent of maximum density in accordance with Test Method ASTM D1557. Compaction shall be by equipment of such design that it will be able to compact the fill to specified density. When the Soil Engineer specifies type of compaction equipment to be used, such equipment to be used, such equipment shall be used as specified.

5.4.6 Compaction of each layer shall be continuous over its entire area and the equipment shall make enough trips to ensure that the desired density has been obtained.

5.4.7 Field density tests shall be made by the Soils Engineer. The compaction of each layer of fill shall be subject to testing. Where sheepfoot rollers are used, the soil may be disturbed to a depth of several inches. Density tests shall be taken in the compacted material below the disturbed surface. When tests indicated the density, the particular layer or portion thereof is below the required (90%) density, the particular layer or portion shall be re-worked until the required density has been obtained.

5.4.8 When the Soils Engineer specifies compaction to other standards or to percentages other than 90%, such specifications, with respect to the particular item shall supersede these specifications.

5.4.9 The fill operation shall be continued in six (6) inch compacted layers, as specified above, until the fill has been brought to within 0.1 foot, plus or minus of the finished surface of fill areas shall be graded or bladed to a smooth and uniform surface and no loose material shall be left on the surface.

5.4.10 No fill material shall be placed, spread, or compacted while it is frozen or thawing or during unfavorable weather conditions. When work is interrupted by weather conditions, fill operations shall not be resumed until the Soils Engineer indicates that moisture content and density of previously placed fill are satisfactory.

5.5 OBSERVATION AND TESTING

The Soils Engineer shall be provided a 48-hour advance notice in order that he may be present at the site during all earthwork activities related to excavation, tree removal, stripping, backfill, and compaction and filling of the site; and to perform periodic compaction tests so that substantial conformance to these recommendations can be established.



March 29, 2023

Tulare County Capital Projects
Mr. Andres Enciso
5961 South Mooney Blvd.
Visalia, Ca. 93277

SUBJECT: R- Values for proposed New Morgue 1225 "O" Street Tulare Ca. 93274

Dear Mr. Enciso:

At your authorization and request, we have collected Two R-Value and delivered to Krazan, Inc. for testing. Using a design subgrade R-Value of 50, the following pavement sections have been calculated using the Cal- Trans Highway Design Manual and Table 633.1 for various traffic indices.

Traffic Index	Asphalt Concrete Thickness (Inches)	Class II Aggregate Base	Compacted Subgrade (Inches)
4	3	4	12
5	3	5	12
6	3.5	5	12
7	4	6	12

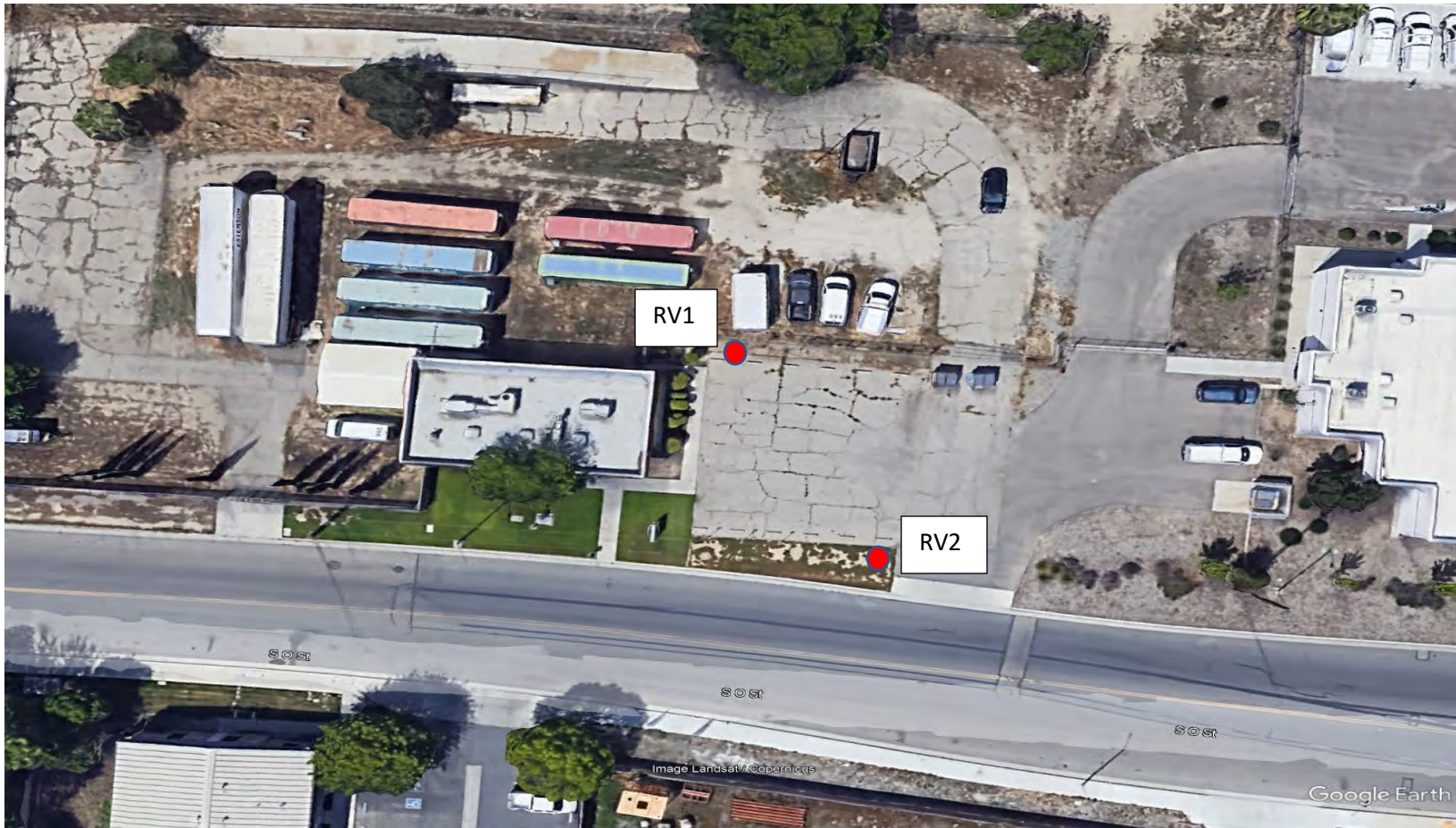
Where Portland cement concrete (PCC) pavements are proposed, we recommend a minimum slab thickness of 6 inches for traffic indices of 7 or less. The PCC should be supported by a minimum of 4 inches of Class II aggregate base compacted to 95 percent based on ASTM D1557.

We appreciate the opportunity to be of service. If you have questions regarding the information contained in this report, please contact our office.

Respectfully submitted,
DC Inspections, Inc.

A handwritten signature in blue ink, appearing to read 'Shannon Bennett'.

Shannon Bennett



R-Value Location Map
Tulare County Morgue
1225 " O " Street Tulare, Ca.

● Approximate Location of R-Values



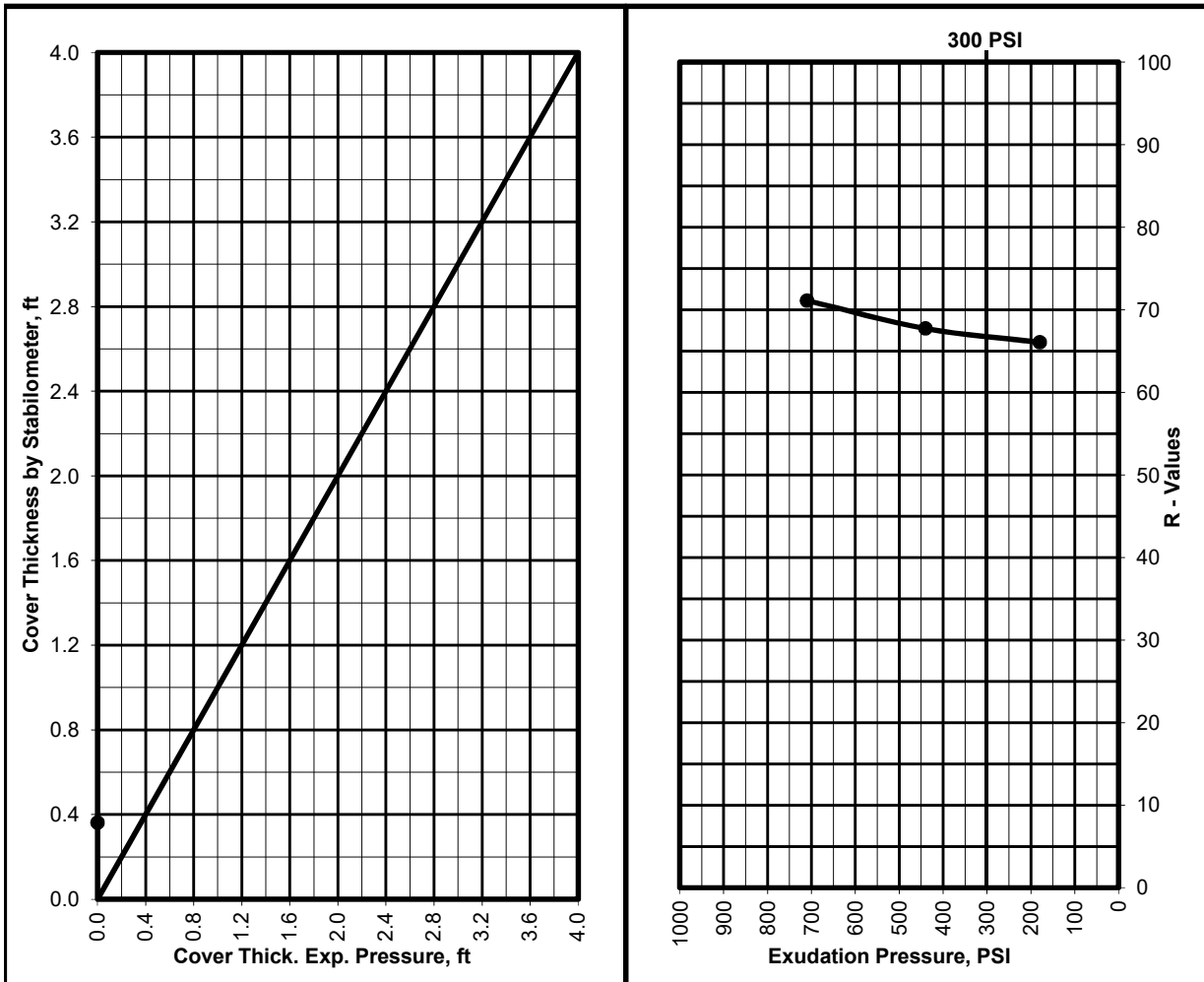
R - VALUE TEST

ASTM D - 2844 / CAL 301

Project Number : 2623100-ID#0017598
 Project Name : DC Inspections Open Lab
 Date : 3/15/2023
 Sample Location/Curve Number : R-Value #1 (1.5-2') Below existing grade
 Soil Classification : SM Dark Brown F Silty Sand

TEST	A	B	C
Percent Moisture @ Compaction, %	10.9	10.4	9.9
Dry Density, lbm/cu.ft.	121.1	121.4	122.1
Exudation Pressure, psi	180	440	710
Expansion Pressure, (Dial Reading)	0	0	0
Expansion Pressure, psf	0	0	0
Resistance Value R	66	68	71

R Value at 300 PSI Exudation Pressure	66
R Value by Expansion Pressure (TI =): 5	Expansion Pressure nil



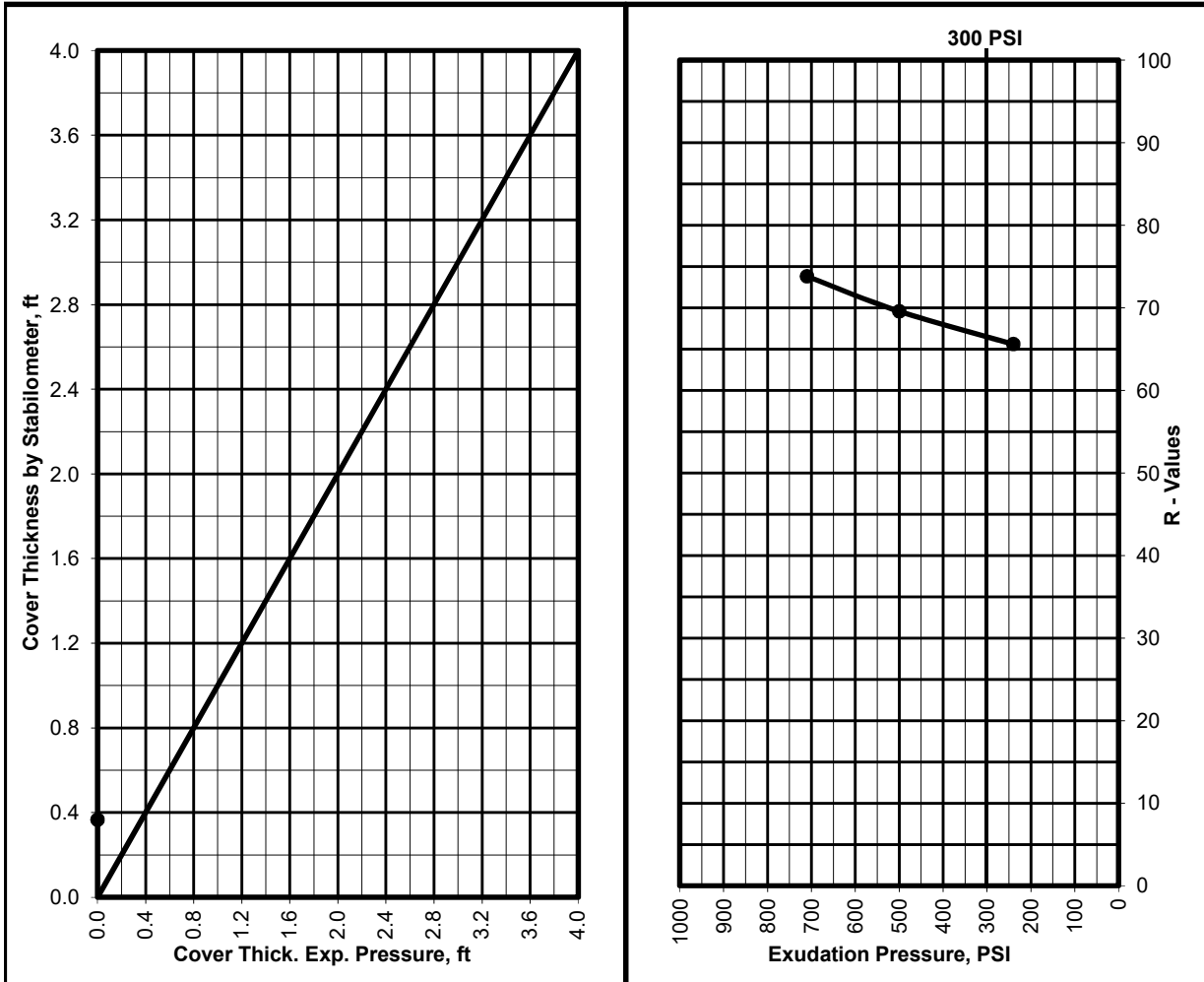
R - VALUE TEST

ASTM D - 2844 / CAL 301

Project Number : 2623100-ID#9569440
 Project Name : DC Inspections Open Lab
 Date : 3/15/2023
 Sample Location/Curve Number : R-Value #2 (2-2.5') Below existing grade
 Soil Classification : SM Dark Brown F Silty Sand

TEST	A	B	C
Percent Moisture @ Compaction, %	10.8	10.3	9.8
Dry Density, lbm/cu.ft.	120.9	122.9	123.3
Exudation Pressure, psi	240	500	710
Expansion Pressure, (Dial Reading)	0	0	0
Expansion Pressure, psf	0	0	0
Resistance Value R	66	70	74

R Value at 300 PSI Exudation Pressure	66
R Value by Expansion Pressure (TI =): 5	Expansion Pressure nil





STRUCTURAL ▪ CIVIL ▪ SURVEY ▪ LAND PLANNING
 9449 Balboa Avenue, Suite 270 ▪ San Diego, CA 92123
 Phone (619) 299-5550 ▪ Fax (619) 299-9934
 www.bwesd.com

ENGINEER: Dave K. Adams, SE
 DATE: June 8, 2023
 PROJECT NUMBER: 14033A

**Approved
 Building
 Dept.**

**STRUCTURAL CALCULATIONS
 FOR
 NEW MORGUE BUILDING
 TULARE COUNTY SHERIFF**

**SOUTH "O" STREET
 TULARE, CALIFORNIA**



COUNTY OF TULARE
 RESOURCE MANAGEMENT AGENCY
 BUILDING PERMIT NO. A2302173
APPROVED
 PLAN CHECK ONLY
 THIS APPROVAL SHALL NOT BE CONSTRUED TO BE
 A PERMIT FOR AN APPROVAL OF ANY VIOLATION OF
 ANY OF THE PROVISIONS OF THE LATEST ADOPTED
 CALIFORNIA BUILDING CODE OR APPLICABLE
 OTHER STATE AND COUNTY LAWS
 BY: kreynolds1 DATE: January 25, 2024

Prepared for

**CHAS RHOADS
 PO BOX 889
 HANFORD, CA 93230**



STRUCTURAL ▪ CIVIL ▪ SURVEY ▪ LAND PLANNING
9449 Balboa Avenue, Suite 270 ▪ San Diego, CA 92123
Phone (619) 299-5550 ▪ Fax (619) 299-9934
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TABLE OF CONTENTS

BASIS OF DESIGN

ASCE 7 HAZARD REPORT	1
GRAVITY LOADS	4

LATERAL DESIGN

SEISMIC STORY WEIGHTS.....	6
TRIBUTARY AREA DIAGRAM	7
SEISMIC BASE SHEAR	9
VERTICAL DISTRIBUTION AND DIAPHRAGM DESIGN FORCES	10
SHEAR WALL FORCES.....	11
RISA 3D CMU SHEAR WALL ANALYSIS	13

GRAVITY DESIGN

OPEN WEB WOOD TRUSS (RED-L) DESIGN.....	33
OPEN WEB WOOD TRUSS CONNECTION DESIGN (STRAPS).....	35
LEDGER ANCHORAGE TO CMU WALL (HILTI PROFIS)	37
SAWN LUMBER AND ENGINEERED LUMBER BEAM/HEADER/LEDGER DESIGN.....	41
STEEL HSS HEADER/JAMB/SILL FOR LARGE OPENING DESIGN.....	79

FOUNDATION DESIGN

EXCERPT OF GEOTECHNICAL REPORT (FOR REFERENCE ONLY).....	97
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MISCELLANEOUS DESIGN

PARTIAL HEIGHT WALL FRAMING AND BRACING.....	101
GENERATOR ENCLOSURE STEEL FRAME	101

Approved
Building
Dept.

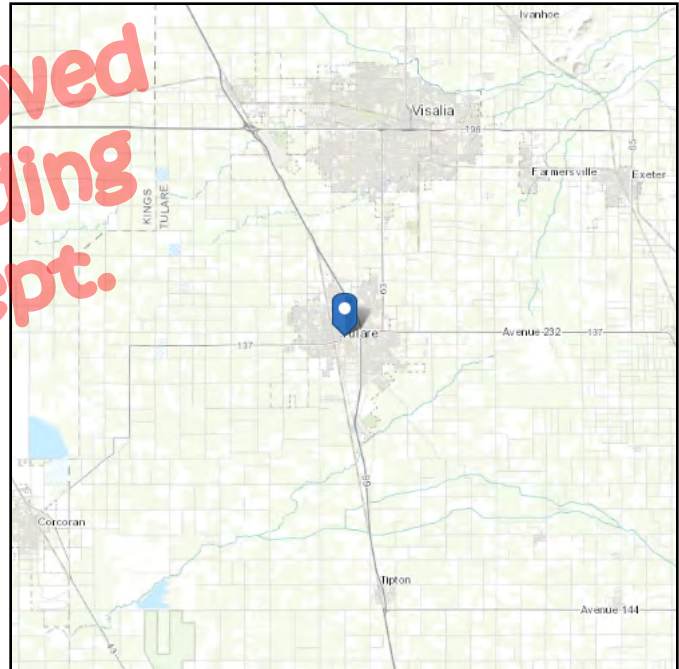
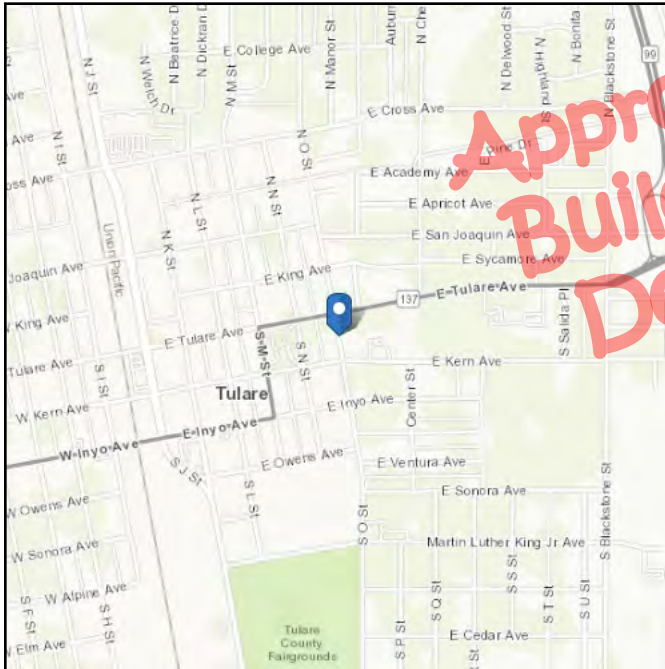


ASCE 7 Hazards Report

Address:
S O St
Tulare, California
93274

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 36.208175
Longitude: -119.34062
Elevation: 290.99 ft (NAVD 88)



Wind

Results:

Wind Speed	94 Vmph
10-year MRI	66 Vmph
25-year MRI	71 Vmph
50-year MRI	76 Vmph
100-year MRI	81 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Mon Jan 23 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_s :	0.603	S_{D1} :	N/A
S_1 :	0.233	T_L :	12
F_a :	1.318	PGA :	0.263
F_v :	N/A	PGA_M :	0.352
S_{MS} :	0.794	F_{PGA} :	1.337
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.53	C_v :	1.101

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Mon Jan 23 2023

Date Source: [USGS Seismic Design Maps](#)



The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Approved
Building
Dept.



ENGINEERED TO EXCEED EXPECTATIONS

Project: Tulare County Morgue
Location: Tulare, CA

By: SC
Date: 5/17/2023
Project Number: 14033A

Gravity Loads

Code: 2022 CBC

Typical Roof Loads:

Solar	3.0 psf		
TPO Membrane Roofing	1.0 psf		
Underlayment Board	1.0 psf		
5/8" Plywood	2.0 psf		
Truss or BCI Joists	6.0 psf		
ACT Ceiling System	3.0 psf		
M/E/P	4.0 psf		
Insulation & Misc	3.0 psf		
	<hr/>		
	23.0 psf	DL:	23.0 psf
		Roof LL:	20.0 psf

Standing Seam Roof Loads:

Standing Seam Metal Roof	1.5 psf		
Underlayment Board	1.0 psf		
5/8" Plywood	2.0 psf		
2x10 Rafters @ 2'-0" o.c.	2.6 psf		
5/8" Gyp. Board Ceiling System	4.8 psf		
M/E/P	4.0 psf		
Insulation & Misc	3.0 psf		
	<hr/>		
	18.9 psf	DL:	19.0 psf
		Roof LL:	20.0 psf

CMU Exterior Walls:

8" CMU Block	78.0 psf		
Insulation & Misc.	2.0 psf		
	<hr/>		
	80.0 psf	DL:	80.0 psf

Exterior Bearing Wall:

3/4" Plaster Finish	15.0 psf		
1 1/2" Rigid Insulation	1.5 psf		
5/8" Plywood Sheathing	2.0 psf		
2x6 Wood Studs at 16" o.c.	1.5 psf		
5/8" Gyp. Board	2.8 psf		
Insulation & Misc.	1.2 psf		
	<hr/>		
	24.0 psf	DL:	24.0 psf



Project: Tulare County Morgue
Location: Tulare, CA

By: SC
Date: 5/17/2023
Project Number: 14033A

Gravity Loads

Code: **2022 CBC**

Interior Non-Bearing Partition:

5/8" Gyp. Board	2.8 psf
2x6 Wood Studs at 24" o.c.	1.5 psf
5/8" Gyp. Board	2.8 psf
Insulation & Misc.	1.4 psf
<hr/>	
	8.5 psf

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Dept.

DL: 8.5 psf





ENGINEERED TO EXCEED EXPECTATIONS

Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Seismic Story Weights

Code: 2022 CBC

Floor/Roof		Morgue Roof Level			Office Roof Level		
Type	Load (psf)	Area (ft ²)	Weight (lbs)	Load (psf)	Area (ft ²)	Weight (lbs)	
Typical Roof	23	4431	101913	23.0	2210	50830	
Standing Seam Roof	19	0	0	19.0	284	5396	
Total:		4431	101913	Total:	2494	56226	

Walls		Morgue Roof Level				Office Roof Level			
Type	Load (psf)	Length (ft)	Trib Ht (ft)	Area (ft ²)	Weight (lbs)	Length (ft)	Trib Ht (ft)	Area (ft ²)	Weight (lbs)
Exterior	24	0	13.50	0	0	138	13.50	1863	44712
Interior	8.5	135	10.00	1350	11475	240	10.00	2400	20400
CMU	80	520	14.00	7280	582400	0	14.00	0	0
Total:					593875				65112

Average roof and floor seismic loads (PSF)

	Wall Weight		Roof Weight		Total DL	DL Used	Areas
Office	26	+	22.5	=	48.65	48.7	2494
Morgue	134.0	+	23.0	=	157.03	157.1	4431

Weight (PSF)	DL	LL	Reduced LL	Roof LL	Reduced Roof LL
Office Roof	48.7	0	0	20	12
Morgue Roof	157.1			20	12

Total for Superstructure:	206.0	0.0	0.0	20.0	12.0
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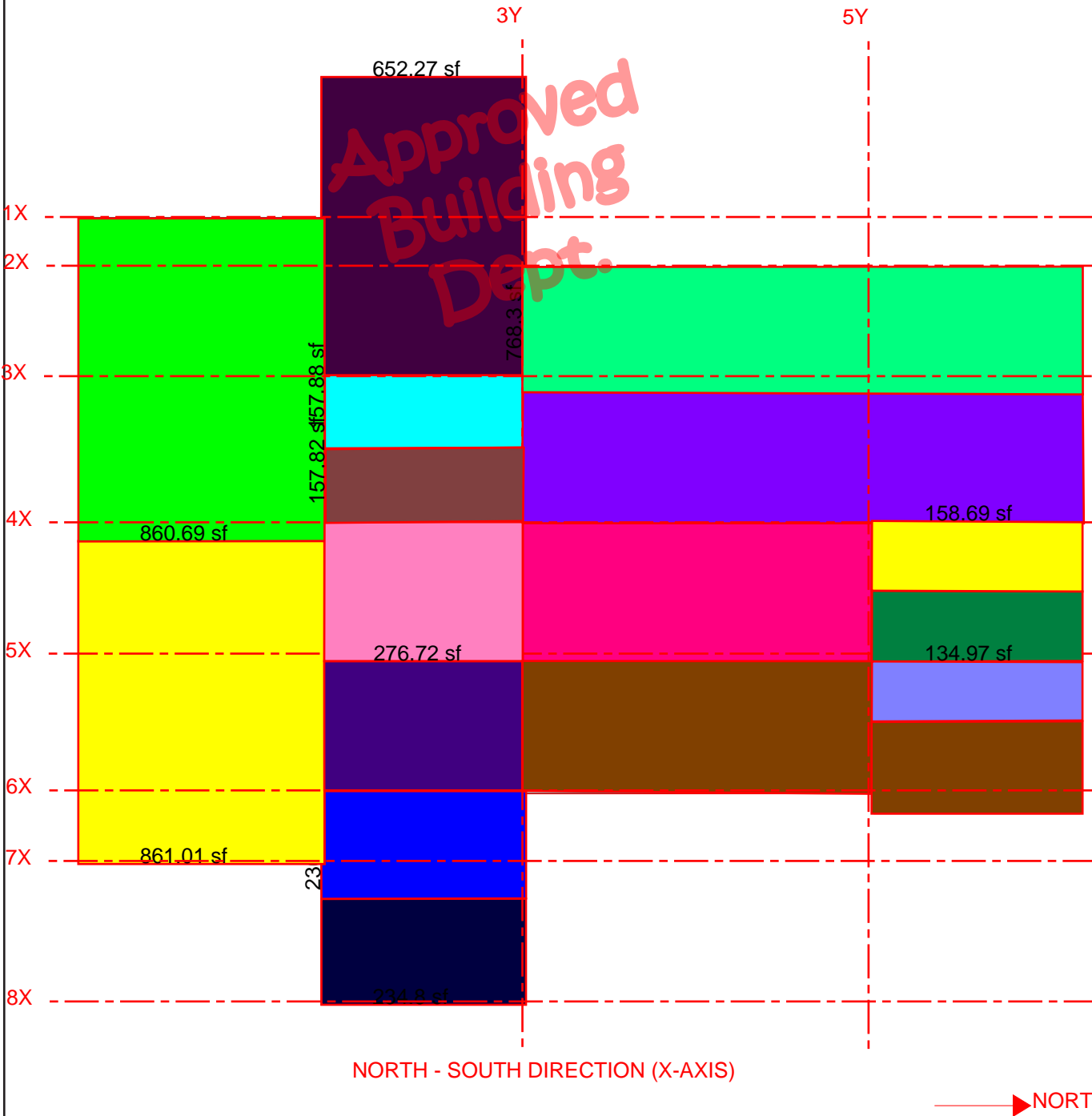
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JOB NO _____

PROJECT _____



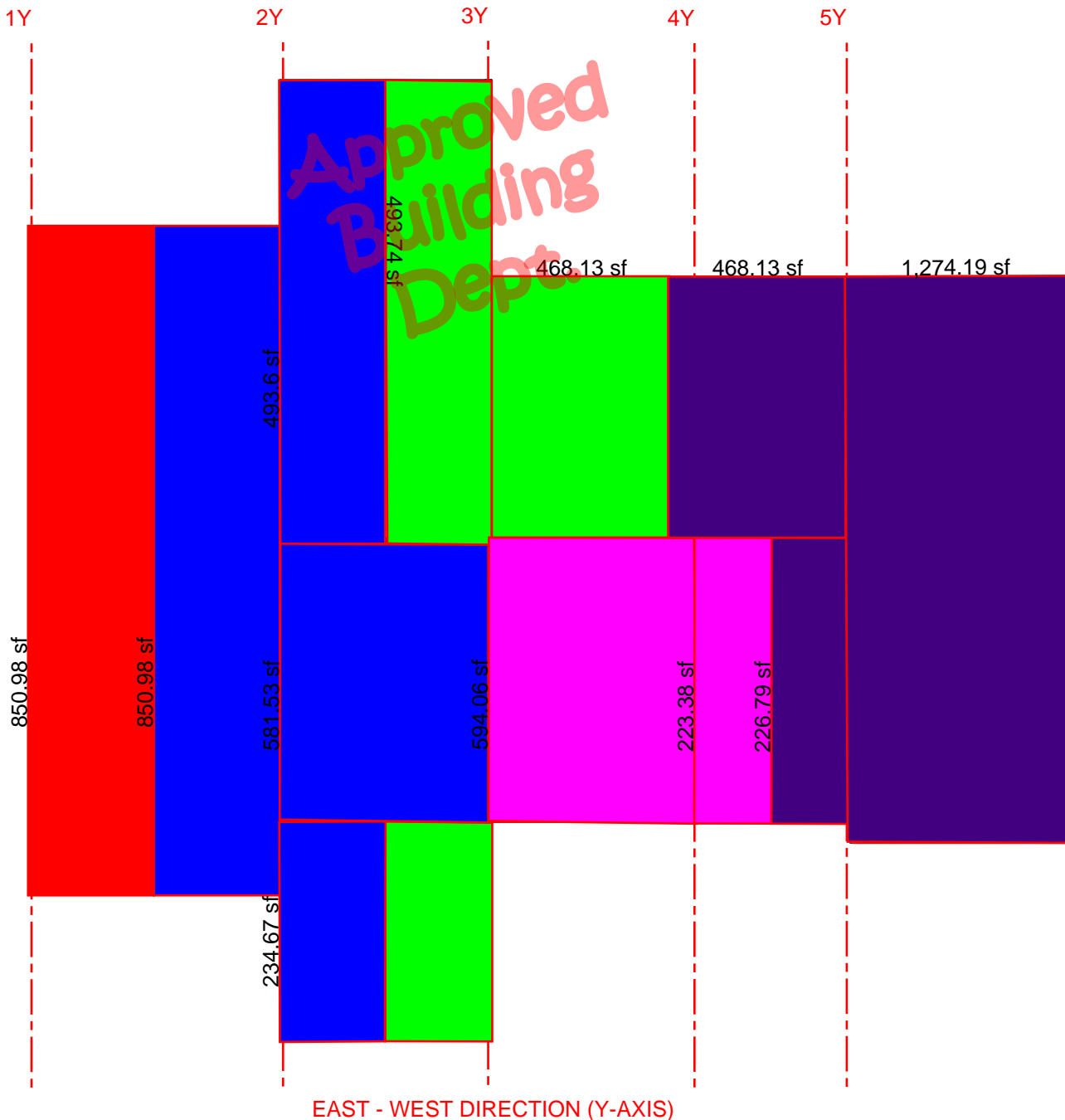
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SHEET _____

ENGR _____

JOB NO _____

PROJECT _____



→ NORTH



ENGINEERED TO EXCEED EXPECTATIONS

Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Seismic Design Base Shear - Equivalent Lateral Force Procedure

(Per ASCE 7-16, Chapter 12.8)

Code: 2022 CBC

Lateral System Information

Risk Category **II** (2022 CBC Table 1604.5)
 $I_e = 1.00$ (Table 11.5-1)
 Lateral System **Special Reinforced Masonry - Bearing**
 $R = 5$
 $\Omega_0 = 2.5$ *Reduce by 1/2 at flexible diaphragms per Table 12.2-1 footnote b
 $C_d = 3.5$

Seismic Ground Motion Values

Site Classification **D**Site-Specific Ground Motion Performed: **No**Site Class Verified by Geotech: **Yes**

Short Period

$S_S = 0.607$ g
 $F_a = 1.314$
 $S_{MS} = 0.798$ g
 $S_{DS} = 0.532$ g

Long Period

$S_1 = 0.234$ g
 $F_v = 2.132$
 $S_{M1} = 0.499$ g
 $S_{D1} = 0.333$ g

Seismic Design Category

SDC = D

Approximate Fundamental Period

Building Type: **All Other Structural Systems**Fundamental Period Known: **No**Maximum Height = **24.0** ft

$T_a = 0.22$ sec (Eq. 12.8-7)
 $T_0 = 0.13$ sec (§11.4.6)
 $T_s = 0.63$ sec (§11.4.6)

 $T_L = 12$ sec (Fig. 22-14)

Seismic Base Shear

$C_s = 0.106$ Govs (Eq. 12.8-2)
 $C_{s, MAX} = 0.460$ (Eq. 12.8-3 & Eq. 12.8-4)
 $C_{s, MIN} = 0.023$ (Eq. 12.8-5 & Eq. 12.8-6)
 $C_s = 0.106$ (§11.4.8, Exception 2)

for $T \leq T_s$

$$C_s = \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} \quad (\text{Eq. 12.8-2})$$

for $T_s \leq T \leq T_L$

$$C_s = \frac{S_{D1}}{T \left(\frac{R}{I_e}\right)} \quad (\text{Eq. 12.8-3})$$

for $T > T_L$

$$C_s = \frac{S_{D1} T_L}{T^2 \left(\frac{R}{I_e}\right)} \quad (\text{Eq. 12.8-4})$$

$V = 0.106 * W$ (Site-specific ground motion procedures apply)

Redundancy

$\rho_x = 1.0$
 $\rho_z = 1.0$





ENGINEERED TO EXCEED EXPECTATIONS

Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Vertical Distribution of Seismic Forces

(Per ASCE 7-16, Section 12.8.3)

Code: 2022 CBC

Level	Height (ft)	Area (ft ²)	DL (psf)	Added Mass (kips)	Weight (kips)	$w_x h_x^k$ (k-ft)	C_{vx} (Eq. 12.8-12)	LRFD	ASD
								F_x (kips)	$F_{x,ASD}$ (kips)
Office Roof	20	2,494	48.7	0	121	2429	0.15	12.9	9.0
Morgue Roof	20	4,431	157.1	0	696	13922	0.85	74.1	51.8
Totals:					818	16351	1.0	87.0	60.9

$$C_s = 0.106$$

$$k = 1.0 \text{ (§12.8.3)}$$

$$V_{base} = 87.0 \text{ kips}$$

$$60.9 \text{ kips, ASD}$$

$$F_x = C_{vx} V \quad (\text{Eq. 12.8-11})$$

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^n w_i h_i^k} \quad (\text{Eq. 12.8-12})$$

Diaphragm Design Forces

(Per ASCE 7-16, Section 12.10.1.1)

Code: 2022 CBC

Level	F_i (kips)	w_i (kips)	F_{px} (kips)	$F_{px, min}$ (kips)	$F_{px, max}$ (kips)	LRFD	ASD
						F_{px} (kips)	$F_{px,ASD}$ (kips)
Office Roof	12.9	121	12.9	12.9	25.8	12.9	9.0
Morgue Roof	74.1	696	74.1	74.1	148.1	74.1	51.8

$$S_{DS} = 0.532$$

$$I_e = 1.0$$

$$F_{px} = \frac{\sum_{i=x}^n F_i}{\sum_{i=x}^n w_i} w_{px} \quad (\text{Eq. 12.10-1})$$

$$F_{px, min} = 0.2 S_{DS} I_e w_{px} \quad (\text{Eq. 12.10-2})$$

$$F_{px, max} = 0.4 S_{DS} I_e w_{px} \quad (\text{Eq. 12.10-3})$$



ENGINEERED TO EXCEED EXPECTATIONS

Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Horizontal Distribution of Seismic Forces - X Direction

(Per ASCE 7-16, Section 12.8.4)

2022 CBC

Level: Office Roof

Area = 2,494 ft²F_x = 12.9 kips

Wall Line	Trib Area (ft ²)	F _{x,wall} (kips)	F _{x,wall total} (kips)	L _{shear wall} (ft)	V _{wall, ASD} (plf)	Out of Plane W _{wall, ASD} (plf)
1X	861	4.5	4.5	25	124.9	0
2X @ 3Y	769	4.0	4.0	6	0.0	464.8
3X	811	4.2	4.2	20	147.1	0
4X1	457	2.4	2.4	20	82.9	0
4X2	1477	7.7	7.7	32	167.4	0
5X @ 5Y	296	1.5	1.5	20	0.0	53.7
6X1	457	2.4	2.4	14	118.4	0
6X2	708	3.7	3.7	35	73.4	0
7X	862	4.5	4.5	24	130.3	0
8X	235	1.2	1.2	20	42.6	0

Total = 6933 35.9 CHECK





ENGINEERED TO EXCEED EXPECTATIONS

Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Horizontal Distribution of Seismic Forces - Y Direction

(Per ASCE 7-16, Section 12.8.4)

2022 CBC

Level: Office Roof

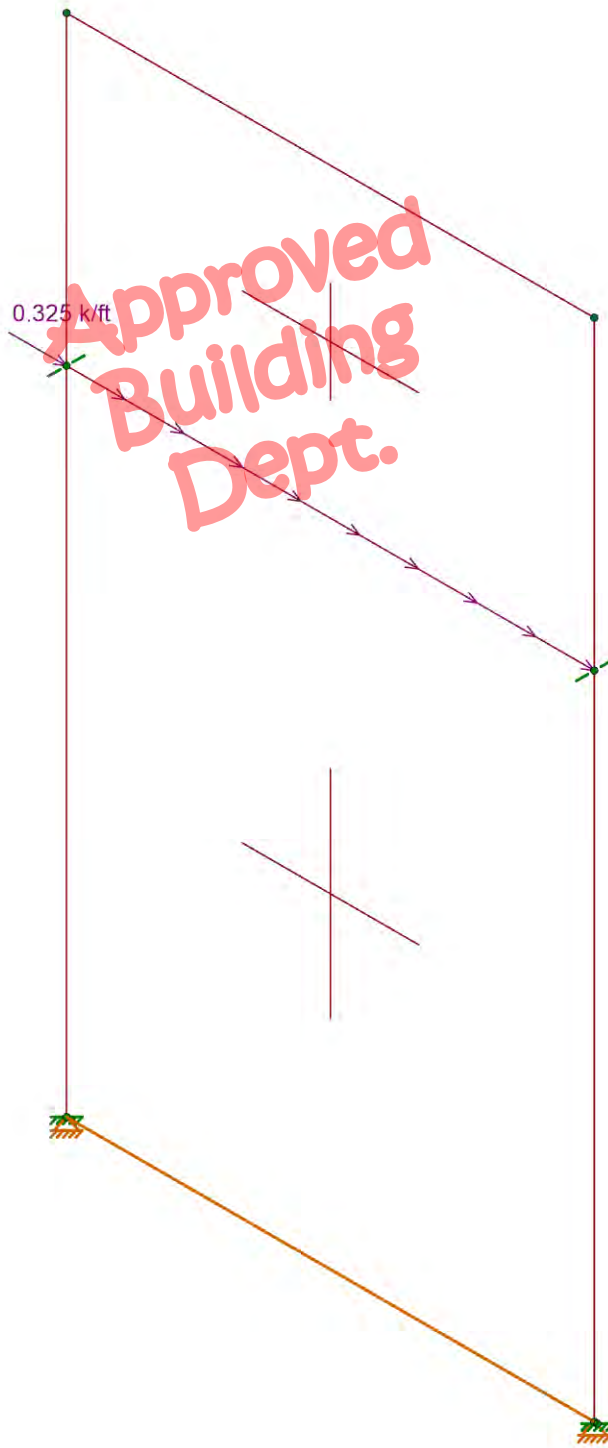
Area = 2,494 ft²

Fx = 12.9 kips

Wall Line	Trib Area (ft ²)	F _{x,wall} (kips)	F _{x,wall total} (kips)	L _{shear wall} (ft)	V _{wall, ASD} (plf)	Out of Plane W _{wall, ASD} (plf)
1Y	851	4.4	4.4	67	46.1	0.0
2Y	2161	11.2	11.2	77	101.8	0.0
3Y1	963	5.0	5.0	30	116.4	0.0
3Y2	237	1.2	1.2	22	39.1	0.0
4Y	818	4.2	4.2	10	296.6	0.0
5Y	1970	10.2	10.2	22	324.7	0.0
6Y	638	3.3	3.3			

Total = 7638 39.6 CHECK

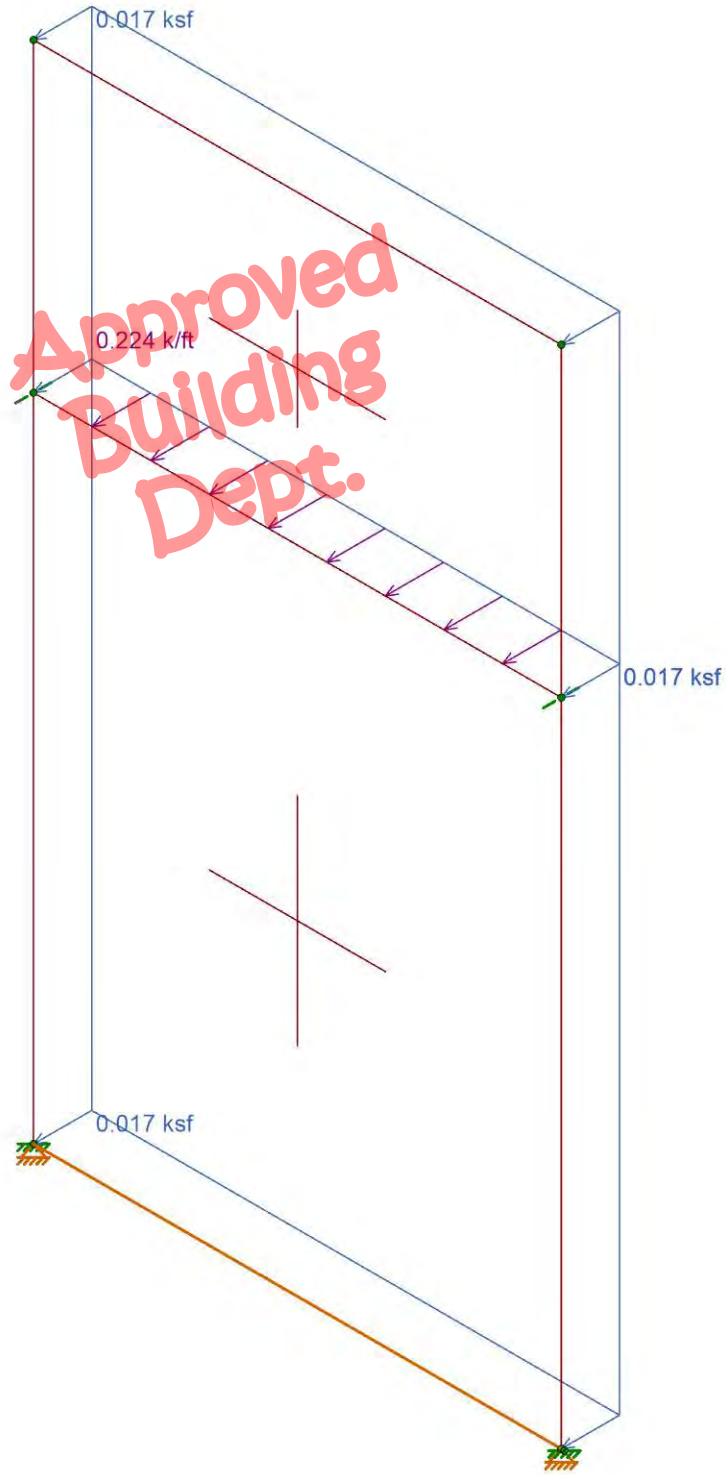
USE THIS TO DESIGN
CMU SHEAR WALL



Loads: BLC 3, EQ_X
Envelope Only Solution

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song

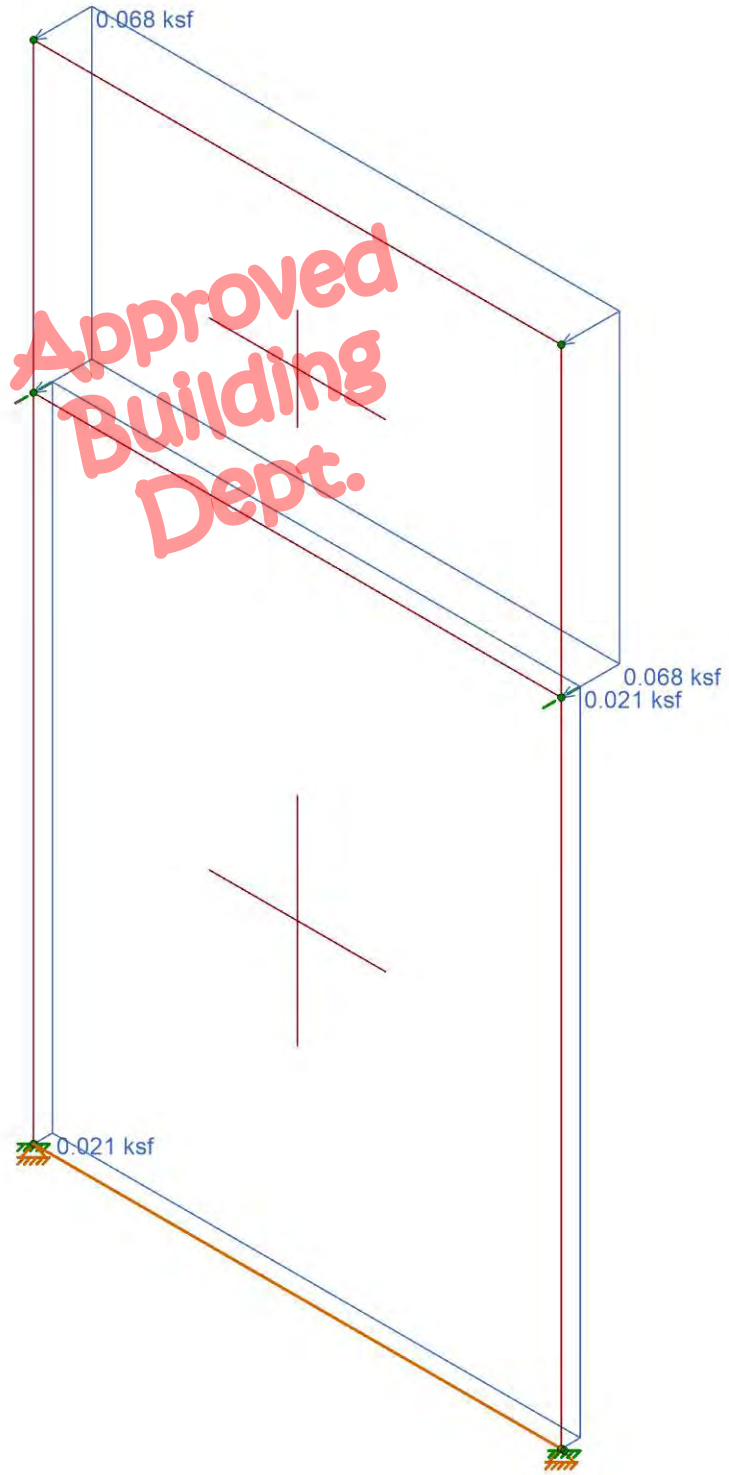
SK-1
May 17, 2023
CMU Wall 2.r3d



Loads: BLC 4, EQ_Z
Envelope Only Solution

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song

SK-2
May 17, 2023
CMU Wall 2.r3d



Loads: BLC 5, WIND
Envelope Only Solution

<Licensed Company>
song

SK-3
May 17, 2023
CMU Wall 2.r3d



Company : <Licensed Company>
 Designer : song
 Job Number :
 Model Name :

5/17/2023
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 Checked By : _____

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N28	8.75	50	0	
2	N32	22.08	50	0	
3	N46	22	50	0	
4	N44	8.75	66.33	0	
5	N45	22	66.33	0	
6	N30	8.75	74	0	
7	N31	22	74	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N45			Reaction			
2	N44			Reaction			
3	N28	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N32	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Masonry Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [$1e^{-5}F^{-1}$]	Self Weight [k/ft ³]	f _m [ksi]	Flex Steel [ksi]	Shear Steel [ksi]
1	Concrete Matl	1350	540	0.25	0.6	Custom	1.5	60	60
2	Clay Matl	1050	420	0.25	0.6	Custom	1.5	60	60
3	Gen Masonry	1800	540	0.25	0.6	0.123	2	60	60

Wall Panel Data

	Label	A Node	B Node	C Node	D Node	Material Type	Material Set	Thickness [in]	Design Rule	Panel/Spacing
1	WP18	N28	N44	N45	N46	Masonry	Gen Masonry	8	Typical	32
2	WP11	N30	N44	N45	N31	Masonry	Gen Masonry	8	Typical	24

Wall Panel Advanced Data

	Label	Seismic Rule	Design Method	SSAF	Cm In-Plane	Cm Out-Plane	Stud Bracing	Sheathing Connect	Dist [in]
1	WP18	Masonry Shear Wall	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	WP11	Masonry Shear Wall	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Masonry Wall Panel Parameters

	Label	Block Nom Width	Block Grouting	Reinforced	Wall Area Method
1	Typical	8"	Fully Grouted	Yes	NCMA

Masonry Wall Panel In-Plane Parameters

	Label	Vert Bar Size	Bars Per Cell	Min Bound Zone Width [in]	Max Bound Zone Width [in]	Horz Bar Size	Transfer Load
1	Typical	#5	2	8	40	#4	

Masonry Wall Panel Out-of-Plane Parameters

	Label	Bar Size	Bar Space Min	Bar Space Max	Bar Placement	Cover [in]	Mortar Type	Cement Type	Transfer Load
1	Typical	#5	8"	72"	Each Face	Min	Type M or S	Portland, Lime/Mortar	



Company : <Licensed Company>
 Designer : song
 Job Number :
 Model Name :

5/17/2023
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Masonry Wall Panel Lintel Parameters

Label	Depth [in]	Bear Length [in]	Bar Size	Min # Bars	Per Layer	Max # Bars	Per Layer	Num of Layers	c/c Sp of Layers [in]	Dist To Bot [in]	Stirrup Size	Analysis Method
1 Typical	16	8	#5	1		3		1	N/A	3.5	#4	Simply Supported

Wall Panel U.C. Parameters

Label	Max Bending Chk	Max Shear Chk
1 Typical	1	1

Masonry Wall Seismic Design Rule

Label	Wall Types	Special Boundary Elements	1.5x Shear ASD
1 Masonry Shear Wall	Special	Yes	Yes

Envelope Node Reactions

Node Label	X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1 N45 max	0	43	0	43	3.255	19	0	43	0	43	0	43
2 min	0	1	0	1	-3.255	16	0	1	0	1	0	1
3 N44 max	0	43	0	43	3.282	19	0	43	0	43	0	43
4 min	0	1	0	1	-3.282	16	0	1	0	1	0	1
5 N28 max	1.152	34	4.673	34	0.27	43	0.767	43	0.138	41	0	43
6 min	-0.252	40	-0.864	40	-0.27	41	-0.767	41	-0.138	43	0	1
7 N32 max	0	43	0	43	0	43	0	43	0	43	0	43
8 min	0	1	0	1	0	1	0	1	0	1	0	1
9 WP18 max	2.232	42	27.342	32	0.779	43	0	43	1.312	41	53.863	32
10 min	-3.131	32	0	2	-0.779	41	0	1	-1.312	43	-28.625	42
11 Totals: max	3.014	42	28.041	32	6.912	31						
12 min	-3.014	32	0	2	-6.912	28						

Envelope Node Reactions - Overstrength or Capacity Limit

Node Label	X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1 N45 max	0	49*	0	49*	0	49*	0	49*	0	49*	0	49*
2 min	0	44*	0	44*	0	44*	0	44*	0	44*	0	44*
3 N44 max	0	49*	0	49*	0	49*	0	49*	0	49*	0	49*
4 min	0	44*	0	44*	0	44*	0	44*	0	44*	0	44*
5 N28 max	0.634	45*	2.686	45*	0	49*	0	49*	0	49*	0	49*
6 min	0.265	48*	1.123	48*	0	44*	0	44*	0	44*	0	44*
7 N32 max	0	49*	0	49*	0	49*	0	49*	0	49*	0	49*
8 min	0	44*	0	44*	0	44*	0	44*	0	44*	0	44*
9 WP18 max	-0.265	49*	25.355	45*	0	49*	0	49*	0	49*	17.794	45*
10 min	-0.634	44*	10.602	48*	0	44*	0	44*	0	44*	7.44	48*
11 Totals: max	0	49*	28.041	45*	0	49*						
12 min	0	44*	11.725	48*	0	44*						

Envelope Node Displacements

Node Label	X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1 N28 max	0	40	0	40	0	41	0	41	0	43	0	43
2 min	0	34	0	34	0	43	0	43	0	41	0	1
3 N32 max	0	43	0	43	0	43	0	43	0	43	0	43
4 min	0	1	0	1	0	1	0	1	0	1	0	1
5 N46 max	0	32	0	42	0	41	4.884e-4	41	1.696e-6	17	0	43
6 min	0	42	0	32	0	43	-4.884e-4	43	-1.696e-6	18	0	1



Company : <Licensed Company>
 Designer : scong
 Job Number :
 Model Name :

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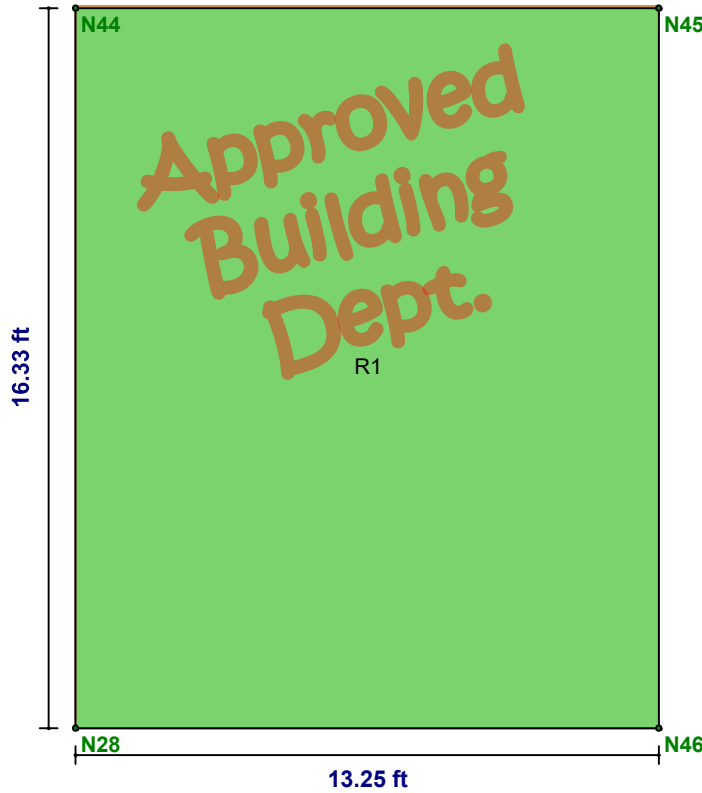
Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
7	N44	max	0.005	40	0.001	40	0	17	1.958e-3	17	2.012e-3	19	0	43
8		min	-0.005	34	-0.005	34	0	18	-1.958e-3	18	-2.012e-3	16	0	1
9	N45	max	0.005	32	0.001	42	0	17	1.983e-3	17	2.007e-3	17	0	43
10		min	-0.005	42	-0.005	32	0	18	-1.983e-3	18	-2.007e-3	18	0	1
11	N30	max	0.008	40	0	40	0.304	17	3.582e-3	17	8.577e-4	19	0	43
12		min	-0.008	34	-0.006	34	-0.304	18	-3.582e-3	18	-8.577e-4	16	0	1
13	N31	max	0.008	32	0	42	0.305	17	3.587e-3	17	8.465e-4	17	0	43
14		min	-0.008	42	-0.006	32	-0.305	18	-3.587e-3	18	-8.465e-4	18	0	1

APPROVED
 Building
 Dept.

Detail Report: WP18

Masonry Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	TMS 402-16: ASD	Total Height (ft):	16.33	Material Type:	Masonry
Special Insp:	Yes	Total Length (ft):	13.25	Material Set:	Gen Masonry
Design Rule:	Typical	Total Lintel Depth (in):	16	Masonry f'm (ksi):	2
Seismic Design Rule:	Masonry Shear Wall	Block Nom Width:	8"	Masonry Em (ksi):	1800
Wall Area:	NCMA	Block Grouting:	Fully Grouted	Steel fy (ksi):	60
Transfer In?:	No	1.5 Shear Factor:	No	Steel E (ksi):	29000
Transfer Out?:	No			Material Name:	Gen Masonry
K:	1			Material Density:	0.12 k/ft ³
Use Cracked?:	Yes			Mortar Type:	Type M or S
In lcr Factor:	0.5			Cement Type:	Portland, Lime/ Mortar
Out lcr Factor:	0.5				
Custom Regions:	No				

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC
R1	0.078	32	0.102	40	0.76	16	0.039	16

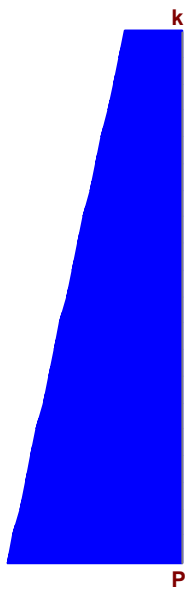
REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Boundary Reinforcement
R1	#5@32" oc e.f.	#4@39 oc	2-#5 ctr

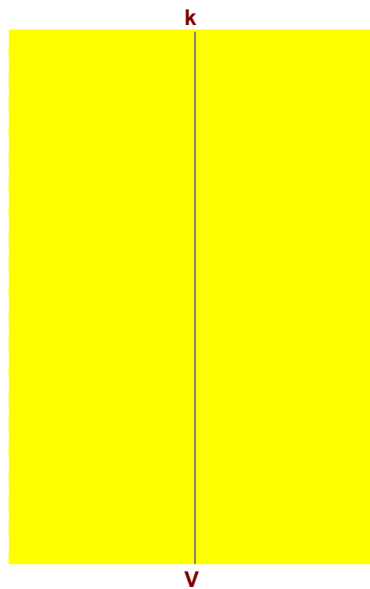
Detail Report: WP18 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	TMS 402-16: ASD	Total Height (ft):	16.33	Masonry f'm (ksi):	2
Special Insp:	Yes	Total Length (ft):	13.25	Masonry Em (ksi):	1800
Wall Area:	NCMA	Block Grouting:	Fully Grouted	Steel fy (ksi):	60
Hor Bar Size:	#4	Grout/Bar Spacing:	32"	Steel E (ksi):	29000
Vert Bar Size:	#5	Block Nom Width:	8"	Matl Name:	Gen Masonry
No of Ten Bars:	2	1.5 Shear Factor:	Yes	Matl Density:	0.12 k/ft^3
Effective Depth (in):	159			Wall Dead Wt (ksf):	0.078

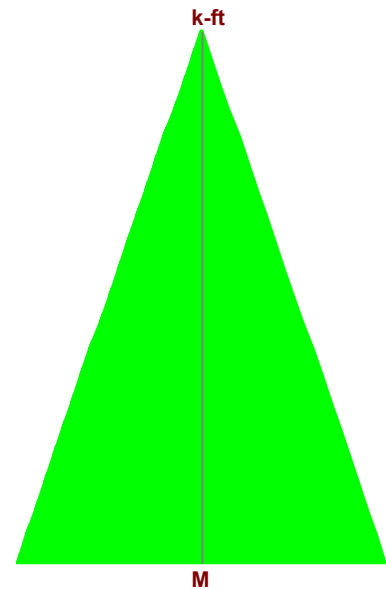
ENVELOPE DIAGRAMS



Min: 8.961 at 16.33 ft
 Max: 28.041 at 0 ft



Min: -3.015 at 8.165 ft
 Max: 3.015 at 8.165 ft



Min: -49.232 at 0 ft
 Max: 49.232 at 0 ft

DESIGN DETAILS AT GOVERNING SECTION

AXIAL DETAILS

fa/Fa:	0.078	Axial (k):	28.041	Rad gyration r (in):	2.2
fa (ksi):	0.023	Location (ft):	0	h'/r:	89.073
Fa (ksi):	0.298	Load Comb:	32	Red Factor R:	0.595

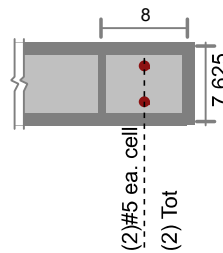
BENDING DETAILS

(fa + fb)/Fb:	0.046	Moment (k-ft):	49.232	k*d (in):	19.05
fb (ksi):	0.018	Location (ft):	0	j:	1
Fb (ksi):	0.9	Load Comb:	32		
fs/Fs:	0	Sect Mod S (in ³):	3.213e+04		
fs (ksi):	0	Tension St Asv (in ²):	0.6136		
Fs (ksi):	32	Per of steel p:	0.0005061		

SHEAR DETAILS

fv/Fv:	0.102	Shear (k):	3.015	Shear St Area (in ²):	0.196
fv (ksi):	0.004	Location (ft):	16.33	Shear Spacing (in):	39
Fv (ksi):	0.036	Load Comb:	40	Peri of Bars (in):	3.927
Fvm (ksi):	0.026	Corresponding M (k-ft):	49.232	Gammag:	1
Fvs (ksi):	0.011	Corresponding P (k):	3.747		
Fv max (ksi):	0.089	M / (V*d):	1		

CROSS SECTION DETAILING

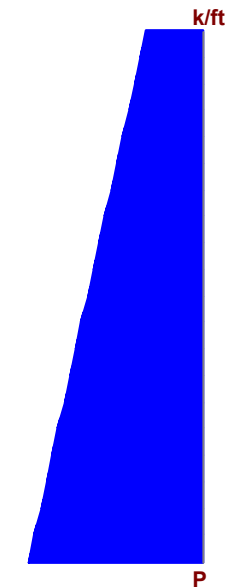


Horizontal reinforcement required at a max 39in oc
 NOTE: All units are in "in."

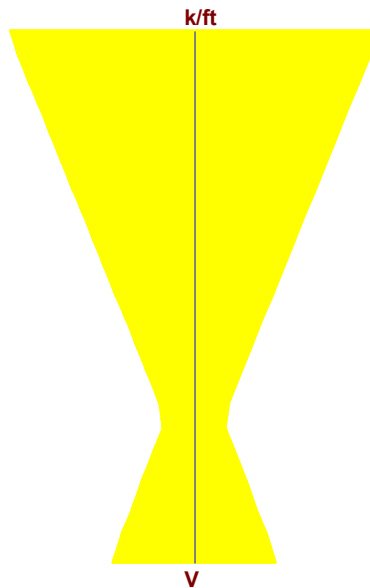
Detail Report: WP18 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	TMS 402-16: ASD	Total Height (ft):	16.33	Masonry f'm (ksi):	2
Special Insp:	Yes	Eq Sld Thickness:	7.625"	Masonry Em (ksi):	1800
Wall Area:	NCMA	An (in ² /ft):	91.5	Steel fy (ksi):	60
Type of Design:	ASD	Block Grouting:	Fully Grouted	Steel E (ksi):	29000
Reinforced:	Yes	Grout/Bar Spacing:	32"	Matl Name:	Gen Masonry
Vertical Bar Size:	#5	Loc of r/f:	Each Face	Matl Density:	0.12 k/ft ³
				Wall Dead Wt (ksf):	0.078
				Mortar Type:	Type M or S
				Cement Type:	Portland, Lime/ Mortar

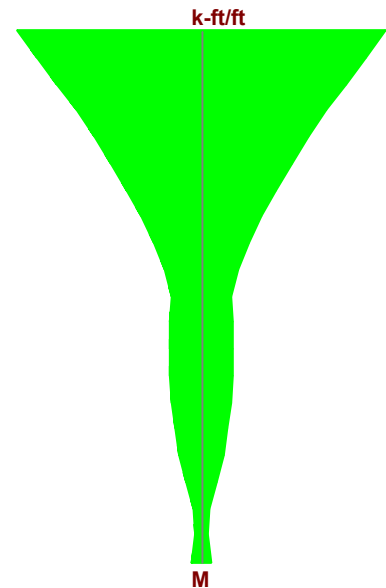
ENVELOPE DIAGRAMS



Min: 0.676 at 16.33 ft
 Max: 2.116 at 0 ft



Min: -0.18 at 16.33 ft
 Max: 0.18 at 16.33 ft



Min: -1.207 at 16.33 ft
 Max: 1.207 at 16.33 ft

DESIGN DETAILS

AXIAL DETAILS					
fa/Fa:	0.078	Max Axial (k/ft):	2.116	Rad gyration r (in):	2.2
fa (ksi):	0.023	Location (ft):	0	h'/r:	89.073
Fa (ksi):	0.298	Load Comb:	32		

BENDING DETAILS

(fa + fb) / Fb:	0.452	M (k-ft/ft):	1.207	k:	0.21
fb (ksi):	0.4	Location (ft):	16.33	d (in):	5.562
Fb (ksi):	0.9	Load Comb:	16	j:	0.93
fs/Fs:	0.76				
fs (ksi):	24.331				
Fs (ksi):	32				

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SHEAR DETAILS

fv/Fv (ksi):	0.039	V (k/ft):	0.18	Corresponding M (k-ft/ft):	1.207
fv (ksi):	0.002	Location (ft):	16.33	Corresponding P (k/ft):	0.599
Fv (ksi):	0.05	Load Comb:	16	M / (V*d):	1
Fv max (ksi):	0.089	Width for Shear (in):	32	Gammag:	1

CROSS SECTION DETAILING



NOTE: All units are in "in."

SEISMIC DETAILING REQUIREMENTS (SPECIAL SHEAR WALL - ASD)

AT OPENINGS:

Min. Vert. Bar at Wall Openings (Section 7.3.2.3.1):	1-#4 within 16 in each side of openings	N/A
Min. Hori. Bar at Wall Openings (Section 7.3.2.3.1):	1-#4 at top and bottom of openings	N/A

AT WALL EDGE:

Min. Vert. Bar at Wall Edge (Section 7.3.2.3.1):	1-#4 within 8 in of wall ends	PASS
--	-------------------------------	-------------

AT TOP OF WALL:

Min. Hori. Bar at Top of Wall (Section 7.3.2.3.1):	1-#4 within 16 in of top of wall	PASS
--	----------------------------------	-------------

HORIZONTAL REINFORCEMENT:

Min. Hori. Bar Size (Section 7.3.2.3.1): #4 (0.196 sq. in) **PASS**

Max Hori. Bar Spacing (Section 7.3.2.3.1): 48 in **PASS**

Max Spacing = $\min(1/3L, 1/3H, 48") = 48$ in

*Masonry assumed to be laid in running bond.

*Horizontal bars shall be embedded in grout.

Min. Hori. Reinf. Area (Section 7.3.2.6c): **PASS**

Ahor $\geq 0.0007A_g(\text{horz})$

Ahor = 1.178 in²

0.0007A_g(horz) = 1.046 in²

*Masonry assumed to be laid in running bond.

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VERTICAL REINFORCEMENT:

Min. Vert. Bar Size (Section 7.3.2.3.1): #4 (0.196 sq. in) **PASS**

Max Vert. Bar Spacing (Section 7.3.2.5): 48 in **PASS**

Max spacing = $\min(1/3L, 1/3H, 48") = 48$ in

*Masonry assumed to be laid in running bond

Min. Vert. Reinf. Area (Section 7.3.2.6c): **PASS**

Aver \geq larger of (0.0007A_g(vert), 1/3Ahor)

Aver = 1.534 in²

0.0007A_g(vert) = 0.849 in²

1/3Ahor = 0.393 in²

Total Reinf. Area (Section 7.3.2.6.c): **PASS**

Ahor + Aver $\geq 0.002A_g(\text{vert})$

Ahor + Aver = 2.712 in²

0.002A_g(vert) = 2.425 in²

MAX. FLEXURAL RHO CHECK: **N/A**

ρ max required (Section 8.3.4.4)? **No**

M/Vd = 1.232 > 1.0

P = 28.041 k

0.05*f_m*A_n = 121.238 k

P < 0.05*f_m*A_n



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 25 of 106
5/17/2023
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SEISMIC SHEAR STRESS INCREASE FOR SPECIAL MASONRY WALLS ONLY:

Seismic Shear Stress Increase - ASD (Section 7.3.2.6.1.2): 1.5fv

PASS

1.5 shear stress increase factor included. Refer to the Detail Report - Shear Design sections for details.

Included

MORTAR CHECK:

Mortar Check (Section 7.4.4.2.2):

Mortar Type M or S cement lime or mortar cement

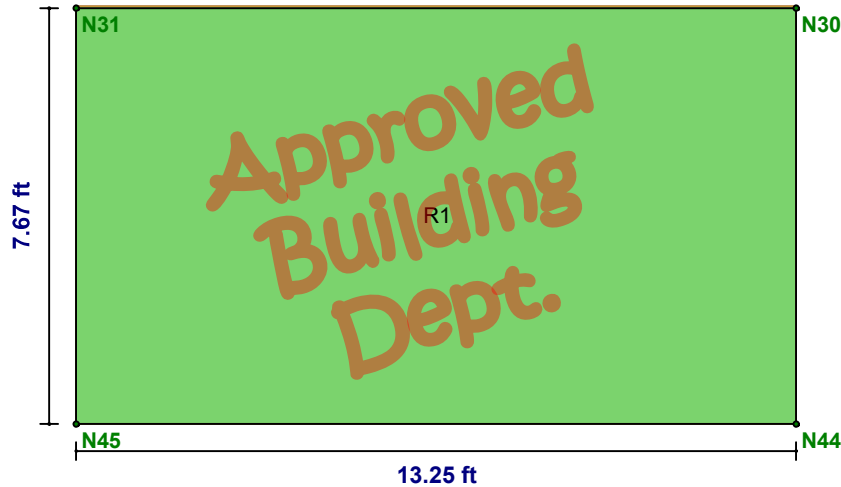
PASS

***No checks are provided for seismic detailing requirements at roof and floor diaphragms, at wall corners, for dowels or through control joints. Additional requirements may apply for seismic design categories D, E and F. Refer to TMS 402 Chapter 7 for additional requirements.**

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Detail Report: WP11

Masonry Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	TMS 402-16: ASD	Total Height (ft):	7.67	Material Type:	Masonry
Special Insp:	Yes	Total Length (ft):	13.25	Material Set:	Gen Masonry
Design Rule:	Typical	Total Lintel Depth (in):	16	Masonry f'm (ksi):	2
Seismic Design Rule:	Masonry Shear Wall	Block Nom Width:	8"	Masonry Em (ksi):	1800
Wall Area:	NCMA	Block Grouting:	Fully Grouted	Steel fy (ksi):	60
Transfer In?:	No	1.5 Shear Factor:	No	Steel E (ksi):	29000
Transfer Out?:	No			Material Name:	Gen Masonry
K:	1			Material Density:	0.12 k/ft ³
Use Cracked?:	Yes			Mortar Type:	Type M or S
In lcr Factor:	0.5			Cement Type:	Portland, Lime/ Mortar
Out lcr Factor:	0.5				
Custom Regions:	No				

REGION RESULTS

Region	UC Max In Plane		UC Shear In Plane		UC Max Out Plane		UC Shear Out Plane	
	LC	LC	LC	LC	LC	LC	LC	
R1	0.016	32	0	1	0.576	16	0.068	16

REINFORCEMENT RESULTS

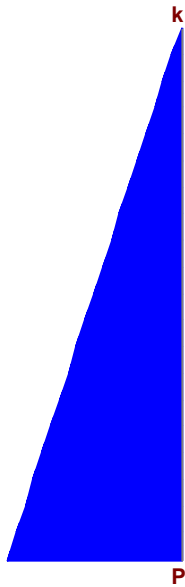
Region	Vertical Reinforcement	Horizontal Reinforcement	Boundary Reinforcement
R1	#5@24" oc e.f.	#4@31 oc	2-#5 ctr

Detail Report: WP11 (In-Plane, Region R1)

CRITERIA	GEOMETRY		MATERIALS		
Code:	TMS 402-16: ASD	Total Height (ft):	7.67	Masonry f'm (ksi):	2
Special Insp:	Yes	Total Length (ft):	13.25	Masonry Em (ksi):	1800
Wall Area:	NCMA	Block Grouting:	Fully Grouted	Steel fy (ksi):	60
Hor Bar Size:	#4	Grout/Bar Spacing:	24"	Steel E (ksi):	29000
Vert Bar Size:	#5	Block Nom Width:	8"	Matl Name:	Gen Masonry
No of Ten Bars:	2	1.5 Shear Factor:	Yes	Matl Density:	0.12 k/ft ³
Effective Depth (in):	159			Wall Dead Wt (ksf):	0.078

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ENVELOPE DIAGRAMS



Min: 0 at 7.67 ft
 Max: 8.961 at 0 ft



DESIGN DETAILS AT GOVERNING SECTION

AXIAL DETAILS			
fa/Fa:	0.016	Axial (k):	8.961
fa (ksi):	0.007	Location (ft):	0
Fa (ksi):	0.455	Load Comb:	33
		Rad gyration r (in):	2.2
		h'/r:	41.836
		Red Factor R:	0.911

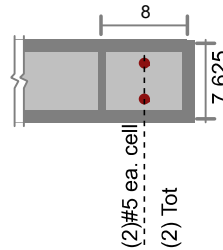
BENDING DETAILS

(fa + fb)/Fb:	0.008	Moment (k-ft):	0.0008584	k*d (in):	19.05
fb (ksi):	3.206e-7	Location (ft):	0	j:	1
Fb (ksi):	0.9	Load Comb:	32		
fs/Fs:	0	Sect Mod S (in ³):	3.213e+04		
fs (ksi):	0	Tension St Asv (in ²):	0.6136		
Fs (ksi):	32	Per of steel p:	0.0005061		

SHEAR DETAILS

fv/Fv:	0	Shear (k):	0	Shear St Area (in ²):	0.196
fv (ksi):	0	Location (ft):	0	Shear Spacing (in):	30.68
Fv (ksi):	0.048	Load Comb:	1	Peri of Bars (in):	3.927
Fvm (ksi):	0.035	Corresponding M (k-ft):	0.0008584	Gammag:	1
Fvs (ksi):	0.013	Corresponding P (k):	7.943		
Fv max (ksi):	0.115	M / (V*d):	0.579		

CROSS SECTION DETAILING



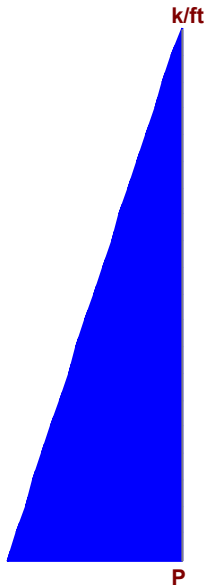
Horizontal reinforcement required at a max 30in oc
 NOTE: All units are in "in."

Detail Report: WP11 (Out-of-Plane, Region R1)

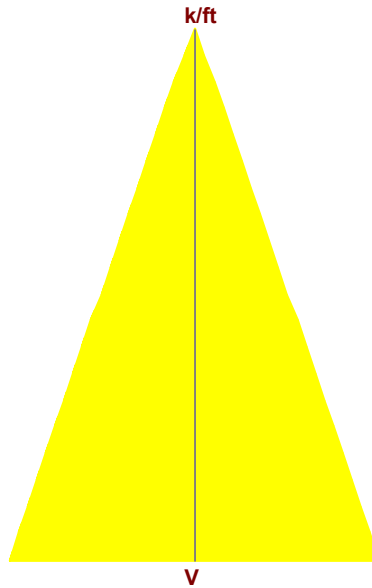
CRITERIA	GEOMETRY	MATERIALS
Code: TMS 402-16: ASD	Total Height (ft): 7.67	Masonry f'm (ksi): 2
Special Insp: Yes	Eq Sld Thickness: 7.625"	Masonry Em (ksi): 1800
Wall Area: NCMA	An (in²/ft): 91.5	Steel fy (ksi): 60
Type of Design: ASD	Block Grouting: Fully Grouted	Steel E (ksi): 29000
Reinforced: Yes	Grout/Bar Spacing: 24"	Matl Name: Gen Masonry
Vertical Bar Size: #5	Loc of r/f: Each Face	Matl Density: 0.12 k/ft ³
		Wall Dead Wt (ksf): 0.078
		Mortar Type: Type M or S
		Cement Type: Portland, Lime/Mortar

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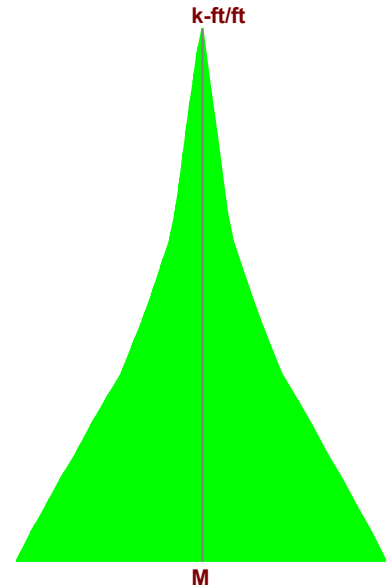
ENVELOPE DIAGRAMS



Min: 0 at 7.67 ft
 Max: 0.676 at 0 ft



Min: -0.314 at 5 ft
 Max: 0.314 at 0 ft



Min: -1.207 at 0 ft
 Max: 1.207 at 0 ft

DESIGN DETAILS

AXIAL DETAILS		
fa/Fa: 0.016	Max Axial (k/ft): 0.676	Rad gyration r (in): 2.2
fa (ksi): 0.007	Location (ft): 0	h'/r: 41.836
Fa (ksi): 0.455	Load Comb: 32	

BENDING DETAILS

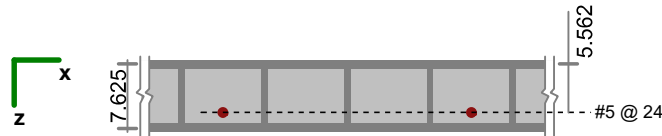
(fa + fb) / Fb:	0.403	M (k-ft/ft):	1.207	k:	0.238
fb (ksi):	0.357	Location (ft):	0	d (in):	5.562
Fb (ksi):	0.9	Load Comb:	16	j:	0.921
fs/Fs:	0.576				
fs (ksi):	18.433				
Fs (ksi):	32				

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SHEAR DETAILS

fv/Fv (ksi):	0.068	V (k/ft):	0.314	Corresponding M (k-ft/ft):	1.207
fv (ksi):	0.003	Location (ft):	0	Corresponding P (k/ft):	0.599
Fv (ksi):	0.05	Load Comb:	16	M / (V*d):	1
Fv max (ksi):	0.089	Width for Shear (in):	24	Gammag:	1

CROSS SECTION DETAILING



NOTE: All units are in "in."

SEISMIC DETAILING REQUIREMENTS (SPECIAL SHEAR WALL - ASD)

AT OPENINGS:

Min. Vert. Bar at Wall Openings (Section 7.3.2.3.1):	1-#4 within 16 in each side of openings	N/A
Min. Hori. Bar at Wall Openings (Section 7.3.2.3.1):	1-#4 at top and bottom of openings	N/A

AT WALL EDGE:

Min. Vert. Bar at Wall Edge (Section 7.3.2.3.1):	1-#4 within 8 in of wall ends	PASS
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AT TOP OF WALL:

Min. Hori. Bar at Top of Wall (Section 7.3.2.3.1):	1-#4 within 16 in of top of wall	PASS
--	----------------------------------	-------------

HORIZONTAL REINFORCEMENT:

Min. Hori. Bar Size (Section 7.3.2.3.1): #4 (0.196 sq. in) **PASS**

Max Hori. Bar Spacing (Section 7.3.2.3.1): 30.68 in **PASS**

Max Spacing = $\min(1/3L, 1/3H, 48") = 30.68$ in

*Masonry assumed to be laid in running bond.

*Horizontal bars shall be embedded in grout.

Min. Hori. Reinf. Area (Section 7.3.2.6c): **PASS**

Ahor $\geq 0.0007A_g(\text{horz})$

Ahor = 0.785 in^2

$0.0007A_g(\text{horz}) = 0.491 \text{ in}^2$

*Masonry assumed to be laid in running bond.

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VERTICAL REINFORCEMENT:

Min. Vert. Bar Size (Section 7.3.2.3.1): #4 (0.196 sq. in) **PASS**

Max Vert. Bar Spacing (Section 7.3.2.5): 30.68 in **PASS**

Max spacing = $\min(1/3L, 1/3H, 48") = 30.68$ in

*Masonry assumed to be laid in running bond

Min. Vert. Reinf. Area (Section 7.3.2.6c): **PASS**

Aver \geq larger of ($0.0007A_g(\text{vert}), 1/3A_{hor}$)

Aver = 2.148 in^2

$0.0007A_g(\text{vert}) = 0.849 \text{ in}^2$

$1/3A_{hor} = 0.262 \text{ in}^2$

Total Reinf. Area (Section 7.3.2.6.c): **PASS**

Ahor + Aver $\geq 0.002A_g(\text{vert})$

Ahor + Aver = 2.933 in^2

$0.002A_g(\text{vert}) = 2.425 \text{ in}^2$

MAX. FLEXURAL RHO CHECK: **N/A**

ρ max required (Section 8.3.4.4)? **No**

$M/Vd = 0.579 < 1.0$

$P = 8.961 \text{ k}$

$0.05 \cdot f'_m \cdot A_n = 121.238 \text{ k}$

$P < 0.05 \cdot f'_m \cdot A_n$



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Designer : scong
Job Number :
Model Name :

Page 32 of 106
5/17/2023
11:24:24 AM
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SEISMIC SHEAR STRESS INCREASE FOR SPECIAL MASONRY WALLS ONLY:

Seismic Shear Stress Increase - ASD (Section 7.3.2.6.1.2): 1.5fv

PASS

1.5 shear stress increase factor included. Refer to the Detail Report - Shear Design sections for details.

Included

MORTAR CHECK:

Mortar Check (Section 7.4.4.2.2):

Mortar Type M or S cement lime or mortar cement

PASS

***No checks are provided for seismic detailing requirements at roof and floor diaphragms, at wall corners, for dowels or through control joints. Additional requirements may apply for seismic design categories D, E and F. Refer to TMS 402 Chapter 7 for additional requirements.**

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SEE PAGE 4 FOR ECONOMICAL TRUSS DESIGN

Span	Depth													
	14"		16"		18"		20"		22"		24"		26"	
	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL
	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL
14'	292	341	329	383	376	400	380	412	340	390	309	360	299	356
	208	370	254	395	323	412	367	429		422		385		386
16'	265	306	306	340	341	361	342	366	335	369	338	351	305	350
	143	311	190	361	232	370	270	376	318	380		375		380
18'	215	250	200	286	232	319	309	328	301	332	315	334	301	332
	110	271	145	306	180	329	215	333	250	340	278	336		339
20'	184	208	171	245	184	275	203	295	227	297	283	299	291	297
	84	229	109	260	139	292	167	298	197	303	226	305	255	310
22'	158	177	142	204	160	233	177	260	200	272	220	271	270	275
	66	192	84	217	110	252	134	269	155	271	184	276	196	280
24'	133	150	133	174	143	199	157	223	173	239	185	247	202	249
	52	164	68	189	88	215	106	241	126	251	146	252	167	254
26'	106	131	113	152	129	173	136	189	151	213	166	225	176	230
	43	137	55	160	70	188	86	210	103	222	123	231	140	236
28'	86	111	109	129	118	148	125	163	136	181	151	199	163	212
	34	111	45	142	57	158	69	181	86	200	102	214	117	213
30'		91	93	114	108	128	121	145	127	158	140	173	150	192
		91	37	121	47	140	58	155	69	175	81	192	93	202
32'		76	76	100	95	113	107	125	118	142	127	155	136	169
		76	31	102	39	124	48	140	58	155	68	170	78	184
34'		63		85	83	101	99	114	105	126	120	138	127	151
		64		85	33	110	41	124	49	136	58	150	67	164
36'		55		73		87	86	98	97	108	107	117	114	129
		55		73		94	35	102	42	117	50	128	58	140
38'		47		62		78	75	86	85	97	92	105	97	116
		47		62		80	30	91	36	104	43	115	50	126
40'		40		53		69		79	79	87	81	96	94	103
		41		53		69		86	31	94	37	100	43	114
42'		35		46		60		72		78	79	87	85	95
		35		47		60		73		82	32	92	38	103
44'		31		40		50		65		70		80	77	82
		31		39		52		66		74		85	33	94
46'				36		45		58		66		73		79
				36		45		58		69		79		86
48'				32		40		52		61		67		73
				32		41		52		62		68		79
50'						36		45		54		62		65
						36		45		56		62		73
52'						32		40		49		57		61
						33		39		50		59		63
54'								35		43		52		55
								36		43		53		62
56'								32		40		48		54
								33		40		47		56
58'										36		43		48
										36		42		49
60'												33		46
												39		44

- See page 5 for available depths and profiles. For depths and profiles not shown, contact your RedBuilt technical representative for assistance.
- Red numbers refer to 115% Total Load (TL).

General Notes

- Values shown demonstrate maximum allowable load capacities based on the following assumptions:
 - Simple span, uniformly loaded conditions, with provisions for positive drainage (¼:12 slope, minimum) in roof applications.
 - Span indicates distance from inside face to inside face of bearing.
 - Top chord no-notch bearing clips with 1¾" bearing. Higher values may be possible with other types of bearing clips.

- Straight line interpolations may be made between depths and spans.
- Values in shaded areas may be increased 7% for repetitive-member use.
- Bold italic values are controlled by minimum concentrated load analysis of 2,000 lbs. Higher loads are possible where minimum concentrated load analysis is not required by code. Contact your RedBuilt technical representative for assistance.

General Notes continued on page 7

Trusses delivered to the jobsite are custom manufactured to resist only project specific application loads provided by the design professional. Actual trusses may not be able to resist the maximum loads shown in the tables above. For questions regarding actual truss capacity contact your RedBuilt technical representative.

RED-L™ TRUSS ALLOWABLE UNIFORM LOAD TABLE (PLF) / PARALLEL CHORD Page 34 of 106

Continued from page 6

SEE PAGE 4 FOR ECONOMICAL TRUSS DESIGN

Load Tables

Span	Depth													
	28"		30"		32"		34"		36"		38"		40"	
	100% TL 100% LL	115% TL 125% TL	100% TL 100% LL	115% TL 125% TL	100% TL 100% LL	115% TL 125% TL	100% TL 100% LL	115% TL 125% TL	100% TL 100% LL	115% TL 125% TL	100% TL 100% LL	115% TL 125% TL	100% TL 100% LL	115% TL 125% TL
14'	295	353	294	324	290	308	277	309	262	300	264	304	243	280
16'	303	347	266	306	264	288	265	305	255	271	256	273	240	275
18'	263	341	266	317	261	279	261	287	237	271	239	250	231	263
20'	270	303	285	298	239	287	242	281	221	259	219	264	221	250
22'	259	279	257	279	241	266	233	259	228	258	224	253	223	236
24'	219	255	252	255	242	259	237	258	227	259	218	246	213	246
26'	195	231	205	233	233	238	227	237	221	238	232	228	212	230
28'	175	216	214	215	216	220	216	218	218	222	198	222	210	215
30'	159	201	167	204	200	205	194	208	204	208	201	208	204	205
32'	149	184	158	191	170	191	181	191	190	195	192	192	189	191
34'	138	162	147	174	157	181	165	189	169	182	179	179	180	179
36'	123	138	132	146	140	160	151	166	161	170	169	170	170	166
38'	113	116	115	134	127	144	136	152	144	161	152	161	159	157
40'	102	110	110	122	117	130	125	139	129	147	140	153	148	151
42'	92	102	99	108	107	114	114	125	121	129	128	141	133	142
44'	78	92	91	96	96	107	103	114	109	121	116	129	121	131
46'	77	84	82	92	89	98	95	105	101	112	105	118	112	120
48'	70	79	73	85	82	91	87	97	91	102	98	108	103	113
50'	72	79	69	78	71	83	80	89	85	94	90	100	95	105
52'	66	73	72	77	70	77	74	82	79	87	83	92	88	97
54'	62	68	65	65	67	67	69	76	73	81	77	86	82	90
56'	57	65	62	68	69	69	72	78	68	78	72	81	76	86
58'	55	58	57	62	62	68	68	75	73	77	67	77	71	82
60'	52	50	55	61	60	65	64	70	68	74	71	78	66	75

J-3

- See page 5 for available depths and profiles. For depths and profiles not shown, contact your RedBuilt technical representative for assistance.
- Red numbers refer to 115% Total Load (TL).

General Notes continued from page 6

To size floor trusses:

Check both total load (100% TL) and live load (100% LL). When live load is not shown, total load will control. Total load values limit deflection to L/240. Live load values are based on the **Commercial Floor Deflection Limit** shown on page 35, and assume a nailed floor system. Live load (100% LL) values may be increased with a glue-nailed floor system; contact your RedBuilt technical representative for assistance.

To size roof trusses:

Check the appropriate snow load area (115% TL) or non-snow load area (125% TL) value to determine the maximum allowable total load. Total load (115% TL and 125% TL) values limit truss deflection to L/180.

Consult local codes to verify deflection limits required for specific applications.

Trusses delivered to the jobsite are custom manufactured to resist only project specific application loads provided by the design professional. Actual trusses may not be able to resist the maximum loads shown in the tables above. For questions regarding actual truss capacity contact your RedBuilt technical representative.

Wall and Strap Ties for Open-Web Trusses

Listed below is a small sample of the various nail-based straps and ties offered by Simpson Strong-Tie® Company Inc. Please consult their catalog or the USP Structural Connectors® catalog for additional options.

Strap Tension Tie Nailing and Allowable Tension Loads

Design Category	Maximum Ledger Size	Model No.	Non-Cracked Concrete			Cracked Concrete			CMU Wall		
			Nail Qty.	Nail Size	Tension (lbs)	Nail Qty.	Nail Size	Tension (lbs)	Nail Qty.	Nail Size	Tension (lbs)
Wind and SDC A-B	4x	PAI18 ⁽¹⁾	9	10d x 1½"	1,820	9	10d x 1½"	1,820	9	10d x 1½"	1,055
		PAI23 ⁽¹⁾	14	10d x 1½"	2,835	14	10d x 1½"	2,360	14	10d x 1½"	1,805
		PAI28 ⁽¹⁾	16	10d x 1½"	3,370	16	10d x 1½"	2,360	16	10d x 1½"	2,705
		PAI35 ⁽¹⁾	18	10d x 1½"	3,370	18	10d x 1½"	2,360	18	10d x 1½"	2,815
		MPAI32	16	10d x 1½"	2,335	-	-	-	16	10d x 1½"	2,355
		MPAI44	24	10d x 1½"	2,865	-	-	-	24	10d x 1½"	2,865
SDC C-F	4x	PAI18 ⁽¹⁾	9	10d x 1½"	1,820	9	10d x 1½"	1,820	9	10d x 1½"	1,055
		PAI23 ⁽¹⁾	14	10d x 1½"	2,830	14	10d x 1½"	1,980	14	10d x 1½"	1,805
		PAI28 ⁽¹⁾	20	10d x 1½"	2,830	16	10d x 1½"	1,980	16	10d x 1½"	2,705
		PAI35 ⁽¹⁾	20	10d x 1½"	2,830	18	10d x 1½"	1,980	18	10d x 1½"	2,815
		MPAI32	-	-	-	-	-	-	16	10d x 1½"	2,355
		MPAI44	-	-	-	-	-	-	24	10d x 1½"	2,865

(1) LSL cap plate required for strap nailing.

- Table information adapted from Simpson Strong-Tie® catalog *Wood Construction Connectors 2017-2018*, page 89.
- For applicable notes and additional information, see the Simpson Strong-Tie catalog.

Strap Ties

Simpson Tie	Required Nails	Nail Size	Allowable Load (lbs) at 160%
MST37 ⁽¹⁾⁽²⁾	42	16d x 2½"	5,080
MST48 ⁽¹⁾⁽²⁾	50	16d x 2½"	5,310
MSTI48 ⁽¹⁾	48	10d x 1½"	5,065
MSTI60 ⁽¹⁾	60	10d x 1½"	5,080
MSTI72 ⁽¹⁾	72	10d x 1½"	5,080
LSTI49	32	10d x 1½"	2,975
LSTI73	48	10d x 1½"	4,205
LSTA36 ⁽¹⁾	24	10d x 3"	1,640
MSTA36 ⁽¹⁾	26	10d x 3"	2,050

(1) LSL cap plate required for strap nailing.

(2) Not suitable for Red-S™ trusses.

- Values consider full strap nailing.
- Table information adapted from Simpson Strong-Tie® catalog *Wood Construction Connectors 2017-2018*, pages 301-304.

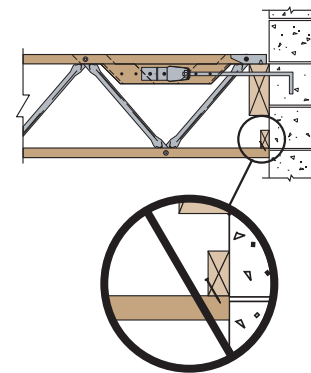
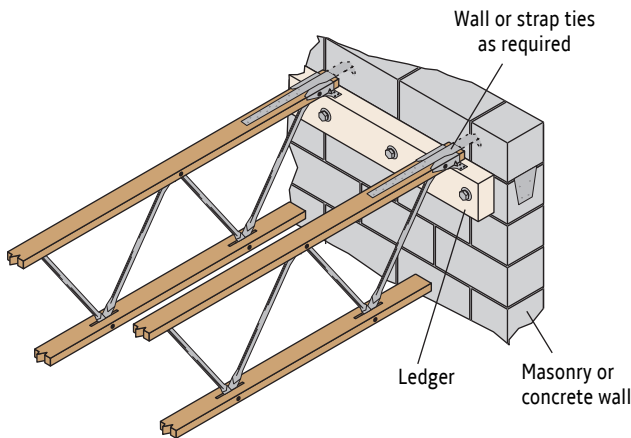
Bolted Wall Ties

Simpson Tie	Required Fasteners	Allowable Tension Load (lbs) at 160%		
		10d x 1½" Nails	16d x 2½" Nails	SD #10 x 1½" Screws
LTT19	8	1,310		
LTT20B ⁽¹⁾	10	1,355		
LTTI31	18	1,350		
HTT4 ⁽¹⁾	18	3,610	4,235	4,455
HTT5 ⁽¹⁾	26	4,350	5,090	4,555
HTT5KT ⁽¹⁾	26			5,445
HTT5-¾ ⁽¹⁾	26	4,065	5,090	4,830

(1) LSL cap plate required for strap nailing.

- Information adapted from Simpson Strong-Tie® catalog *Wood Construction Connectors 2017-2018*, pages 80-81.
- For applicable notes and additional information, see the Simpson Strong-Tie catalog.

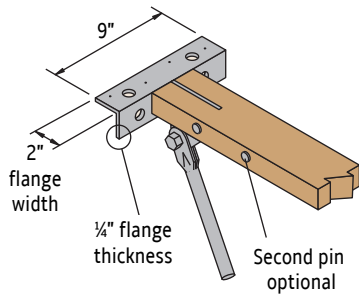
58 Wall and Strap Ties for Red-L™, Red-W™, Red-S™, Red-M™ and Red-H™ Trusses



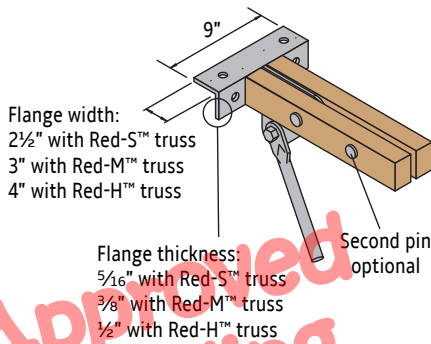
DO NOT attach bottom chord to wall when using any top chord bearing truss

Also see detail 6 on page 13 for more information.

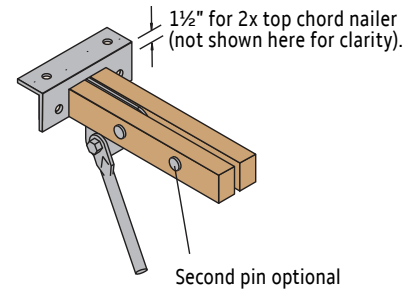
62 Single Chord Flush-Mount Bearing Clip



63 Double Chord Flush-Mount Bearing Clip



64 Double Chord Flush-Mount Bearing Clip with Nailer



Axial Tension or Compression Capacity

Truss Series	Capacity at 133% or 160% (lbs)	
	1 Pin	2 Pin
Red-L™	2,705	4,450
Red-W™	3,700	6,115
Red-S™(1)	4,320	8,125
Red-M™(1)	5,115	10,235
Red-H™(1)	6,325	12,220

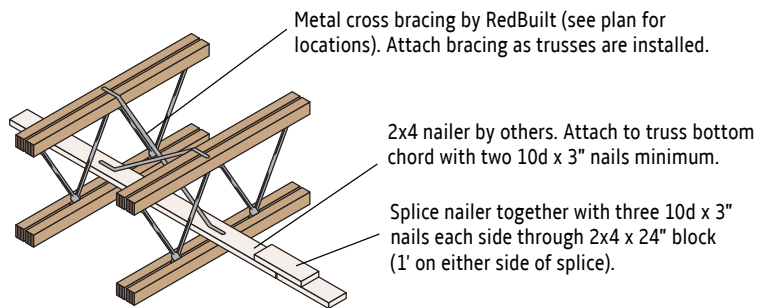
(1) With or without top chord nailer.

- Design professional of record shall provide attachment for clip to bearing.

WIND BRACING

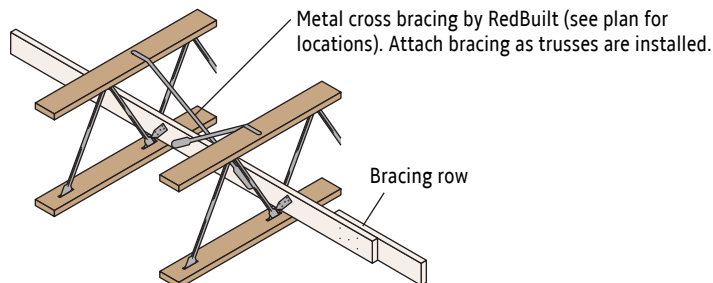
Truss bottom chord bracing may be required by building code provisions for wind uplift design when roof trusses do not have directly applied ceilings. Project engineer shall specify wind load; contact your RedBuilt representative for specific wind bracing stability requirements.

60 Cross Bracing with 2x4 Nailer



For wind bracing on Red-S™, Red-M™ and Red-H™ trusses. Cross bracing may not actually cross.

61 Cross Bracing with Bridging Row



For wind bracing on Red-L™ and Red-W™ trusses. Cross bracing may not actually cross.



Hilti PROFIS Engineering 3.0.83

LEDGER ANCHORAGE TO CMU WALL

www.hilti.com

Company: BWE, Inc
 Address: 9449 Balboa Ave, Suite 270
 Phone | Fax: 6192995550 |
 Design: Masonry - Feb 28, 2023 (1)
 Fastening point:

Page: 1
 Specifier: S.C.
 E-Mail: scong@bwesd.com
 Date: 2/28/2023

Specifier's comments:

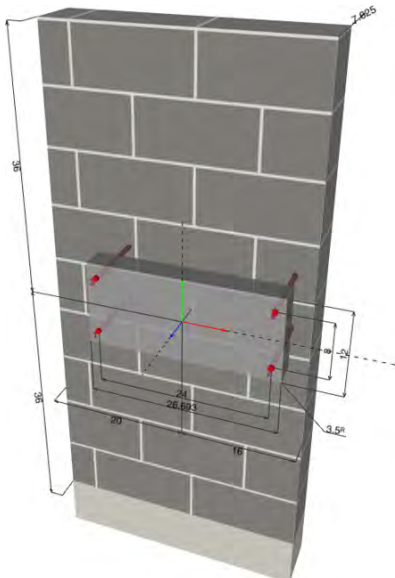
1 Input data

Anchor type and diameter:	HY 100 + threaded rod 5.8 3/4
Item number:	385434 HAS 5.8 3/4"x12" (element) / 2078494 HIT-HY 100 (adhesive)
Effective embedment depth:	$h_{ef} = 6.750$ in.
Material:	5.8
Evaluation Service Report:	ER-547
Issued Valid:	5/16/2022 5/31/2023
Proof:	Design Method ASD Masonry
Stand-off installation:	$e_b = 0.000$ in. (no stand-off); $t = 3.500$ in.
Anchor plate ^R :	$l_x \times l_y \times t = 26.693$ in. x 12.000 in. x 3.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	Grout-filled CMU, L x W x H: 16.000 in. x 8.000 in. x 8.000 in.;
	Joints: vertical: 0.375 in.; horizontal: 0.375 in.
	Base material temperature: 68 °F
Installation:	Face installation
Seismic loads	yes



^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.]





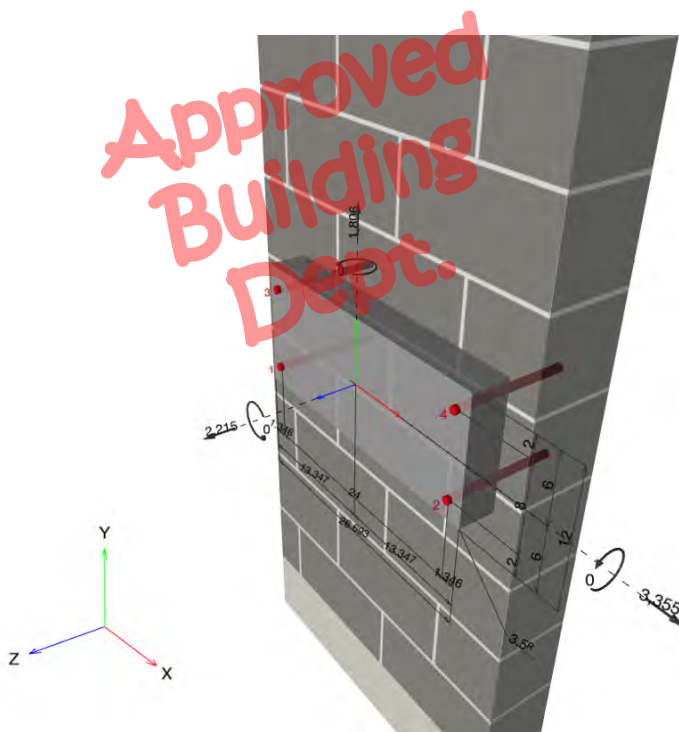
Hilti PROFIS Engineering 3.0.83

www.hilti.com

Company: BWE, Inc
 Address: 9449 Balboa Ave, Suite 270
 Phone | Fax: 6192995550 |
 Design: Masonry - Feb 28, 2023 (1)
 Fastening point:

Page: 2
 Specifier: S.C.
 E-Mail: scong@bwesd.com
 Date: 2/28/2023

Geometry [in.] & Loading [lb, in.lb]



1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 2,215; V _x = 3,355; V _y = 1,806; M _x = 0; M _y = 0; M _z = 0;	yes	94

Input data and results must be checked for conformity with the existing conditions and for plausibility!
 PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan



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Company:	BWE, Inc	Page:	3
Address:	9449 Balboa Ave, Suite 270	Specifier:	S.C.
Phone Fax:	6192995550	E-Mail:	scong@bwesd.com
Design:	Masonry - Feb 28, 2023 (1)	Date:	2/28/2023
Fastening point:			

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization β_N / β_V [%]	Status
		Load	Capacity		
Tension	Bond strength	554	1,586	35 / -	OK
Shear	Bond strength	-	-	- / 59	OK

Loading	β_N	β_V	α	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.349	0.381	1.000	94	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!



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Company:	BWE, Inc	Page:	4
Address:	9449 Balboa Ave, Suite 270	Specifier:	S.C.
Phone Fax:	6192995550	E-Mail:	scong@bwesd.com
Design:	Masonry - Feb 28, 2023 (1)	Date:	2/28/2023
Fastening point:			

4 Remarks; Your Cooperation Duties

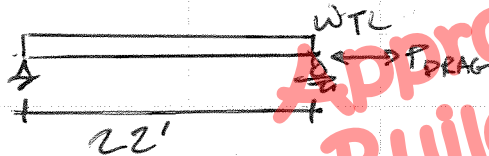
- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
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DATE 2/22/2023**BWE**
ENGINEERED TO EXCEED EXPECTATIONS

SHEET _____

ENGR SC

JOB NO _____

PROJECT TULARE MORGUEBEAMS

$$P_{DRAG} = 0.183 \left[24(22)(10/2) + 24(12/2)(15/2) + 19(4+12/2)(22) \right]$$

$$W_{DL} = 19(12/2 + 4) = 190 \text{ PLF} = 1,446 \text{ LBS}$$

$$W_{LL} = 20(12/2 + 4) = 200 \text{ PLF} \quad \Omega P_{DRAG} = \frac{2.5(1,446)}{1000 \text{ LBS}} = 3.6 \text{ KIPS}$$

$$W_{TL} = 390 \text{ PLF}$$

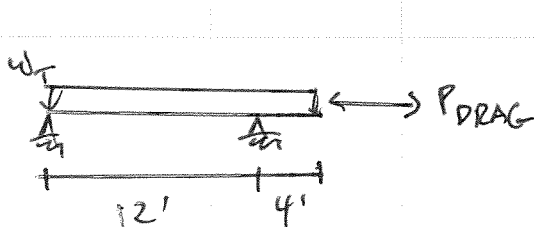
CHECK WIND:

$$G_{CP} = (-1.4, 1.0)$$

$$P = q_n [G_{CP} + G_{Cpi}] = 13.46(-1.4 + -0.18) = 21.3 \text{ PSF}$$

$$W_{WL} = 21.3(10/2) = 106 \text{ PLF}$$

PER RISA 3D, USE $3\frac{1}{2} \times 16$ LVL B-2



$$P_{DRAG} = 0.183 \left[19(185) + 24(11)(10/2) + 24(12)(15/2) \right]$$

$$= 1,280 \text{ LBS}$$

$$W_{DL} = 19(2) = 38 \text{ PLF}$$

$$W_{LL} = 20(2) = 40 \text{ PLF}$$

$$\Omega P_{DRAG} = \frac{2.5(1,280)}{1000} = 3.2 \text{ KIPS}$$

$$W_{WL} = 21.3(15/2) = 160 \text{ PLF}$$

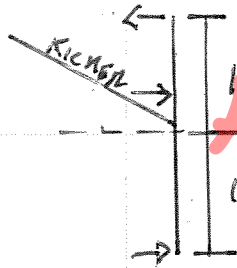
PER RISA 3D, USE 4×10 DF#1 B-1

DATE 2/22/2023**BWE**
ENGINEERED TO EXCEED EXPECTATIONS

SHEET _____

ENGR SC

JOB NO _____

PROJECT TULARE MORQUEHEADER

$$W_{WALL} = 21.3 \left(\frac{5'}{2} \right) = 53.3 \text{ PLF}$$

$$W_{HEADER} = 107 \text{ PLF}$$

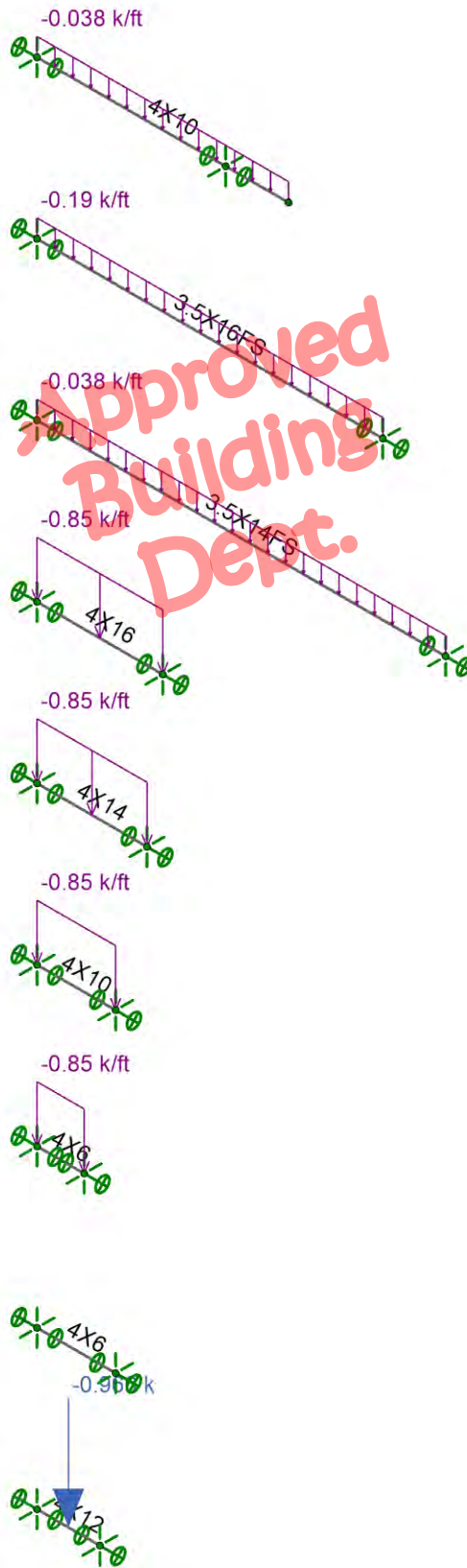
$$W_{SILL} = 21.3 (10.5/2) = 111.8 \text{ PLF}$$

$$P_{ROOF} = -46.5 \text{ PSF OR } 6.6 \text{ PSF } \text{ FIG 30.4-1}$$

$$\text{LOAD CASE A} = 13.46 (1.0) + 46.5 = 60 \text{ PSF}$$

$$\text{LOAD CASE B} = 13.46 (1.4) + 6.6 = 25.5 \text{ PSF}$$

USE 60 PSF FOR PARABETS



Loads: BLC 1, DEAD
Envelope Only Solution

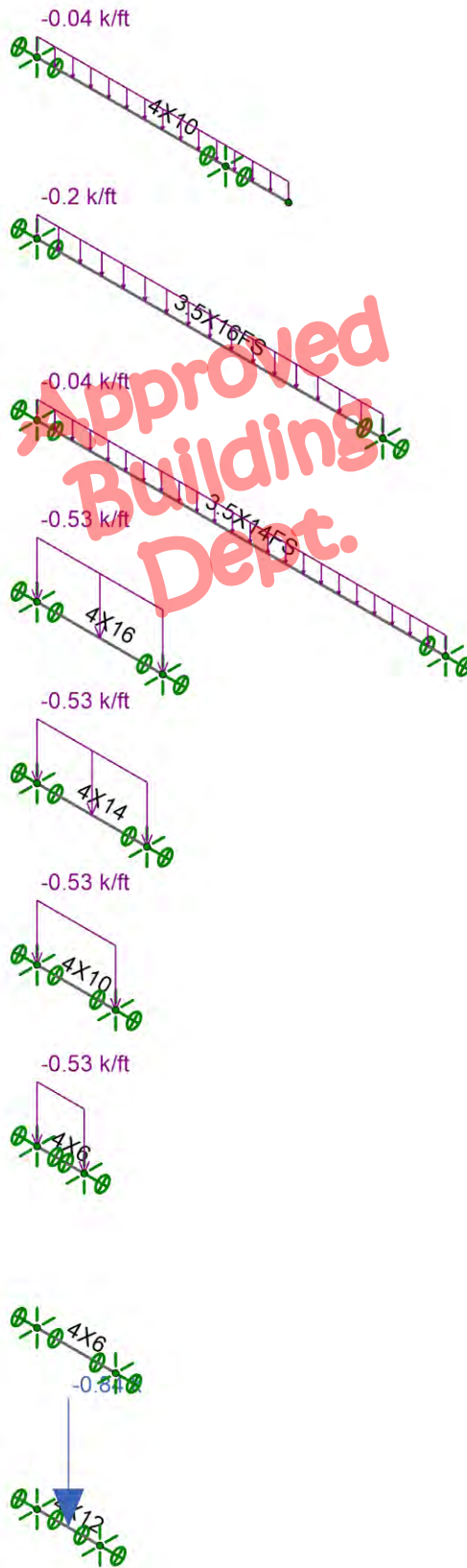
<Licensed Company>

scong

SK-1

May 17, 2023

BEAMS.r3d



Loads: BLC 2, LIVE
Envelope Only Solution

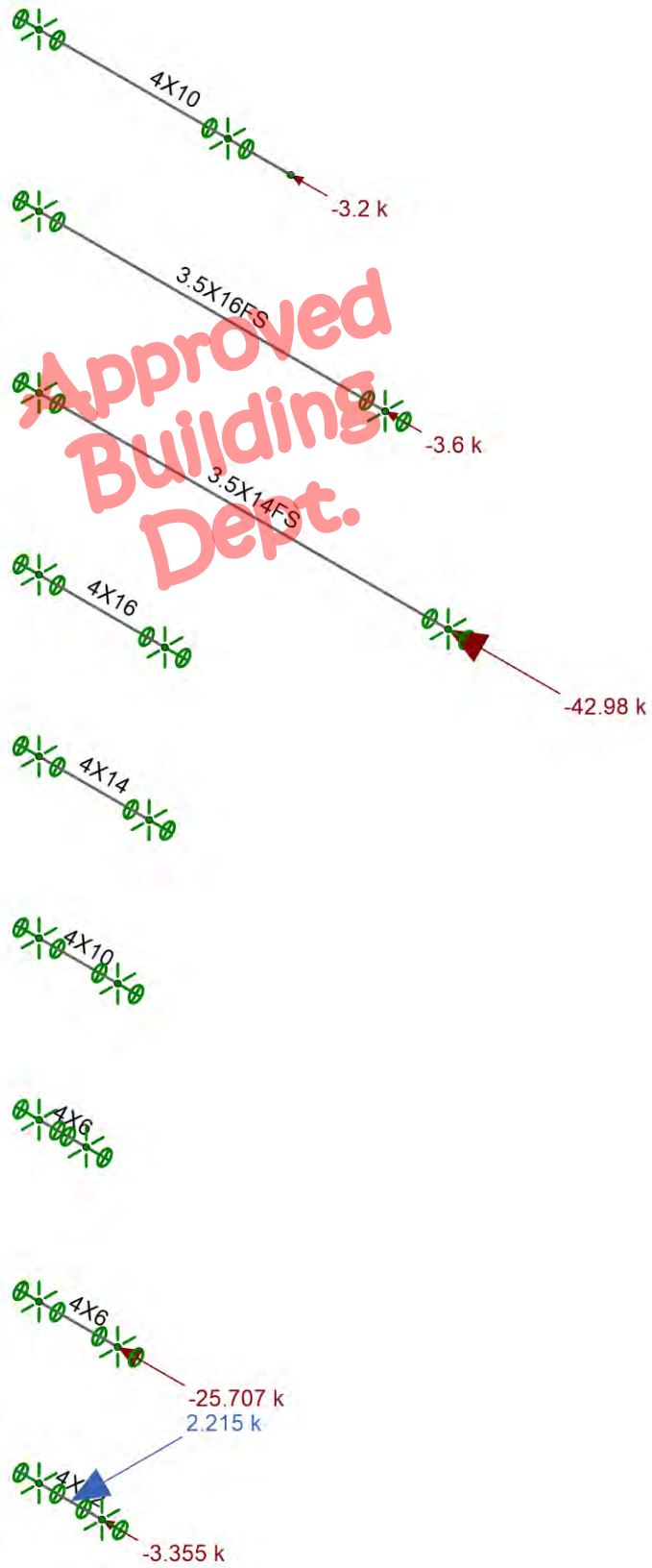
<Licensed Company>

scong

SK-2

May 17, 2023

BEAMS.r3d



Loads: BLC 3, DRAG
Envelope Only Solution

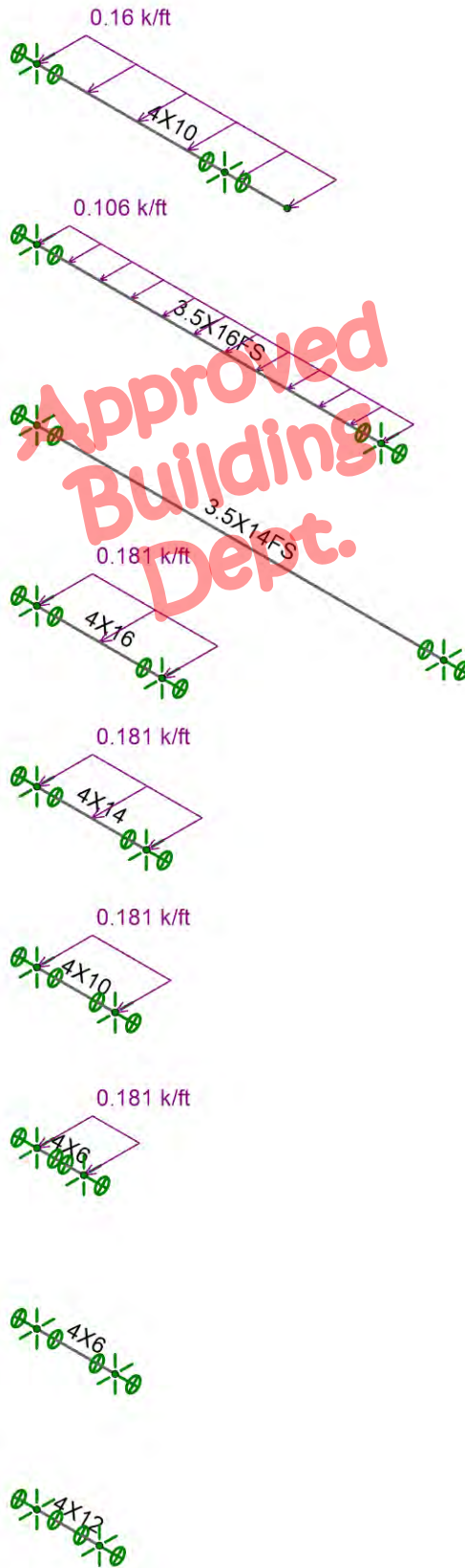
<Licensed Company>

scong

SK-3

May 17, 2023

BEAMS.r3d



Approved
Building
Dept.

Loads: BLC 4, WIND
Envelope Only Solution

<Licensed Company>

scong

SK-4

May 17, 2023

BEAMS.r3d



Company : <Licensed Company>
 Designer : song
 Job Number :
 Model Name :

5/17/2023
 10:35:54 AM
 Checked By : _____

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	22	0	0	
3	N3	0	10	0	
4	N4	16	10	0	
5	N5	12	10	0	
6	N6	0	-10	0	
7	N7	26	-10	0	
8	N8	0	-20	0	
9	N9	8	-20	0	
10	N10	0	-30	0	
11	N11	7	-30	0	
12	N12	0	-40	0	
13	N13	5	-40	0	
14	N14	0	-50	0	
15	N15	3	-50	0	
16	N16	0	-60	0	
17	N17	5	-60	0	
18	N18	0	-70	0	
19	N19	4	-70	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction
2	N2		Reaction	Reaction	Reaction
3	N3	Reaction	Reaction	Reaction	Reaction
4	N5		Reaction	Reaction	Reaction
5	N6	Reaction	Reaction	Reaction	Reaction
6	N7		Reaction	Reaction	Reaction
7	N8	Reaction	Reaction	Reaction	Reaction
8	N9		Reaction	Reaction	Reaction
9	N10	Reaction	Reaction	Reaction	Reaction
10	N11		Reaction	Reaction	Reaction
11	N12	Reaction	Reaction	Reaction	Reaction
12	N13		Reaction	Reaction	Reaction
13	N14	Reaction	Reaction	Reaction	Reaction
14	N15		Reaction	Reaction	Reaction
15	N16	Reaction	Reaction	Reaction	Reaction
16	N17		Reaction	Reaction	Reaction
17	N18	Reaction	Reaction	Reaction	Reaction
18	N19		Reaction	Reaction	Reaction

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e ⁻⁶ F ⁻¹]	Density [k/ft ³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.1			1	0.3	0.3	0.035
2	SP	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.1			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.1			1	0.3	0.3	0.035
5	24F-1.8E DF Balanced	Glulam	NDS Table 5A	24F-1.8E_DF_BAL	na			1	0.3	0.3	0.035
6	24F-1.8E DF Unbalanced	Glulam	NDS Table 5A	24F-1.8E_DF_UNBAL	na			1	0.3	0.3	0.035
7	24F-1.8E SP Balanced	Glulam	NDS Table 5A	24F-1.8E_SP_BAL	na			1	0.3	0.3	0.035
8	24F-1.8E SP Unbalanced	Glulam	NDS Table 5A	24F-1.8E_SP_UNBAL	na			1	0.3	0.3	0.035
9	1.3E-1600F_VERSALAM	SCL	Boise Cascade	1.3E-1600F_VERSALAM	na			1	0.3	0.3	0.035



Company : <Licensed Company>
 Designer : song
 Job Number :
 Model Name :

5/17/2023
 10:35:54 AM
 Checked By : _____

Wood Properties (Continued)

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e°F ⁻¹]	Density [k/ft ³]
10	1.35E LSL SolidStart	SCL	Louisiana Pacific	1.35E LSL SolidStart	na			1	0.3	0.3	0.035
11	1.3E RIGIDLAM LVL	SCL	Roseburg Forest Products	1.3E RIGIDLAM LVL	na			1	0.3	0.3	0.035
12	2.0E DF Parallam PSL	SCL	TrusJoist	2.0E DF Parallam PSL	na			1	0.3	0.3	0.035
13	LVL PRL 1.5E 2250F	Custom	N/A	LVL PRL 1.5E 2250F	na			1	0.3	0.3	0.035
14	LVL Microlam 1.9E 2600F	Custom	N/A	LVL Microlam 1.9E 2600F	na			1	0.3	0.3	0.035
15	PSL Parallam 2.0E 2900F	Custom	N/A	PSL Parallam 2.0E 2900F	na			1	0.3	0.3	0.035
16	LSL TimberStrand 1.55E 2325F	Custom	N/A	LSL TimberStrand 1.55E 2325F	na			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	WOOD1	2X6	Beam	Rectangular Double	DF	Typical	8.25	1.547	20.797	5.125

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K z-z	Cr	y sway	z sway
1	M1	3.5X16FS	22	2	2	Lbyy	2	0.5			
2	M2	4X10	16	2	2	Lbyy	2	0.5			
3	M3	3.5X14FS	26	2	2	Lbyy	2	0.5			
4	M4	4X16	8	2	2	Lbyy	2	0.5			
5	M5	4X14	7	2	2	Lbyy	2	0.5			
6	M6	4X10	5	2	2	Lbyy	2	0.5			
7	M7	4X6	3	2	2	Lbyy	2	0.5			
8	M8	4X6	5	2	2	Lbyy	2	0.5			
9	M9	4X12	4	2	2	Lbyy	2	0.5			

Member Distributed Loads (BLC 1 : DEAD)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.19	-0.19	0	%100
2	M2	Y	-0.038	-0.038	0	%100
3	M3	Y	-0.038	-0.038	0	%100
4	M4	Y	-0.85	-0.85	0	%100
5	M5	Y	-0.85	-0.85	0	%100
6	M6	Y	-0.85	-0.85	0	%100
7	M7	Y	-0.85	-0.85	0	%100

Member Distributed Loads (BLC 2 : LIVE)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.2	-0.2	0	%100
2	M2	Y	-0.04	-0.04	0	%100
3	M3	Y	-0.04	-0.04	0	%100
4	M4	Y	-0.53	-0.53	0	%100
5	M5	Y	-0.53	-0.53	0	%100
6	M6	Y	-0.53	-0.53	0	%100
7	M7	Y	-0.53	-0.53	0	%100

Member Distributed Loads (BLC 4 : WIND)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.106	0.106	0	%100
2	M2	Z	0.16	0.16	0	%100
3	M5	Z	0.181	0.181	0	%100



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 Designer : scong
 Job Number :
 Model Name :

5/17/2023
 10:35:54 AM
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Member Distributed Loads (BLC 4 : WIND) (Continued)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
4	M6	Z	0.181	0.181	0 %100
5	M4	Z	0.181	0.181	0 %100
6	M7	Z	0.181	0.181	0 %100

Member Point Loads (BLC 1 : DEAD)

Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M9	Y	-0.966 %50

Member Point Loads (BLC 2 : LIVE)

Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M9	Y	-0.84 %50

Member Point Loads (BLC 3 : DRAG)

Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M9	Z	2.215 %50

Basic Load Cases

BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	DEAD	DL	-1	1	7
2	LIVE	RLL		1	7
3	DRAG	EL	5	1	
4	WIND	WL			6

Load Combinations

Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1			
2	Deflection 2	Yes	Y	RLL	1			
3	Deflection 3	Yes	Y	DL	1	RLL	1	
4	IBC 16-8	Yes	Y	DL	1			
5	IBC 16-9	Yes	Y	DL	1	RLL	1	
6	IBC 16-10 (a)	Yes	Y	DL	1	RLL	1	
7	IBC 16-11 (a)	Yes	Y	DL	1	RLL	0.75	
8	IBC 16-12 (b) (a)	Yes	Y	DL	1	EL	0.7	
9	IBC 16-12 (b) (b)	Yes	Y	DL	1	EL	-0.7	
10	IBC 16-14 (a)	Yes	Y	DL	1	EL	0.525	RLL 0.75
11	IBC 16-14 (b)	Yes	Y	DL	1	EL	-0.525	RLL 0.75
12	IBC 16-16 (a)	Yes	Y	DL	0.6	EL	0.7	
13	IBC 16-16 (b)	Yes	Y	DL	0.6	EL	-0.7	
14	IBC 16-12 (a) (a)	Yes	Y	DL	1	WL	0.6	
15	IBC 16-13 (a) (a)	Yes	Y	DL	1	WL	0.45	RLL 0.75
16	IBC 16-15 (a)	Yes	Y	DL	0.6	WL	0.6	

Load Combination Design

Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



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 Designer : scong
 Job Number :
 Model Name :

5/17/2023
 10:35:54 AM
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Load Combination Design (Continued)

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
4	IBC 16-8	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-9		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-10 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-12 (b) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (b) (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-14 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-14 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-16 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-16 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-12 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-13 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-15 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	2.52	12	4.44	6	0	13	0	16	0	16	0	16
2		min	-2.52	9	1.344	12	-0.7	14	0	1	0	1	0	1
3	N2	max	0	16	4.44	6	0	13	0	16	0	16	0	16
4		min	0	1	1.344	12	-0.7	14	0	1	0	1	0	1
5	N3	max	2.24	12	0.458	6	0	13	0	16	0	16	0	16
6		min	-2.24	9	0.147	13	-0.512	14	0	1	0	1	0	1
7	N5	max	0	16	0.916	6	0	13	0	16	0	16	0	16
8		min	0	1	0.293	12	-1.024	14	0	1	0	1	0	1
9	N6	max	30.086	12	1.169	6	0	16	0	16	0	16	0	16
10		min	-30.086	9	0.389	12	0	1	0	1	0	1	0	1
11	N7	max	0	16	1.169	6	0	16	0	16	0	16	0	16
12		min	0	1	0.389	12	0	1	0	1	0	1	0	1
13	N8	max	0	16	5.572	6	0	13	0	16	0	16	0	16
14		min	0	1	2.071	12	-0.434	14	0	1	0	1	0	1
15	N9	max	0	16	5.572	6	0	13	0	16	0	16	0	16
16		min	0	1	2.071	12	-0.434	14	0	1	0	1	0	1
17	N10	max	0	16	4.869	6	0	13	0	16	0	16	0	16
18		min	0	1	1.809	12	-0.38	14	0	1	0	1	0	1
19	N11	max	0	16	4.869	6	0	13	0	16	0	16	0	16
20		min	0	1	1.809	12	-0.38	14	0	1	0	1	0	1
21	N12	max	0	16	3.47	6	0	13	0	16	0	16	0	16
22		min	0	1	1.287	12	-0.271	14	0	1	0	1	0	1
23	N13	max	0	16	3.47	6	0	13	0	16	0	16	0	16
24		min	0	1	1.287	12	-0.272	14	0	1	0	1	0	1
25	N14	max	0	16	2.077	6	0	13	0	16	0	16	0	16
26		min	0	1	0.769	12	-0.163	14	0	1	0	1	0	1
27	N15	max	0	16	2.077	6	0	13	0	16	0	16	0	16
28		min	0	1	0.769	12	-0.163	14	0	1	0	1	0	1
29	N16	max	17.995	12	0.012	15	0	16	0	16	0	16	0	16
30		min	-17.995	9	0	2	0	1	0	1	0	1	0	1
31	N17	max	0	16	0.012	15	0	16	0	16	0	16	0	16
32		min	0	1	0	2	0	1	0	1	0	1	0	1
33	N18	max	2.349	12	0.922	6	0.775	13	0	16	0	16	0	16
34		min	-2.349	9	0.301	12	-0.775	8	0	1	0	1	0	1
35	N19	max	0	16	0.922	6	0.775	13	0	16	0	16	0	16
36		min	0	1	0.301	12	-0.775	8	0	1	0	1	0	1
37	Totals:	max	55.189	12	46.435	6	1.55	13						
38		min	-55.189	9	16.395	12	-5.433	14						



Company : <Licensed Company>
 Designer : scong
 Job Number :
 Model Name :

5/17/2023
 10:35:54 AM
 Checked By : _____

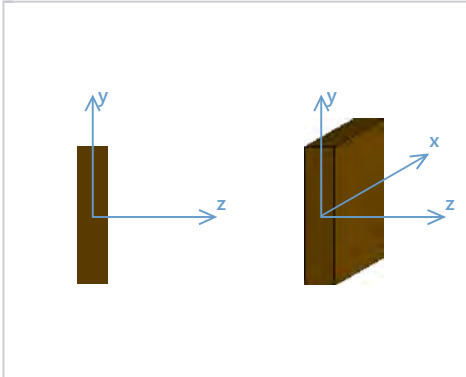
Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	13	0	16	0	16	0	16	0	13	-3.439e-3	16
2		min	0	8	0	3	0	1	0	1	-3.741e-2	14	-1.136e-2	3
3	N2	max	0.006	13	0	16	0	16	0	16	3.741e-2	16	1.136e-2	6
4		min	-0.006	8	0	3	0	1	0	1	0	1	3.439e-3	12
5	N3	max	0	13	0	13	0	16	0	16	0	13	-5.645e-4	13
6		min	0	8	0	3	0	1	0	1	-1.378e-2	14	-1.768e-3	3
7	N4	max	0.008	13	0.048	6	0	13	0	16	7.214e-3	16	9.211e-4	6
8		min	-0.008	8	0.015	13	-0.377	14	0	1	0	1	2.89e-4	13
9	N5	max	0.006	13	0	12	0	16	0	16	9.838e-3	16	1.257e-3	6
10		min	-0.006	8	0	3	0	1	0	1	0	1	3.988e-4	13
11	N6	max	0	13	0	16	0	16	0	16	0	16	-2.077e-3	16
12		min	0	8	0	3	0	1	0	1	0	1	-6.235e-3	3
13	N7	max	0.101	13	0	16	0	16	0	16	0	16	6.235e-3	6
14		min	-0.101	8	0	3	0	1	0	1	0	1	2.077e-3	12
15	N8	max	0	16	0	16	0	16	0	16	0	13	-9.045e-4	16
16		min	0	1	0	3	0	1	0	1	-3.602e-3	14	-2.433e-3	3
17	N9	max	0	16	0	16	0	16	0	16	3.602e-3	16	2.433e-3	6
18		min	0	1	0	3	0	1	0	1	0	1	9.045e-4	12
19	N10	max	0	16	0	16	0	16	0	16	0	13	-9.22e-4	16
20		min	0	1	0	3	0	1	0	1	-2.777e-3	14	-2.482e-3	3
21	N11	max	0	16	0	16	0	16	0	16	2.777e-3	16	2.482e-3	6
22		min	0	1	0	3	0	1	0	1	0	1	9.22e-4	12
23	N12	max	0	16	0	16	0	16	0	16	0	13	-9.837e-4	16
24		min	0	1	0	3	0	1	0	1	-1.45e-3	14	-2.652e-3	3
25	N13	max	0	16	0	16	0	16	0	16	1.45e-3	16	2.652e-3	6
26		min	0	1	0	3	0	1	0	1	0	1	9.837e-4	12
27	N14	max	0	16	0	16	0	16	0	16	0	13	-1.007e-3	16
28		min	0	1	0	3	0	1	0	1	-5.266e-4	14	-2.719e-3	3
29	N15	max	0	16	0	16	0	16	0	16	5.266e-4	16	2.719e-3	6
30		min	0	1	0	3	0	1	0	1	0	1	1.007e-3	12
31	N16	max	0	13	0	2	0	16	0	16	0	16	0	2
32		min	0	8	0	1	0	1	0	1	0	1	-4.254e-5	1
33	N17	max	0.033	13	0	2	0	16	0	16	0	16	4.254e-5	15
34		min	-0.033	8	0	1	0	1	0	1	0	1	0	2
35	N18	max	0	13	0	16	0	12	0	16	3.267e-3	13	-1.213e-4	16
36		min	0	8	0	3	0	9	0	1	-3.267e-3	8	-3.736e-4	3
37	N19	max	0.002	13	0	16	0	12	0	16	3.267e-3	12	3.736e-4	6
38		min	-0.002	8	0	3	0	9	0	1	-3.267e-3	9	1.213e-4	12

Detail Report: M1

Load Combination: Envelope

Code check: 0.757 (LC 5)



Input Data

Shape:	3.5X16FS (nominal)	I Node:	N1
Member Type:	Beam	J Node:	N2
Length (ft):	22	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

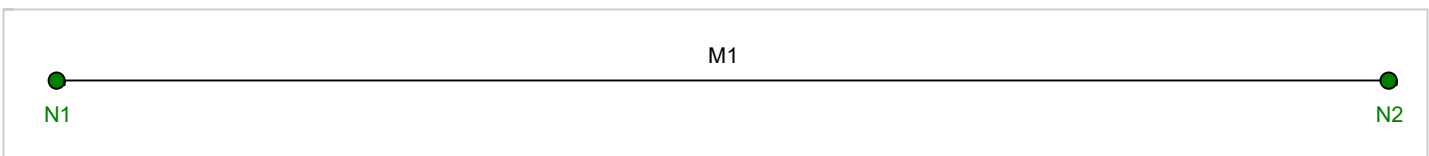
Material:	LVL_Microlam_1.9E_2600F	Grade:	na	Nu:	0.3
Type:	Custom	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	N/A	Ci:	No	Density (k/ft³):	0.035
Species:	LVL_Microlam_1.9E_2600F	Emod:	1		

Shape Properties

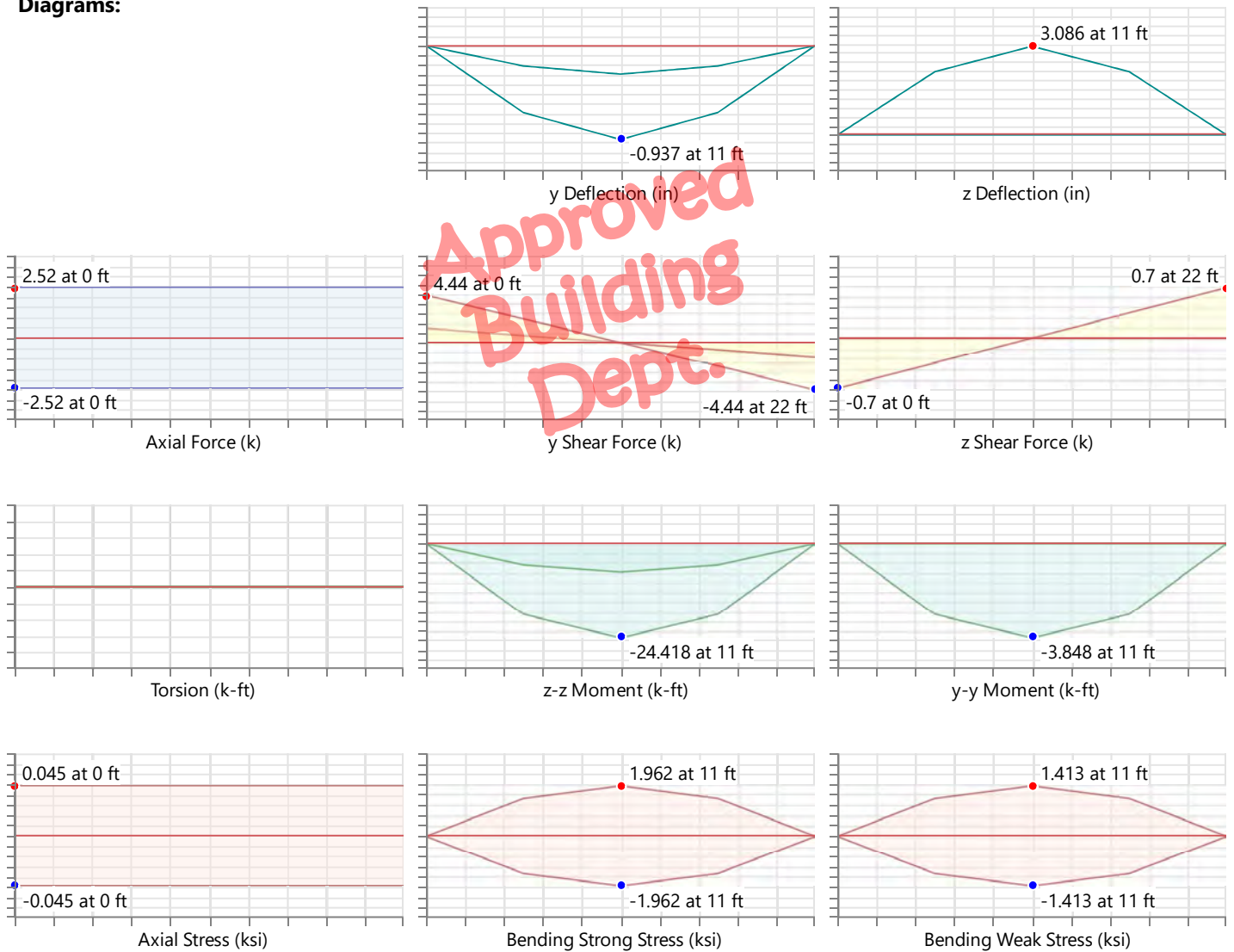
F_b (ksi):	2.6	E (ksi):	1900	b (actual) (in):	3.5
F_t (ksi):	1.555	Emod:	1	d (actual) (in):	16
F_v (ksi):	0.285	COV_E (Table F1):	0.1		
F_c (ksi):	2.51	E_{min} (ksi):	1004.11		

Design Properties

le2 (ft):	2	y sway:	No	C_r:	1
le1 (ft):	2	z sway:	No	C_{fu}:	1
le-bend top:	Lbyy	C_D:	1	C_P:	0.984
le-bend bot (ft):	2	R_B:	5.599	Max Defl Ratio:	L/281
K_{y-y}:	1	C_L:	0.996	Max Defl Location:	11
K_{z-z}:	0.5	C_V:	1	Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.47 ksi	-	-
Axial Tension Analysis	-	0 ksi	1.555 ksi	-	-
Flexural Analysis, Fb1'	-	1.962 ksi	2.591 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	2.6 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.757	PASS
Bending & Axial Tension Analysis	-	-	-	0.757	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 54 of 106
5/17/2023
10:35:57 AM
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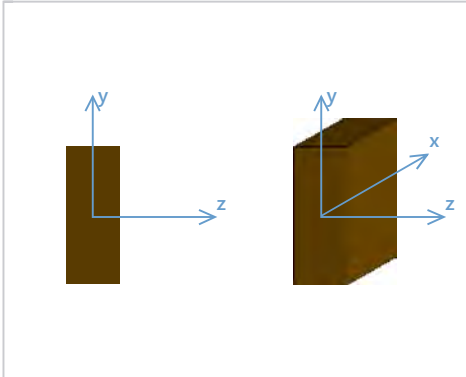
Shear Analysis	-	0.119 ksi	0.285 ksi	0.417	PASS
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Detail Report: M2

Load Combination: Envelope

Code check: 0.493 (LC 14)



Input Data

Shape:	4X10 (nominal)	I Node:	N3
Member Type:	Beam	J Node:	N4
Length (ft):	16	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

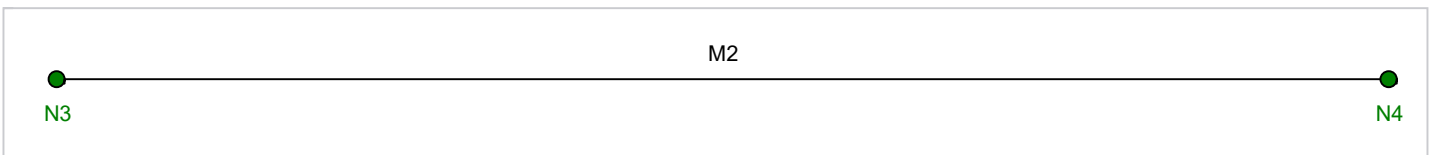
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

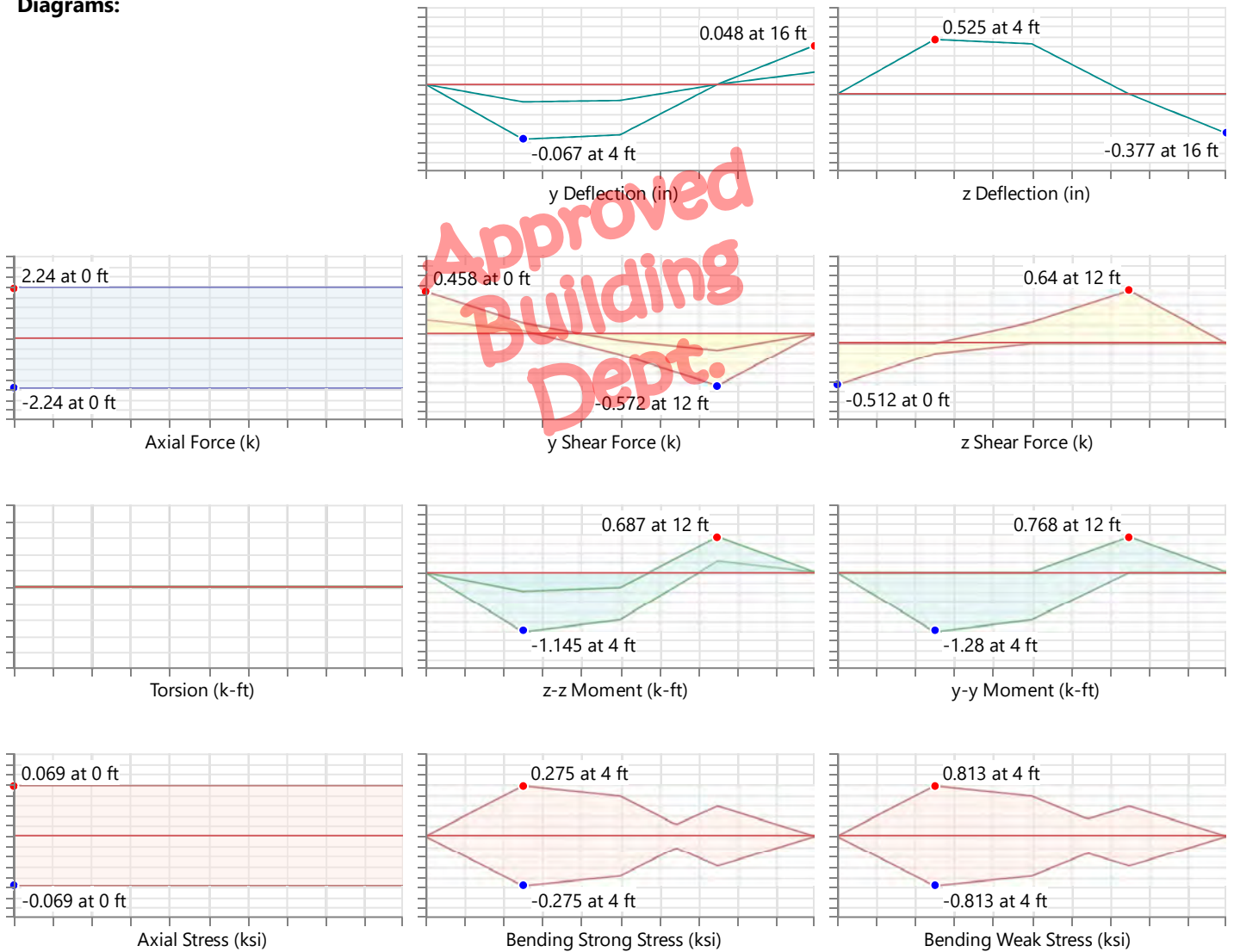
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	9.25
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.95
le-bend top:	Lbyy	C_D:	1.6	Max Defl Ratio:	L/1918
le-bend bot (ft):	2	R_B:	4.257	Max Defl Location:	5.667
K_{y-y}:	1	C_L:	0.998	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	14	-	-	-	-
Applied Loading - Shear + Torsion	15	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.279 ksi	-	-
Axial Tension Analysis	-	0 ksi	1.188 ksi	-	-
Flexural Analysis, Fb1'	-	0.157 ksi	1.915 ksi	-	-
Flexural Analysis, Fb2'	-	0.867 ksi	2.112 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.493	PASS
Bending & Axial Tension Analysis	-	-	-	0.493	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 57 of 106
5/17/2023
10:35:58 AM
Checked By : _____

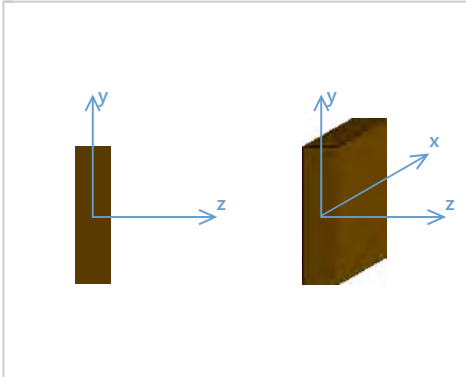
Shear Analysis	-	0.027 ksi	0.18 ksi	0.147	PASS
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**Approved
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Detail Report: M3

Load Combination: Envelope

Code check: 0.355 (LC 11)



Input Data

Shape:	3.5X14FS (nominal)	I Node:	N6
Member Type:	Beam	J Node:	N7
Length (ft):	26	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

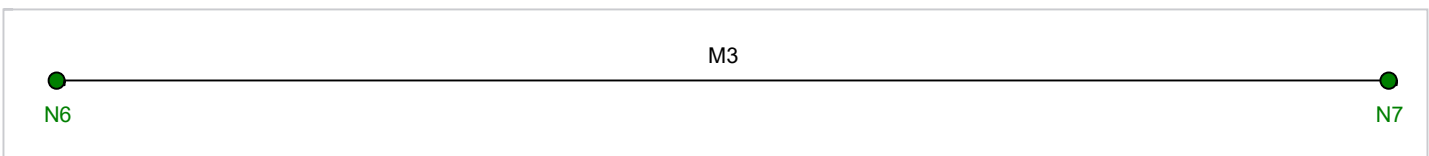
Material:	LVL_Microlam_1.9E_2600F	Grade:	na	Nu:	0.3
Type:	Custom	Cm:	No	Alpha (1e⁵⁰-1):	0.3
Database:	N/A	Ci:	No	Density (k/ft³):	0.035
Species:	LVL_Microlam_1.9E_2600F	Emod:	1		

Shape Properties

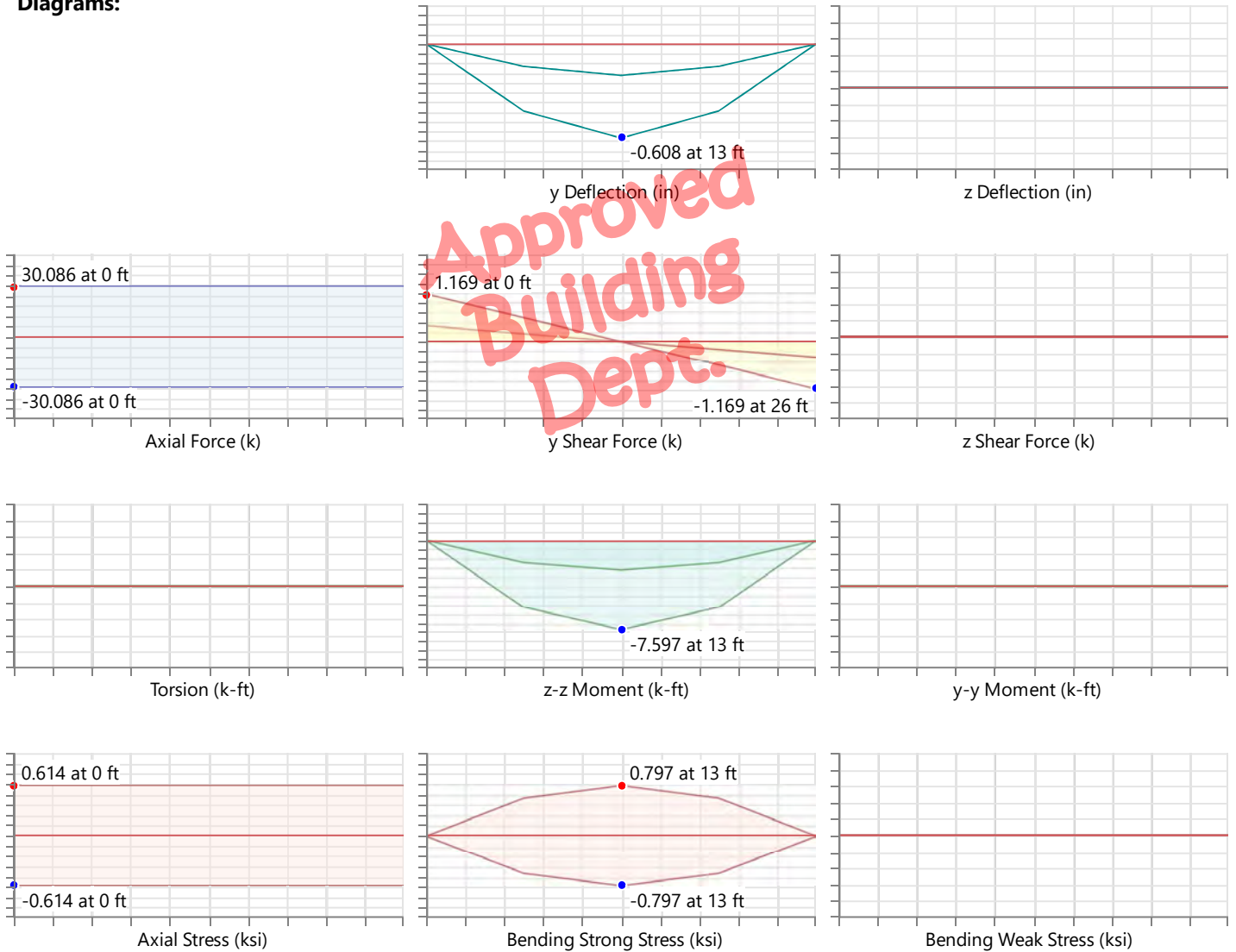
F_b (ksi):	2.6	E (ksi):	1900	b (actual) (in):	3.5
F_t (ksi):	1.555	Emod:	1	d (actual) (in):	14
F_v (ksi):	0.285	COV_E (Table F1):	0.1		
F_c (ksi):	2.51	E_{min} (ksi):	1004.11		

Design Properties

le2 (ft):	2	y sway:	No	C_r:	1
le1 (ft):	2	z sway:	No	C_{fu}:	1
le-bend top:	Lbyy	C_D:	1.6	C_P:	0.972
le-bend bot (ft):	2	R_B:	5.237	Max Defl Ratio:	L/513
K_{y-y}:	1	C_L:	0.995	Max Defl Location:	13
K_{z-z}:	0.5	C_V:	1	Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	11	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	3.904 ksi	-	-
Axial Tension Analysis	-	-0.461 ksi	2.488 ksi	-	-
Flexural Analysis, Fb1'	-	0.709 ksi	4.138 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	4.16 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.171	PASS
Bending & Axial Tension Analysis	-	-	-	0.355	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 60 of 106
5/17/2023
10:36:00 AM
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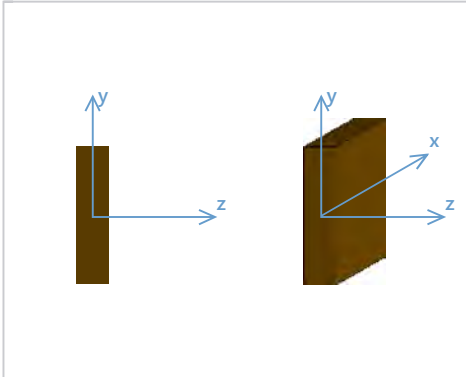
Shear Analysis	-	0.036 ksi	0.285 ksi	0.126	PASS
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**Approved
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Detail Report: M4

Load Combination: Envelope

Code check: 0.988 (LC 5)



Input Data

Shape:	4X16 (nominal)	I Node:	N8
Member Type:	Beam	J Node:	N9
Length (ft):	8	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

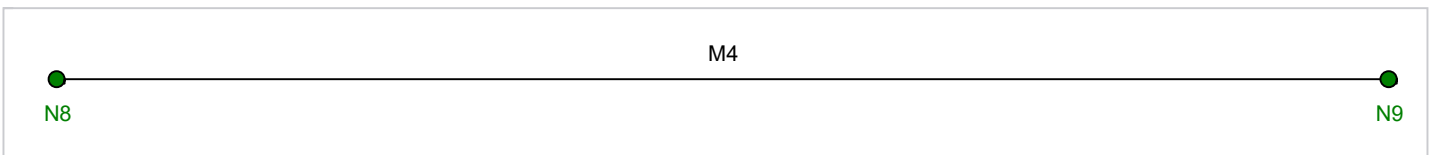
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

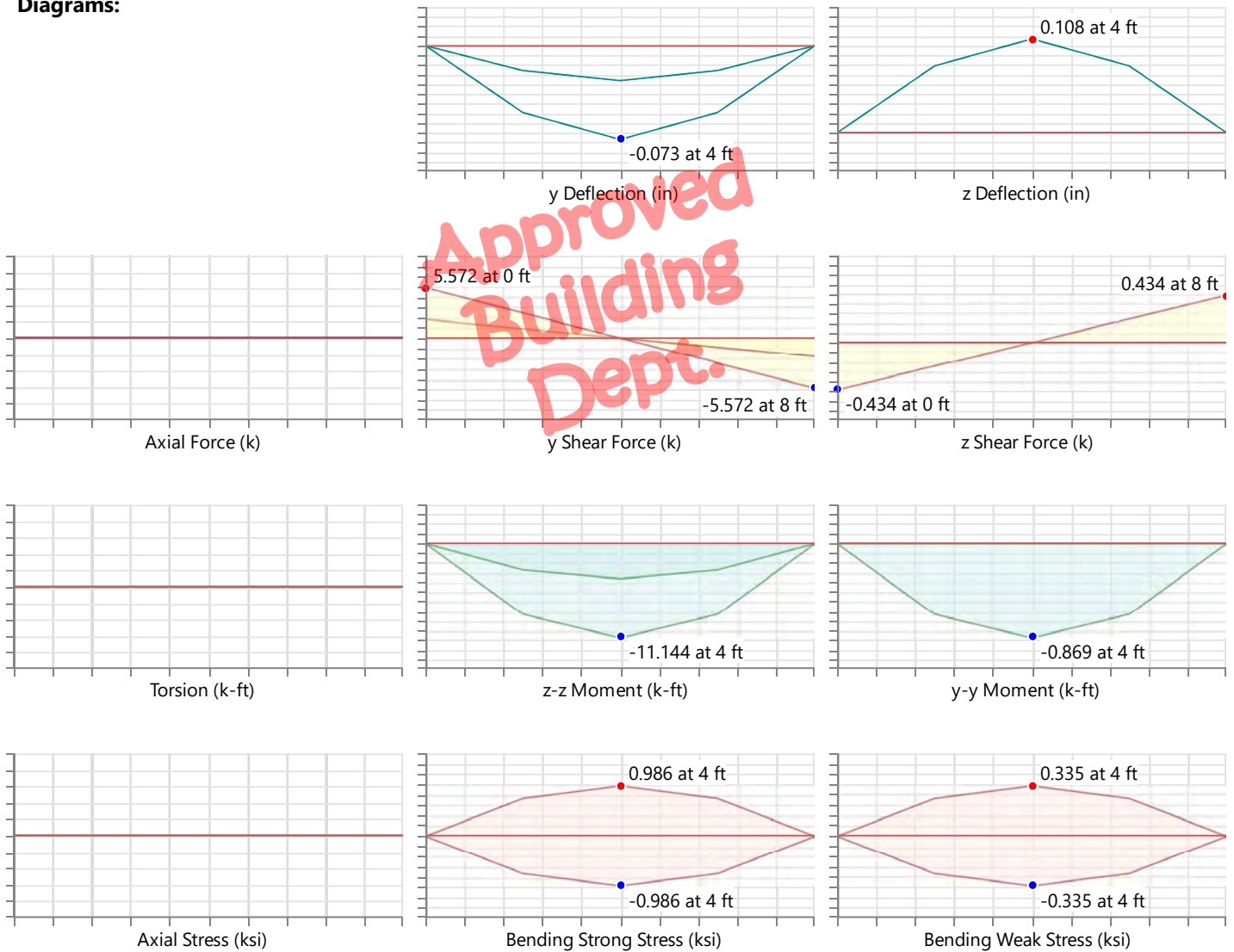
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	15.25
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.973
le-bend top:	Lbyy	C_D:	1	Max Defl Ratio:	L/1315
le-bend bot (ft):	2	R_B:	5.466	Max Defl Location:	4
K_{y-y}:	1	C_L:	0.998	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.314 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.608 ksi	-	-
Flexural Analysis, Fb1'	-	0.986 ksi	0.998 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.988	PASS
Bending & Axial Tension Analysis	-	-	-	0.988	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 63 of 106
5/17/2023
10:36:02 AM
Checked By : _____

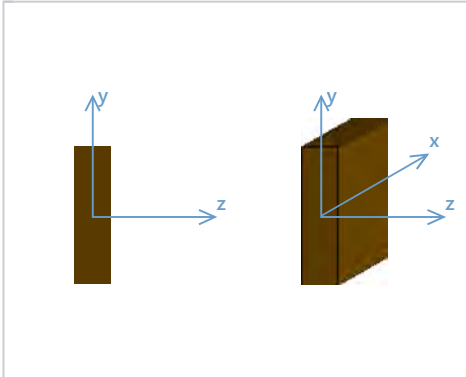
Shear Analysis	-	0.157 ksi	0.18 ksi	0.87	PASS
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**Approved
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Detail Report: M5

Load Combination: Envelope

Code check: 1.000 (LC 5)



Input Data

Shape:	4X14 (nominal)	I Node:	N10
Member Type:	Beam	J Node:	N11
Length (ft):	7	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

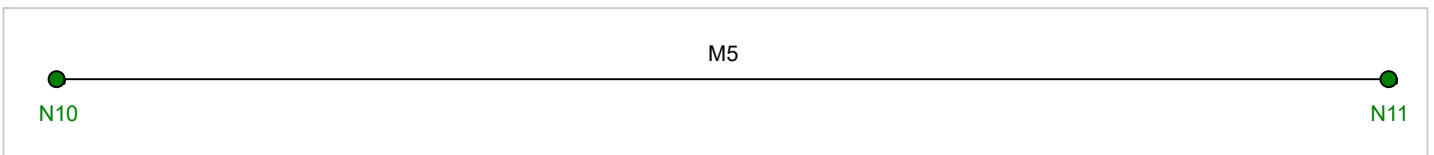
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

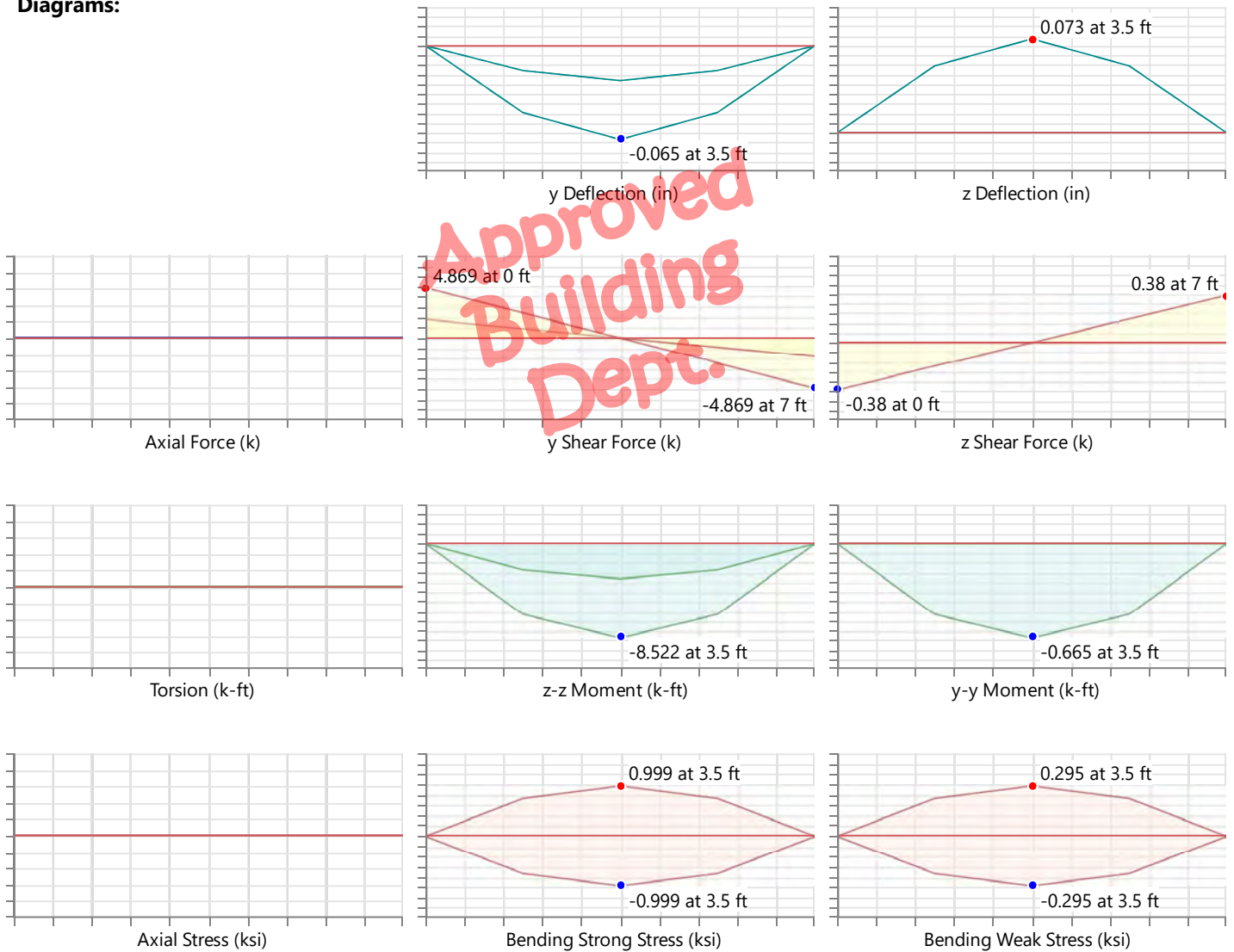
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	13.25
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.973
le-bend top:	Lbyy	C_D:	1	Max Defl Ratio:	L/1289
le-bend bot (ft):	2	R_B:	5.095	Max Defl Location:	3.5
K_{y-y}:	1	C_L:	0.998	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.314 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.608 ksi	-	-
Flexural Analysis, Fb1'	-	0.999 ksi	0.998 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	1	FAIL
Bending & Axial Tension Analysis	-	-	-	1	FAIL



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 66 of 106
5/17/2023
10:36:04 AM
Checked By : _____

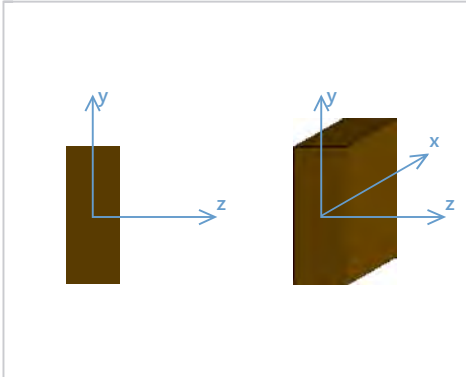
Shear Analysis	-	0.158 ksi	0.18 ksi	0.875	PASS
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Detail Report: M6

Load Combination: Envelope

Code check: 0.893 (LC 5)



Input Data

Shape:	4X10 (nominal)	I Node:	N12
Member Type:	Beam	J Node:	N13
Length (ft):	5	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

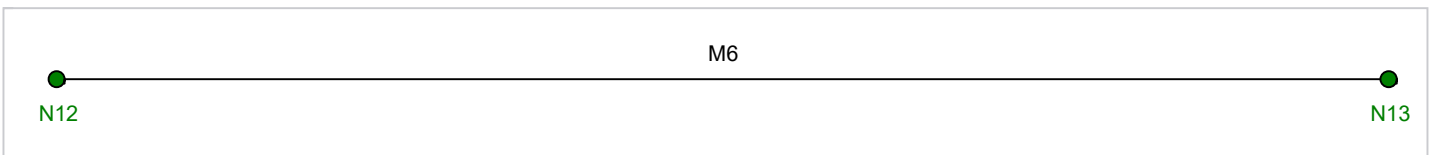
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

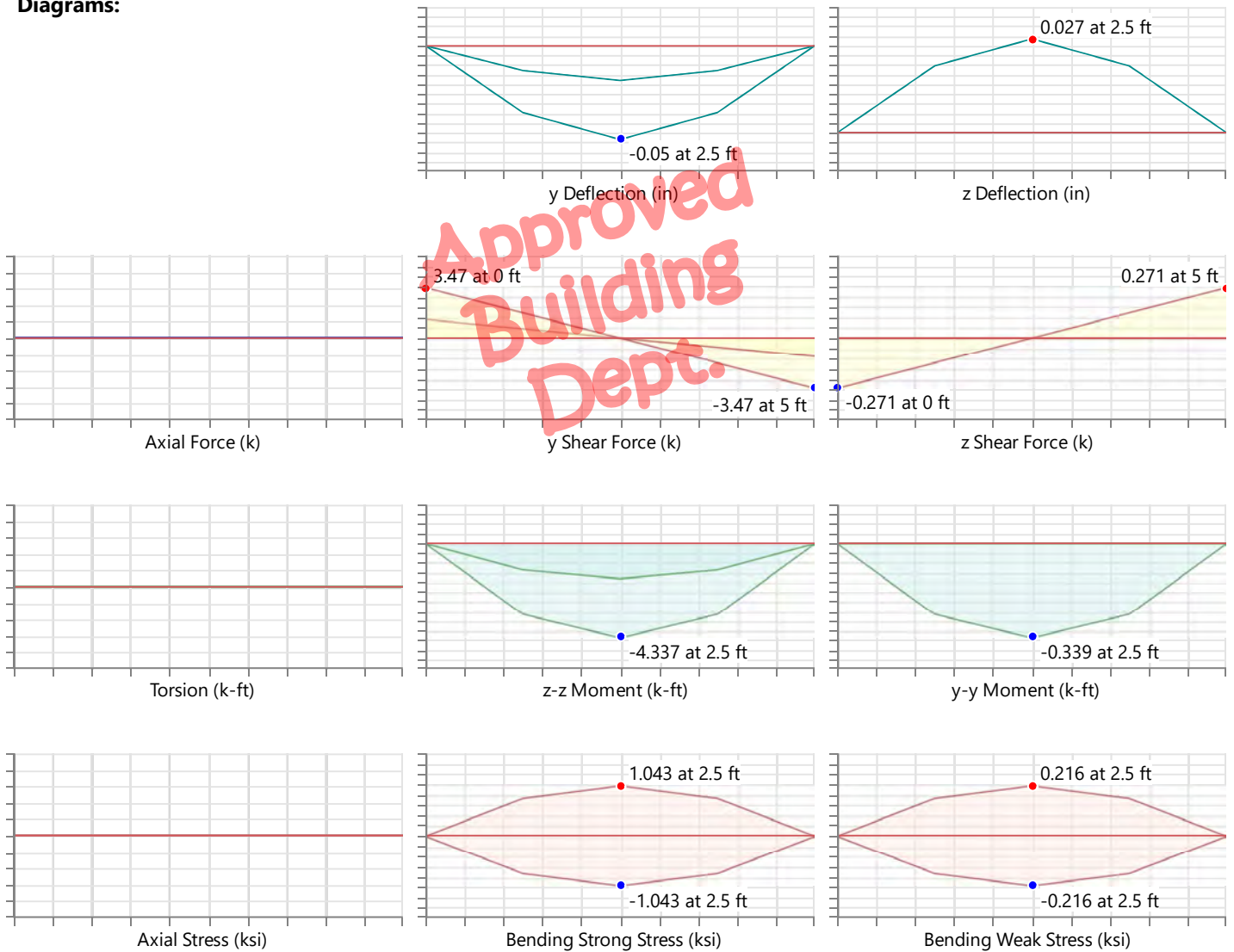
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	9.25
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.97
le-bend top:	Lbyy	C_D:	1	Max Defl Ratio:	L/1206
le-bend bot (ft):	2	R_B:	4.257	Max Defl Location:	2.5
K_{y-y}:	1	C_L:	0.999	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.455 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.743 ksi	-	-
Flexural Analysis, Fb1'	-	1.043 ksi	1.198 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.87	PASS
Bending & Axial Tension Analysis	-	-	-	0.87	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 69 of 106
5/17/2023
10:36:05 AM
Checked By : _____

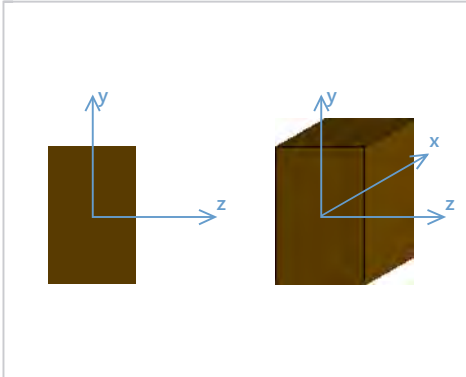
Shear Analysis	-	0.161 ksi	0.18 ksi	0.893	PASS
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**Approved
Building
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Detail Report: M7

Load Combination: Envelope

Code check: 0.899 (LC 5)



Input Data

Shape:	4X6 (nominal)	I Node:	N14
Member Type:	Beam	J Node:	N15
Length (ft):	3	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

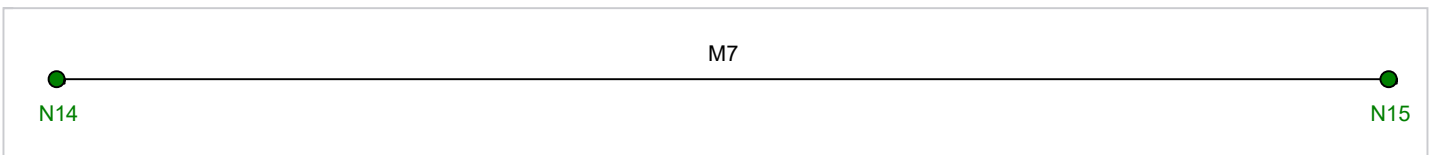
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

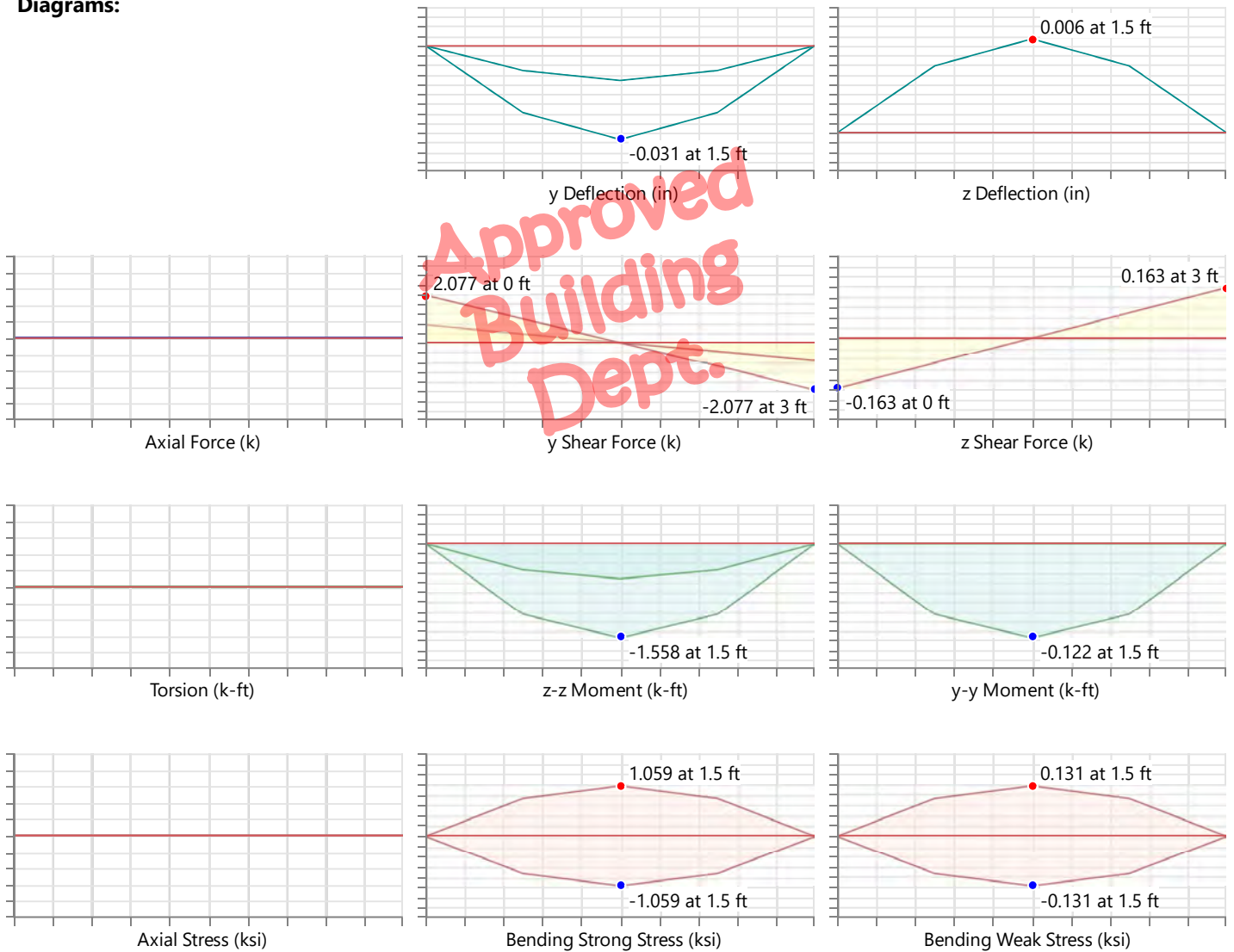
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	5.5
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.967
le-bend top:	Lbyy	C_D:	1	Max Defl Ratio:	L/1176
le-bend bot (ft):	2	R_B:	3.283	Max Defl Location:	1.5
K_{y-y}:	1	C_L:	0.999	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.595 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.877 ksi	-	-
Flexural Analysis, Fb1'	-	1.059 ksi	1.299 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1.3 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.816	PASS
Bending & Axial Tension Analysis	-	-	-	0.816	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 72 of 106
5/17/2023
10:36:07 AM
Checked By : _____

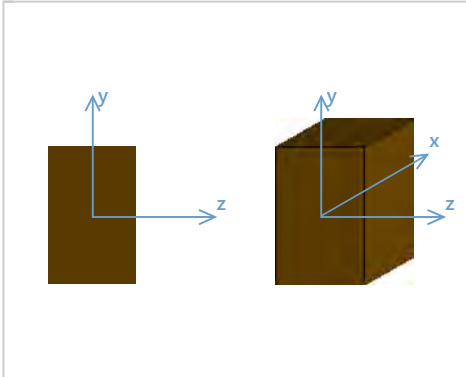
Shear Analysis	-	0.162 ksi	0.18 ksi	0.899	PASS
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Detail Report: M8

Load Combination: Envelope

Code check: 0.671 (LC 9)



Input Data

Shape:	4X6 (nominal)	I Node:	N16
Member Type:	Beam	J Node:	N17
Length (ft):	5	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

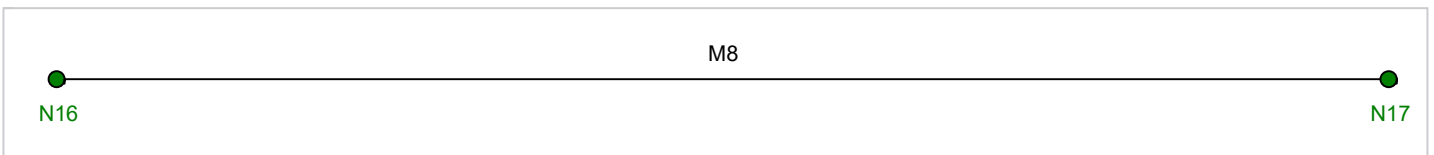
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

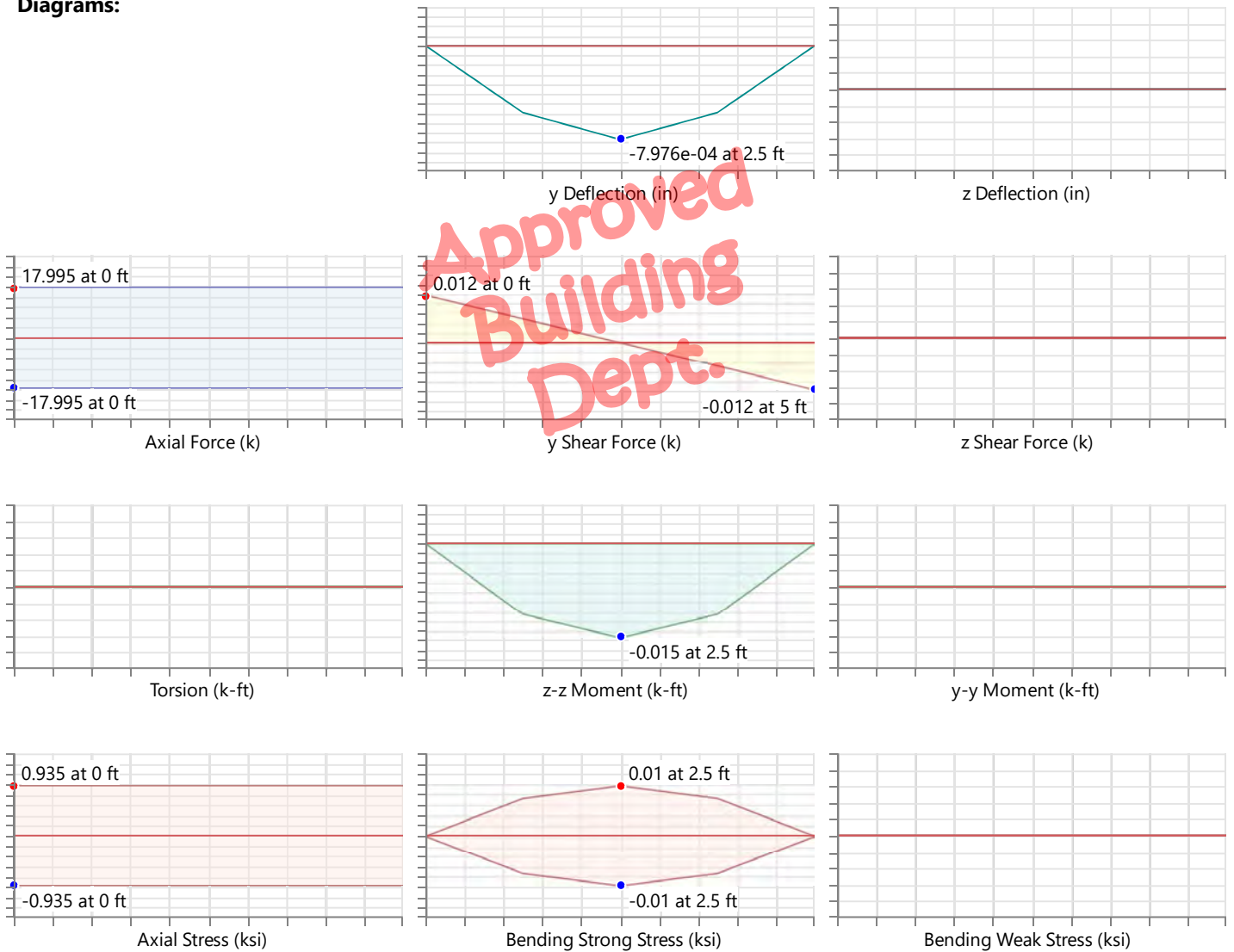
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	5.5
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.944
le-bend top:	Lbyy	C_D:	1.6	Max Defl Ratio:	L/10000
le-bend bot (ft):	2	R_B:	3.283	Max Defl Location:	0
K_{y-y}:	1	C_L:	0.998	Span:	N/A
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	9	-	-	-	-
Applied Loading - Shear + Torsion	4	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.492 ksi	-	-
Axial Tension Analysis	-	-0.935 ksi	1.404 ksi	-	-
Flexural Analysis, Fb1'	-	0.01 ksi	2.077 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	2.08 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.005	PASS
Bending & Axial Tension Analysis	-	-	-	0.671	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 75 of 106
5/17/2023
10:36:09 AM
Checked By : _____

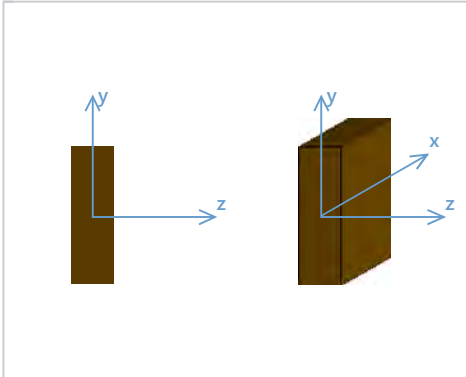
Shear Analysis	-	0.0009115 ksi	0.162 ksi	0.006	PASS
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Detail Report: M9

Load Combination: Envelope

Code check: 0.565 (LC 9)



Input Data

Shape:	4X12 (nominal)	I Node:	N18
Member Type:	Beam	J Node:	N19
Length (ft):	4	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

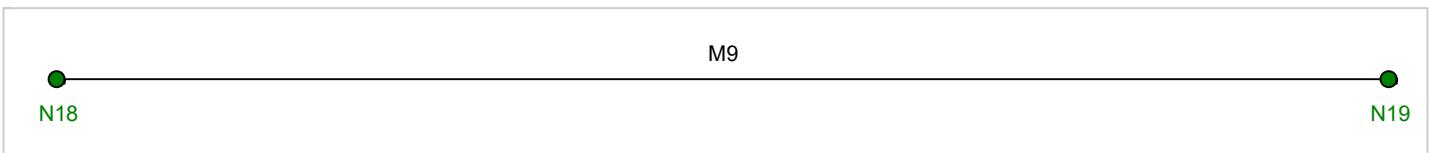
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

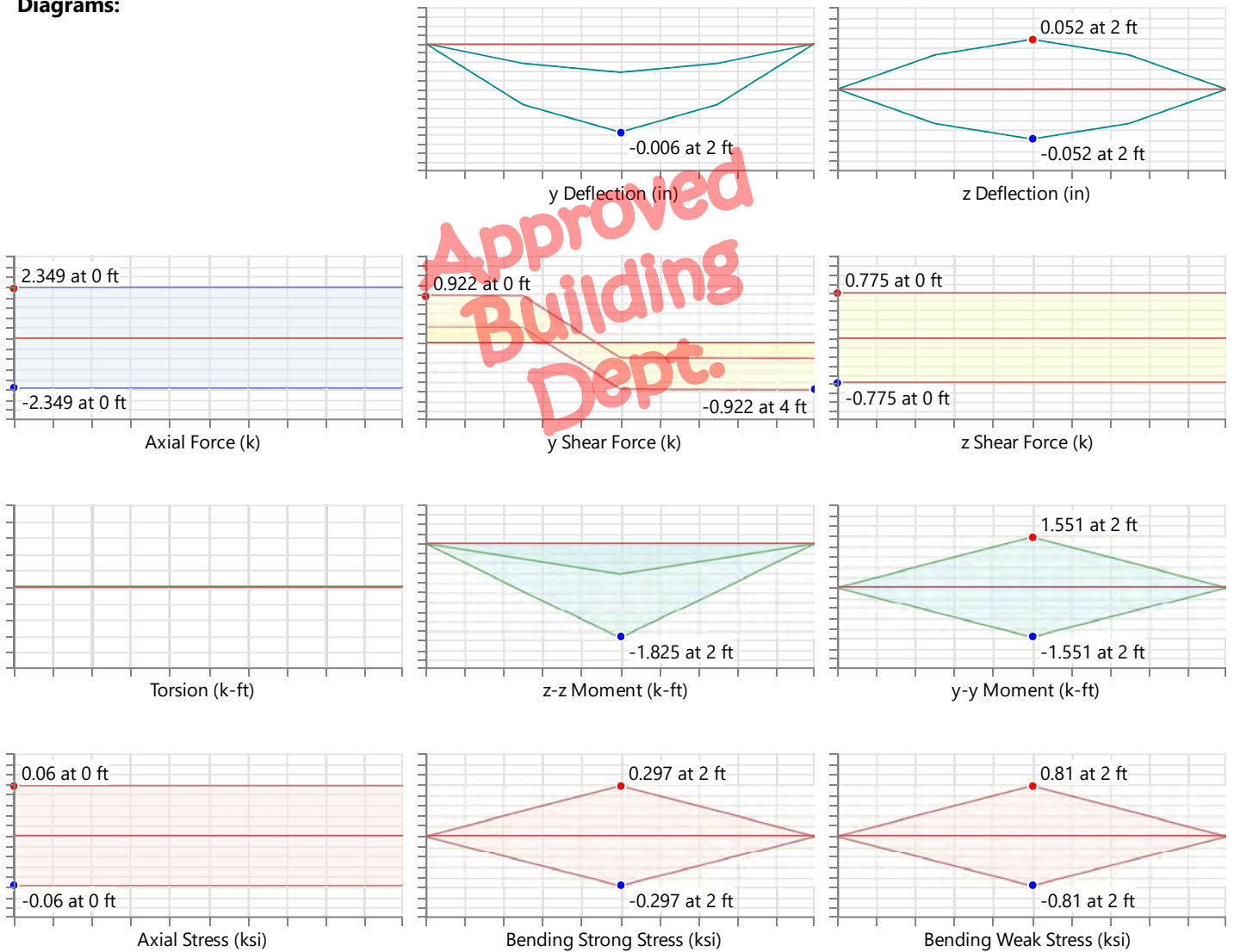
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	11.25
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1.1
le1 (ft):	2	z sway:	No	C_p:	0.95
le-bend top:	Lbyy	C_D:	1.6	Max Defl Ratio:	L/8037
le-bend bot (ft):	2	R_B:	4.695	Max Defl Location:	2
K_{y-y}:	1	C_L:	0.997	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	9	-	-	-	-
Applied Loading - Shear + Torsion	10	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.279 ksi	-	-
Axial Tension Analysis	-	-0.06 ksi	1.08 ksi	-	-
Flexural Analysis, Fb1'	-	0.16 ksi	1.755 ksi	-	-
Flexural Analysis, Fb2'	-	0.81 ksi	1.936 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.51	PASS
Bending & Axial Tension Analysis	-	-	-	0.565	PASS

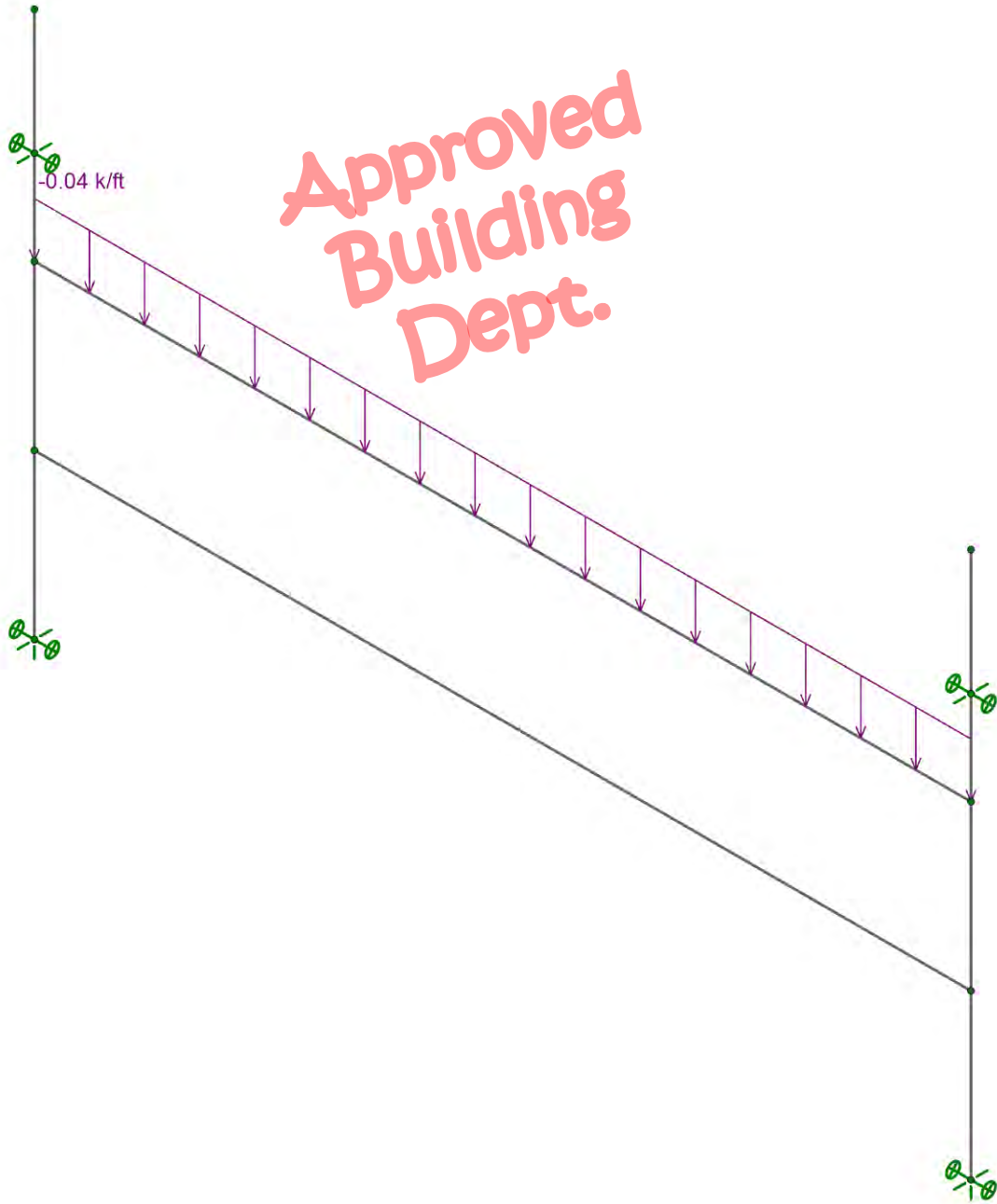


Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 78 of 106
5/17/2023
10:36:11 AM
Checked By : _____

Shear Analysis	-	0.035 ksi	0.18 ksi	0.195	PASS
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Loads: BLC 2, LIVE
Envelope Only Solution

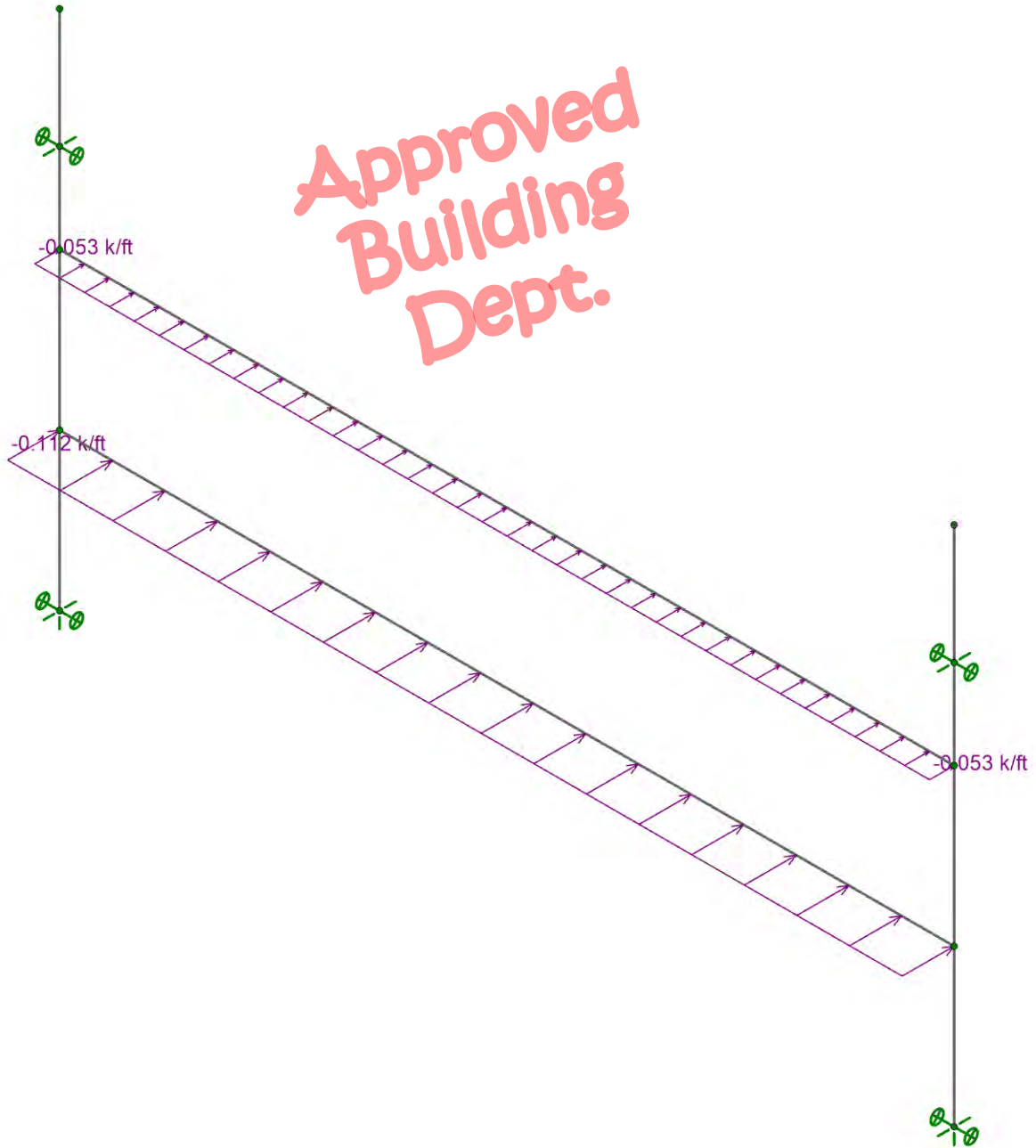
<Licensed Company>

scong

SK-2

May 17, 2023

OPENING.r3d



Loads: BLC 4, WIND
Envelope Only Solution

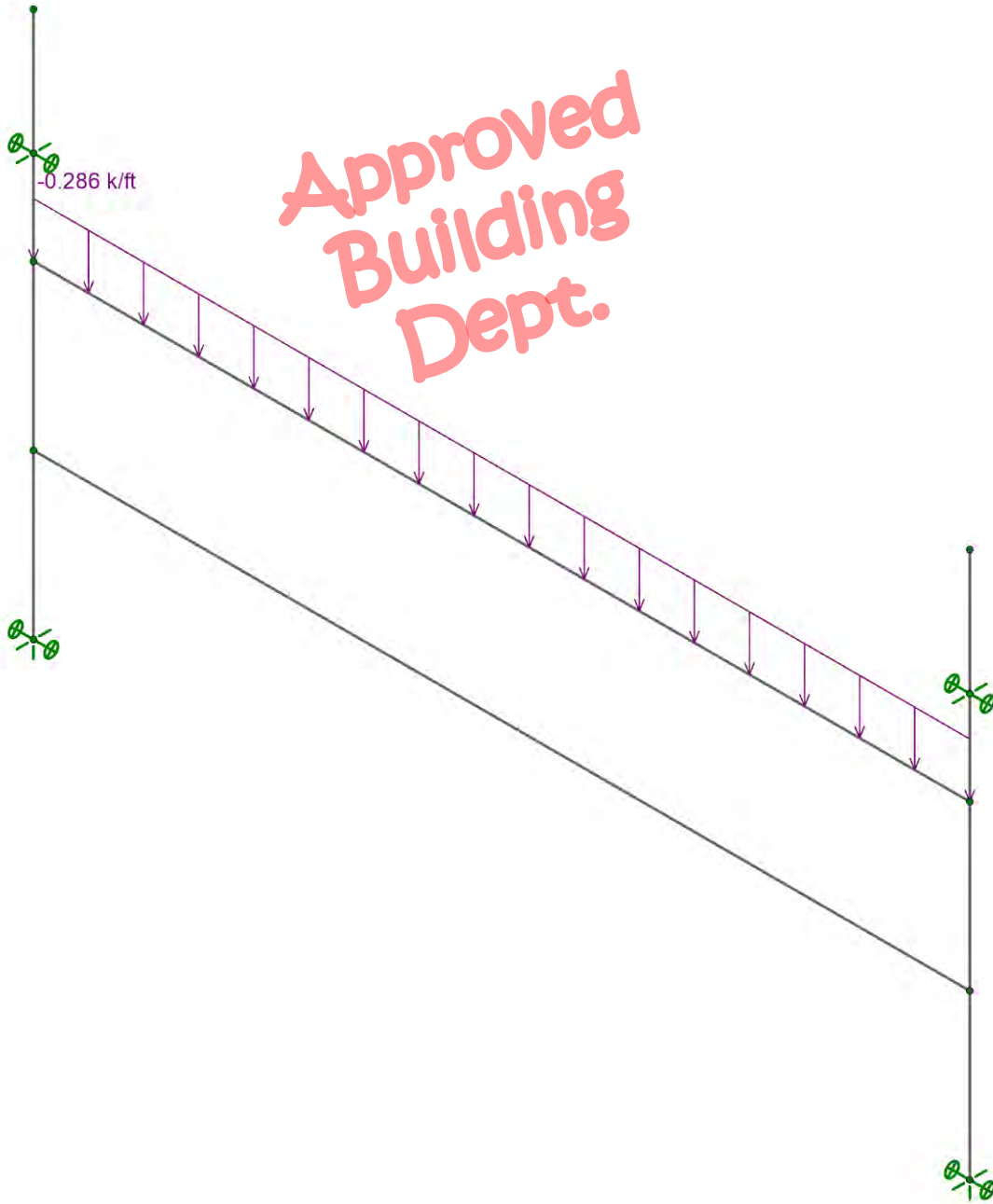
<Licensed Company>

scong

SK-3

May 17, 2023

OPENING.r3d



Loads: BLC 1, DEAD
Envelope Only Solution

<Licensed Company>

scong

SK-1

May 17, 2023

OPENING.r3d



Company : <Licensed Company>
 Designer : scong
 Job Number :
 Model Name :

5/17/2023
 11:05:14 AM
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Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N8	0	-20	0	
2	N9	30	-20	0	
3	N3	0	-17	0	
4	N4	30	-17	0	
5	N5	0	-13	0	
6	N6	30	-13	0	
7	N7	0	-30.5	0	
8	N10	30	-30.5	0	
9	N11	0	-25.25	0	
10	N12	30	-25.25	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]
1	N3	Reaction	Reaction	Reaction	Reaction
2	N4			Reaction	Reaction
3	N7	Reaction	Reaction	Reaction	Reaction
4	N10		Reaction	Reaction	Reaction

Member Distributed Loads (BLC 1 : DEAD)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	Y	-0.286	-0.286	0 %100

Member Distributed Loads (BLC 2 : LIVE)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	Y	-0.04	-0.04	0 %100

Member Distributed Loads (BLC 4 : WIND)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	Z	-0.053	-0.053	0 %100
2	M5	Z	-0.112	-0.112	0 %100

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1				
2	Deflection 2	Yes	Y	RLL	1				
3	Deflection 3	Yes	Y	DL	1	RLL	1		
4	IBC 16-8	Yes	Y	DL	1				
5	IBC 16-9	Yes	Y	DL	1	RLL	1		
6	IBC 16-10 (a)	Yes	Y	DL	1	RLL	1		
7	IBC 16-11 (a)	Yes	Y	DL	1	RLL	0.75		
8	IBC 16-12 (b) (a)	Yes	Y	DL	1	EL	0.7		
9	IBC 16-12 (b) (b)	Yes	Y	DL	1	EL	-0.7		
10	IBC 16-14 (a)	Yes	Y	DL	1	EL	0.525	RLL	0.75
11	IBC 16-14 (b)	Yes	Y	DL	1	EL	-0.525	RLL	0.75
12	IBC 16-16 (a)	Yes	Y	DL	0.6	EL	0.7		
13	IBC 16-16 (b)	Yes	Y	DL	0.6	EL	-0.7		
14	IBC 16-12 (a) (a)	Yes	Y	DL	1	WL	0.6		
15	IBC 16-13 (a) (a)	Yes	Y	DL	1	WL	0.45	RLL	0.75



Company : <Licensed Company>
 Designer : song
 Job Number :
 Model Name :

5/17/2023
 11:05:14 AM
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Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
16	IBC 16-15 (a)	Yes	Y	DL	0.6	WL	0.6		
17	Deflection - Wind	Yes	Y	WL	0.42				

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-8	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-9		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-10 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-12 (b) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (b) (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-14 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-14 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-16 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-16 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-12 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-13 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-15 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Deflection - Wind	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N3	max	0	17	4.512	6	0.758	14	0	13	0	17	0	17
2		min	-0.178	3	0	17	0	1	-2.123	16	0	1	0	1
3	N4	max	0	17	0	17	0.757	14	0	13	0	17	0	17
4		min	0	1	0	1	0	1	-2.133	14	0	1	0	1
5	N7	max	0.178	6	1.494	6	0.729	16	2.227	14	0	17	0	17
6		min	0	17	0	17	0	1	0	1	0	1	0	1
7	N10	max	0	17	5.817	6	0.729	16	2.246	14	0	17	0	17
8		min	0	1	0	17	0	1	0	1	0	1	0	1
9	Totals:	max	0	17	11.822	6	2.973	16						
10		min	0	3	0	17	0	1						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N8	max	0	17	0	17	0	13	1.153e-3	16	1.003e-2	14	0	17
2		min	-0.323	3	-0.002	3	-0.03	16	0	1	0	1	-9.257e-3	3
3	N9	max	0	17	0	17	0	13	1.161e-3	14	0	13	9.64e-3	6
4		min	-0.328	3	-0.007	3	-0.03	14	0	1	-1.003e-2	16	0	17
5	N3	max	0	6	0	17	0	13	0	16	1.003e-2	14	0	17
6		min	0	17	0	3	0	14	0	1	0	1	-8.838e-3	3
7	N4	max	0	17	0	17	0	13	0	14	0	13	9.645e-3	6
8		min	-0.675	3	-0.007	3	0	14	0	1	-1.003e-2	16	0	17
9	N5	max	0.424	6	0	17	0	16	0	16	1.003e-2	14	0	17
10		min	0	17	0	3	0	1	0	1	0	1	-8.839e-3	3
11	N6	max	0	17	0	17	0	14	0	14	0	13	9.646e-3	6
12		min	-1.138	3	-0.007	3	0	1	0	1	-1.003e-2	16	0	17
13	N7	max	0	17	0	17	0	13	0	13	1.523e-2	14	5.092e-3	6
14		min	0	3	0	3	0	16	0	14	0	1	0	17



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 Designer : scong
 Job Number :
 Model Name :

5/17/2023
 11:05:14 AM
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Envelope Node Displacements (Continued)

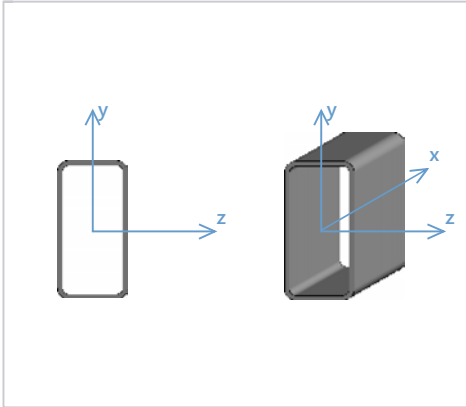
	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
15	N10	max	0	17	0	17	0	13	0	13	0	13	0	17
16		min	-0.48	3	0	3	0	16	0	14	-1.523e-2	16	-3.061e-3	3
17	N11	max	0	17	0	17	0	13	0	13	1.523e-2	14	4.082e-3	6
18		min	-0.3	3	-0.001	3	-0.063	14	-6.29e-4	16	0	1	0	17
19	N12	max	0	17	0	17	0	13	0	13	0	13	0	17
20		min	-0.29	3	-0.004	3	-0.063	14	-6.325e-4	14	-1.523e-2	16	-2.912e-3	3

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Detail Report: M4

Load Combination: Envelope

Code check: 0.424 (LC 14)



Input Data

Shape:	HSS10X5X6	I Node:	N8
Member Type:	Beam	J Node:	N9
Length (ft):	30	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

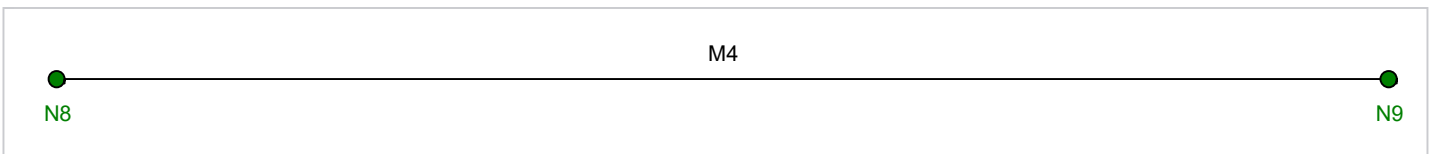
Material:	A992	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	65
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.1
G (ksi):	11154	F_y (ksi):	50		
Nu:	0.3	R_y:	1.1		

Shape Properties

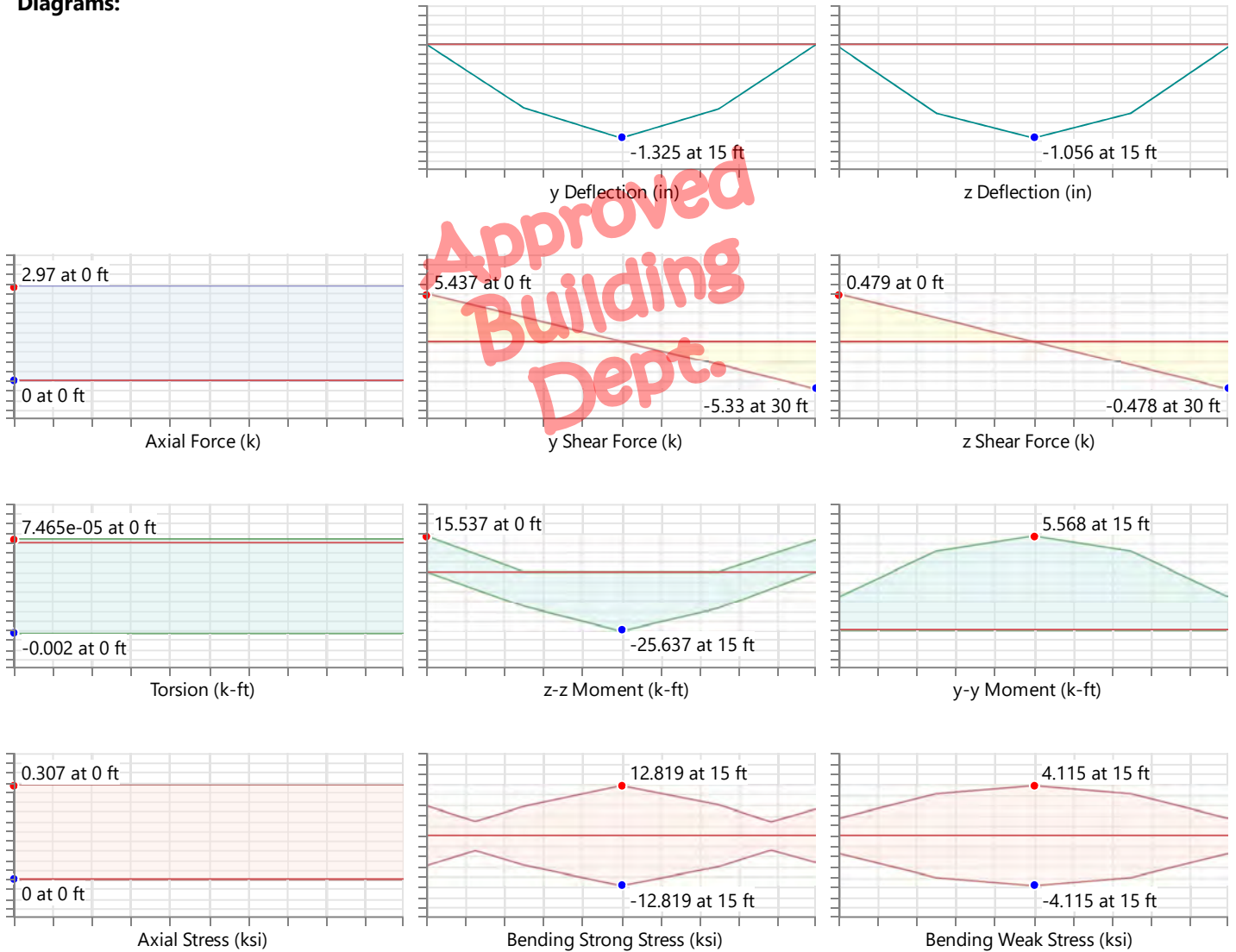
d (in):	10	I_{yy} (in⁴):	40.6	J (in⁴):	100
b_f (in):	5	I_{zz} (in⁴):	120		
t (in):	0.349	Area (in²):	9.67		

Design Properties

L_{b y-y} (ft):	2	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	2	K_{z-z}:	0.5	Max Defl Ratio:	L/272
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	15
L_{comp bot} (ft):	2	z sway:	No	Span:	1
L_{torque} (ft):	30	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	14	-	-	-	-
Applied Loading - Shear + Torsion	6	-	-	-	-
Axial Tension Analysis	14	0 k	289.521 k	-	-
Axial Compression Analysis	14	2.664 k	286.631 k	-	-
Flexural Analysis (Strong Axis)	14	22.753 k-ft	75.848 k-ft	-	-
Flexural Analysis (Weak Axis)	-	5.568 k-ft	46.657 k-ft	-	-
Shear Analysis (Major Axis y)	6	5.437 k	112.261 k	0.048	PASS
Shear Analysis (Minor Axis z)	6	0 k	49.566 k	0	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 87 of 106
5/17/2023
11:05:17 AM
Checked By : _____

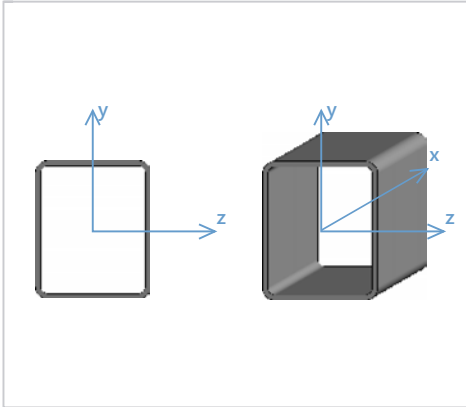
Bending & Axial Interaction Check (UC Bending Max)	14	-	-	0.424	PASS
Torsional Analysis	14	0.002 k-ft	46.657 k-ft	3.986e-5	PASS

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Detail Report: M5

Load Combination: Envelope

Code check: 0.296 (LC 14)



Input Data

Shape:	HSS6X5X4	I Node:	N11
Member Type:	Beam	J Node:	N12
Length (ft):	30	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

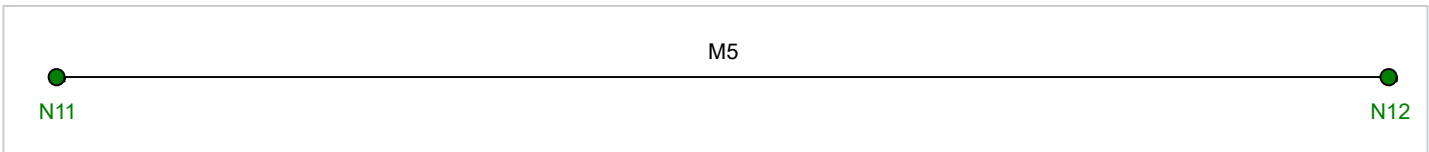
Material:	A500 Gr.B RECT	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.527	R_t:	1.3
G (ksi):	11154	F_y (ksi):	46		
Nu:	0.3	R_y:	1.4		

Shape Properties

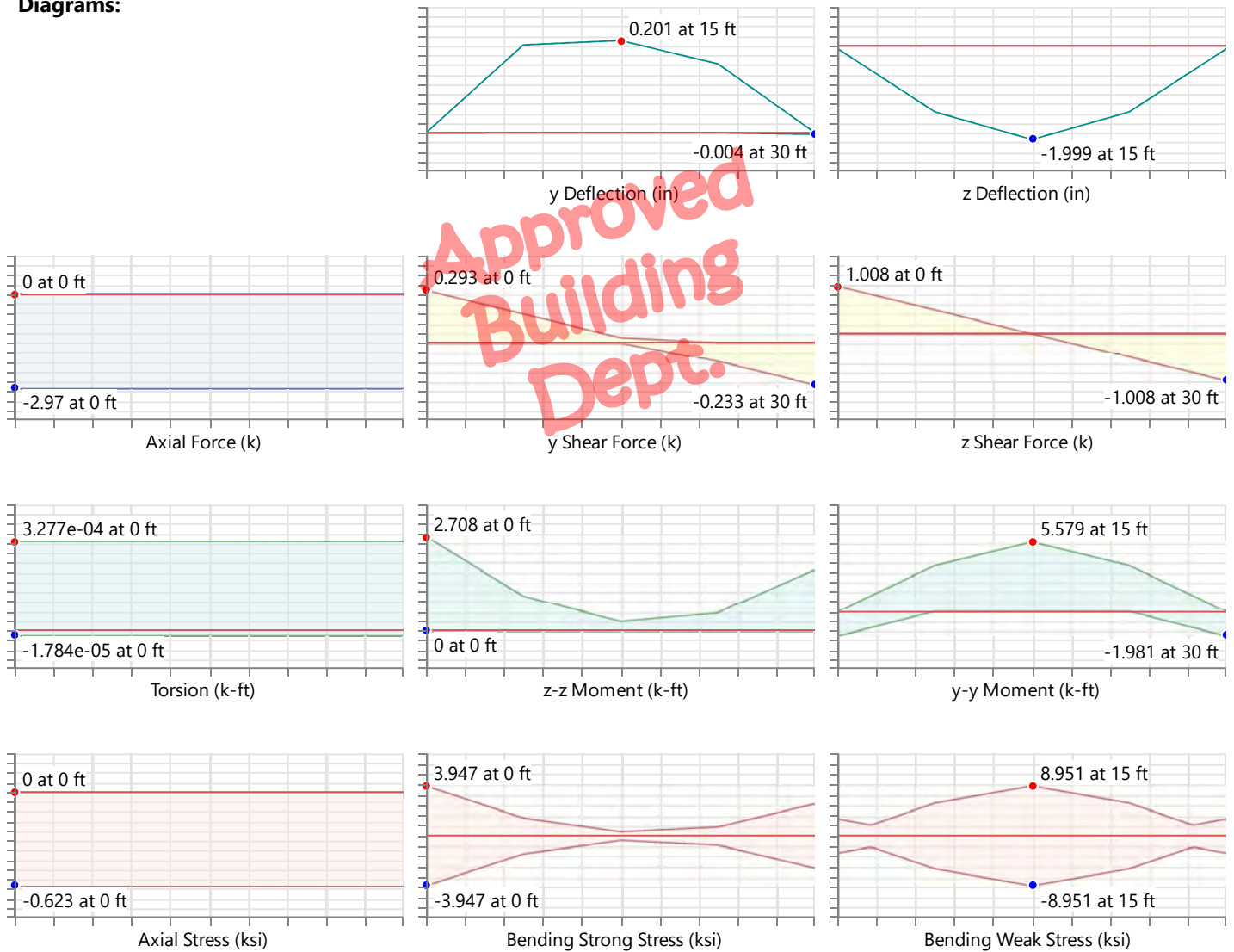
d (in):	6	I_{yy} (in⁴):	18.7	J (in⁴):	34.2
b_f (in):	5	I_{zz} (in⁴):	24.7		
t (in):	0.233	Area (in²):	4.77		

Design Properties

L_{b y-y} (ft):	30	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	30	K_{z-z}:	1	Max Defl Ratio:	L/1713
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	11.562
L_{comp bot} (ft):	30	z sway:	No	Span:	1
L_{torque} (ft):	30	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	14	-	-	-	-
Applied Loading - Shear + Torsion	14	-	-	-	-
Axial Tension Analysis	14	2.664 k	131.389 k	-	-
Axial Compression Analysis	14	0 k	21.688 k	-	-
Flexural Analysis (Strong Axis)	14	0.171 k-ft	22.656 k-ft	-	-
Flexural Analysis (Weak Axis)	-	5.566 k-ft	20.016 k-ft	-	-
Shear Analysis (Major Axis y)	14	0.233 k	40.826 k	0.006	PASS
Shear Analysis (Minor Axis z)	14	1.009 k	33.124 k	0.03	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 90 of 106
5/17/2023
11:05:19 AM
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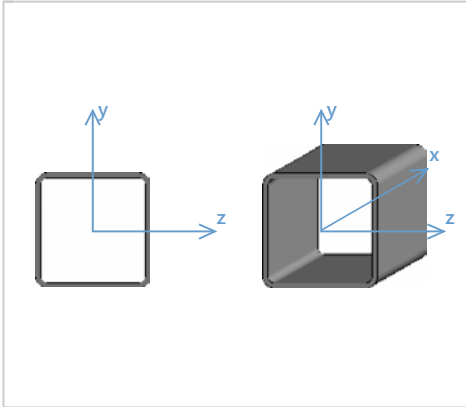
Bending & Axial Interaction Check (UC Bending Max)	14	-	-	0.296	PASS
Torsional Analysis	14	0.0003277 k-ft	17.577 k-ft	1.865e-5	PASS

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Detail Report: M2

Load Combination: Envelope

Code check: 0.838 (LC 6)



Input Data

Shape:	HSS5X5X4	I Node:	N7
Member Type:	Column	J Node:	N5
Length (ft):	17.5	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

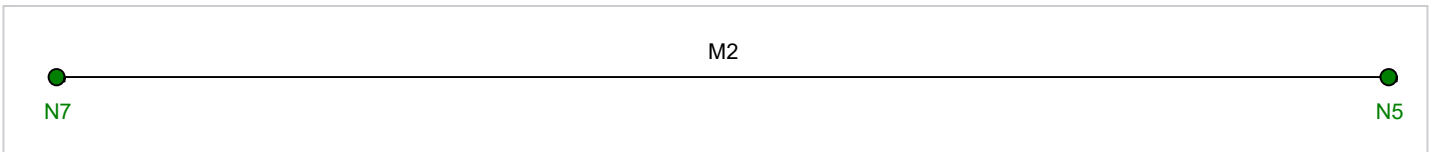
Material:	A500 Gr.B RECT	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.527	R_t:	1.3
G (ksi):	11154	F_y (ksi):	46		
Nu:	0.3	R_y:	1.4		

Shape Properties

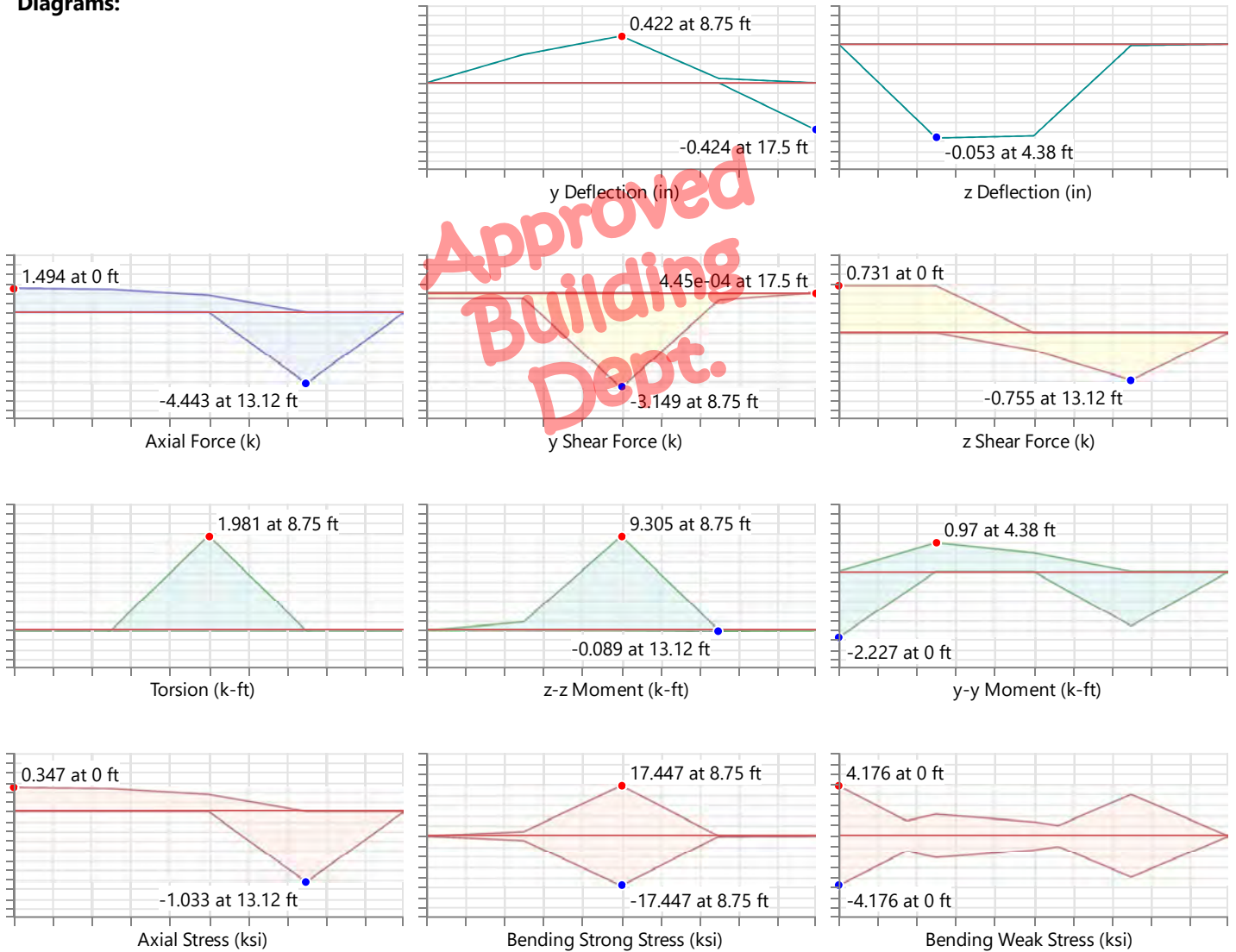
d (in):	5	I_{yy} (in⁴):	16	J (in⁴):	25.8
b_f (in):	5	I_{zz} (in⁴):	16		
t (in):	0.233	Area (in²):	4.3		

Design Properties

L_{b y-y} (ft):	17.5	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	17.5	K_{z-z}:	1	Max Defl Ratio:	L/331
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	8.75
L_{comp bot} (ft):	17.5	z sway:	No	Span:	N/A
L_{torque} (ft):	17.5	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	6	-	-	-	-
Applied Loading - Shear + Torsion	14	-	-	-	-
Axial Tension Analysis	6	0 k	118.443 k	-	-
Axial Compression Analysis	6	1.037 k	53.366 k	-	-
Flexural Analysis (Strong Axis)	6	14.471 k-ft	17.468 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	17.468 k-ft	-	-
Shear Analysis (Major Axis y)	14	7.328 k	33.124 k	0.221	PASS
Shear Analysis (Minor Axis z)	14	4.779 k	33.124 k	0.144	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 93 of 106
5/17/2023
11:05:21 AM
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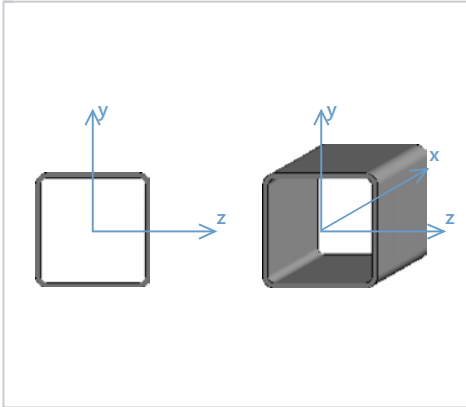
Bending & Axial Interaction Check (UC Bending Max)	6	-	-	0.838	PASS
Torsional Analysis	6	0 k-ft	14.517 k-ft	0	PASS

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Detail Report: M3

Load Combination: Envelope

Code check: 0.768 (LC 6)



Input Data

Shape:	HSS5X5X4	I Node:	N10
Member Type:	Column	J Node:	N6
Length (ft):	17.5	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

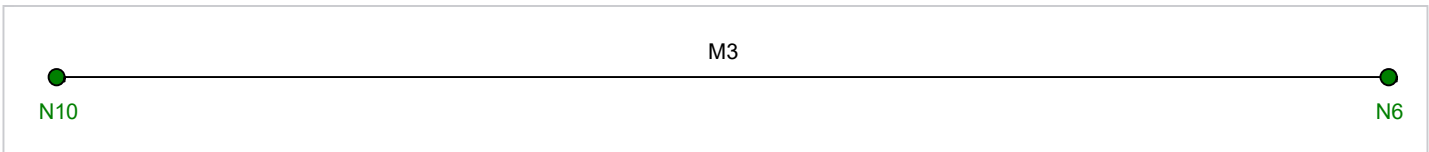
Material:	A992	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	65
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.1
G (ksi):	11154	F_y (ksi):	50		
Nu:	0.3	R_y:	1.1		

Shape Properties

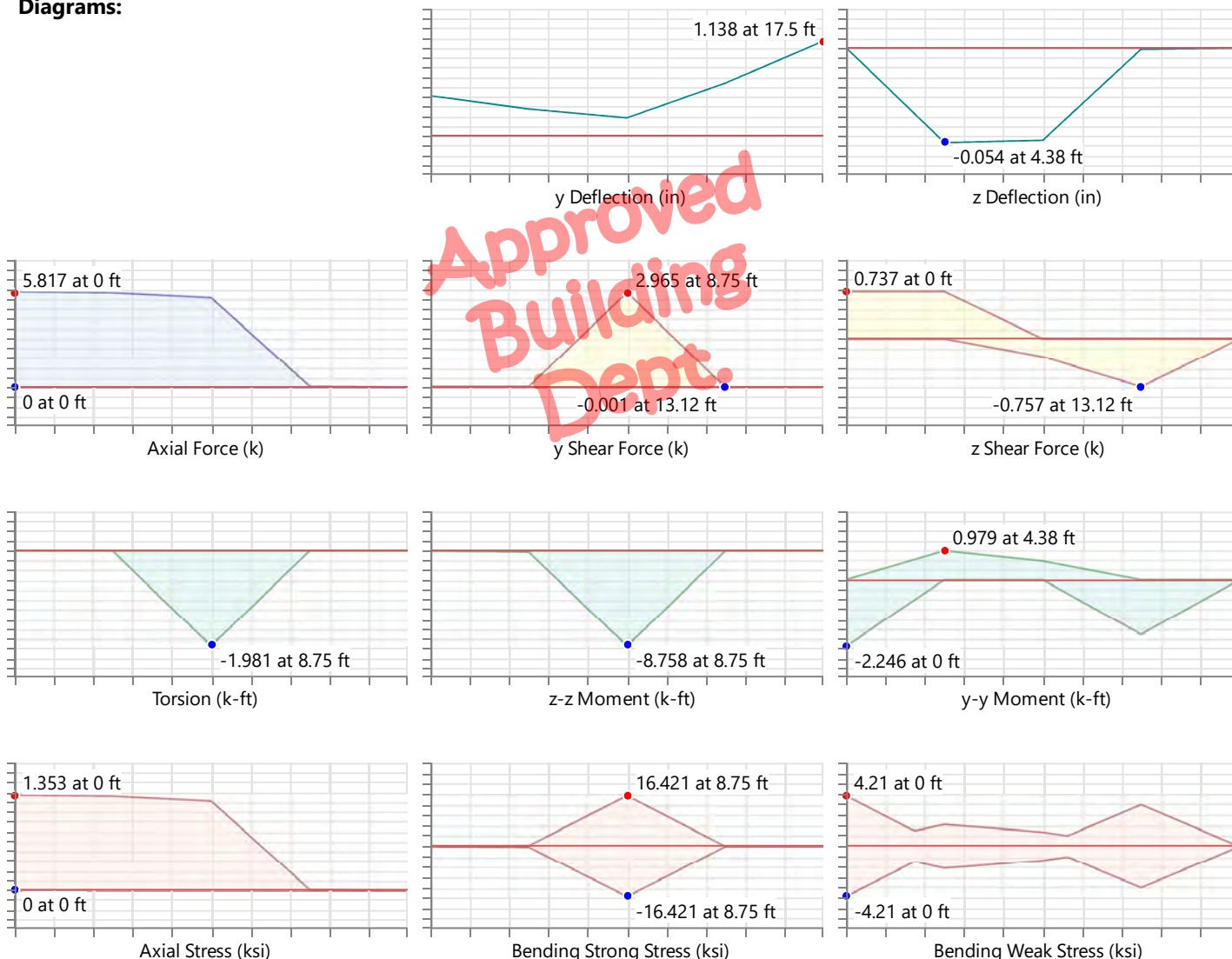
d (in):	5	I_{yy} (in⁴):	16	J (in⁴):	25.8
b_f (in):	5	I_{zz} (in⁴):	16		
t (in):	0.233	Area (in²):	4.3		

Design Properties

L_{b y-y} (ft):	17.5	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	17.5	K_{z-z}:	1	Max Defl Ratio:	L/319
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	17.5
L_{comp bot} (ft):	17.5	z sway:	No	Span:	N/A
L_{torque} (ft):	17.5	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	6	-	-	-	-
Applied Loading - Shear + Torsion	14	-	-	-	-
Axial Tension Analysis	6	0 k	128.743 k	-	-
Axial Compression Analysis	6	5.434 k	54.122 k	-	-
Flexural Analysis (Strong Axis)	6	13.623 k-ft	18.987 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	18.987 k-ft	-	-
Shear Analysis (Major Axis y)	14	7.159 k	36.005 k	0.199	PASS
Shear Analysis (Minor Axis z)	14	4.782 k	36.005 k	0.133	PASS



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Designer : scong
Job Number :
Model Name :

Page 96 of 106
5/17/2023
11:05:23 AM
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Bending & Axial Interaction Check (UC Bending Max)	6	-	-	0.768	PASS
Torsional Analysis	6	0 k-ft	15.779 k-ft	0	PASS

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Percent Passing 3- Inch Sieve	100
Percent Passing No. 4 Sieve	85-100
Percent Passing No. 200 Sieve	10-40
Expansion Index	Less than 16
R-Value (pavement only)	Minimum 50

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9.0 Surface Drainage

9.1 Surface runoff from natural and graded areas should be controlled. Final grading around the structure should be such that there is positive and enduring drainage away from the foundations. For landscape areas without concrete flat slabs, a minimum five percent positive fall away from building perimeter to at least five feet is recommended.

10.0 [REDACTED] s

10.1 Provided the site preparation procedures presented in this report are preformed, conventional spread footings, bearing in compacted or undisturbed native soil at a [REDACTED] may be used for supporting the structural loads of the proposed structure.

10.2 Column spread footings may be sized according to a net bearing pressure of 2,500 pounds per square foot (psf). [REDACTED] a [REDACTED] pressure [REDACTED] a [REDACTED] e.

10.3 The recommended bearing pressure applies to combined dead and sustained live loads and may be increased by one third (1/3) to include transient loads due to wind and seismic effects.

10.4 Based on a column load of 60 kips, a total footing settlement on the order of 1.5 inch is anticipated. Differential settlement between two adjacent isolated footings is expected to be about 1/2 inch.

10.5 The building should be designed to allow differential movement equivalent to an angular distortion of 1/600. For structural design, a Modulus of Subgrade Reaction k- value of 100 pounds per cubic inch may be used

10.6 The proposed structure should be designed with construction specifications and structure properties to withstand the anticipated or probable effects of seismic ground motion, if a seismic event was to occur. The latitude is 36.19522 degrees and the longitude is -119.340423 degrees at the approximate center of the site. Probabilistic values of ground motion corresponding to various levels of seismic hazards have been established by CGS and USGS base on ASCE 7-16. Based on the new procedure in Section 1613 of 2019 California Building Code (CBC), the seismic design parameters are provided as follows.

SEISMIC DESIGN PARAMETERS 2019 CBC		
<u>Property</u>	<u>Symbol</u>	<u>Value</u>
Occupancy Category		[REDACTED]
Site Class		[REDACTED]
Mapped Acceleration Short Periods	S_s	[REDACTED]
Mapped Acceleration At 1 Second Periods	S_1	[REDACTED]
Site Coefficient	F_a	[REDACTED]

Design Spectral Acceleration Parameter	S_{MS}	[REDACTED]
Design Spectral Acceleration Parameter	S_{DS}	[REDACTED]
Mapped Maximum Considered Earthquake MCE_G	PGA	0.265
Maximum Considered Earthquake MCE_G	PGA_M	0.354

11.0 Lateral Earth Pressure and Fractional Resistance:

For structures subject to lateral pressures from native soils and backfill at the Site, the following values are recommended:

LATERAL EARTH PRESSURE	
Lateral Pressure and Condition	Equivalent Fluid Pressure, pcf
Active case, drained	45
At-rest case, drained	60
Passive case, drained	360

11.1 Design values assume level, drained granular backfill. Pressures due to surcharge loads from adjacent footings, traffic, etc., should be analyzed separately. The upper one foot of soil of the adjacent grade should not be used in the passive pressure computation. A coefficient of friction of 0.40 may be used between subgrade soil and concrete footings. Vertical soil loads may be calculated based on soil bulk density of 120 pounds per cubic foot.

11.2 The foregoing equivalent fluid pressures and fractional coefficients represent ultimate soil values, and a safety factor consistent with design conditions should be included. A minimum safety factor of 1.5 against lateral sliding is recommended if the sliding is resisted only by fractional resistance. When combined passive and fractional resistance is used, we recommend a minimum safety factor of 2.0. For lateral stability against seismic loading, we recommend a minimum safety factor of 1.1.

12.0 Interior Concrete Slab-On-Grade:

Interior concrete slab-on-grade floors may be placed on compacted native soil or engineered fill. Concrete should be formulated with Type II cement. A damp-proofing system should be used beneath the slab-on-grade floors that would be covered with floor coverings. The damp-proofing system should consist of a vapor retarder with a minimum thickness of 10 mills and a water vapor transmission rate less than 0.3 grains/sq.ft./hr. per ASTM E-96, Method B. The vapor retarder should have sufficient strength to resist the rigors of construction. Splices and perforations should be properly sealed. Two inches of clean sand should be placed between the vapor retarder and the concrete slab to protect the vapor retarder during construction and to aid in curing the concrete

13.0 Additional Services:

MISCELLANEOUS

1. PARTIAL HEIGHT WALL

$H_{POST} = 14'-0"$ BEAM SPAN = 12'-6"
 $H_{WALL} = 8'-0"$
 INTERIOR LATERAL = 5 PSF
 $W_{BEAM} = 5 \text{ PSF}(4') = 20 \text{ PLF}$

$$F_b = \frac{20(12')^2(1/8)(12'4")}{(1/8)(9.5")(5.5")^2} = 90 \text{ PSI} \rightarrow \text{OK}$$

FOR POST:

AXIAL COMPRESSION = 0
 $M = 20 \text{ PLF}(6')(14')/4 = 420 \text{ Lb-ft}$

$$F_b = \frac{420(12)}{(1/8)(5.5)(5.5)^2} = 182 \text{ PSI} \rightarrow \text{OK}$$

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USE 6x6 POSTS w/
 6x10 BEAM & 2x6
 STUDS @ 16" o.c.

 PROVIDE 2x6 SILL w/ 1/2"
 SMC STUDS - BAYS @ 32" o.c.

2. GENERATOR ENCLOSURE

SEE FOLLOWING MSD ANALYSIS

$P_{SEISMIC} (1-00L) = 750 \text{ # (ALTERNATIVE)}$
 $M_{BASE} (WEAK AXIS) = 750(12') = 9000 \text{ Lb-ft}$

$$\hookrightarrow F_b (MS 10x5x3/8, WEAK) = \frac{9000(12)}{16.2} = 6670 \text{ PSI} \rightarrow \text{OK}$$

FRAME: MS 10x5x3/8
 BASE: 1/2" w/ (4) 3/4" dia. B.



Company : BWE, Inc.
 Designer : D. Adams
 Job Number : 14033A.1.00
 Model Name : Generator Enclosure Moment Fra...

Checked By :

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	0	12	0	
3	N3	9	15.5	0	
4	N4	18	12	0	
5	N5	18	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]
1	ALL			Fixed	Fixed	Fixed
2	N1	Reaction	Reaction	Fixed	Fixed	Fixed
3	N5	Reaction	Reaction	Fixed	Fixed	Fixed

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M3	Y	-0.14	-0.14	0	%100
2	M4	Y	-0.14	-0.14	0	%100

Member Distributed Loads (BLC 2 : Live)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M3	Y	-0.14	-0.14	0	%100
2	M4	Y	-0.14	-0.14	0	%100

Node Loads and Enforced Displacements (BLC 3 : Seismic)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1	N2	L	X	0.75

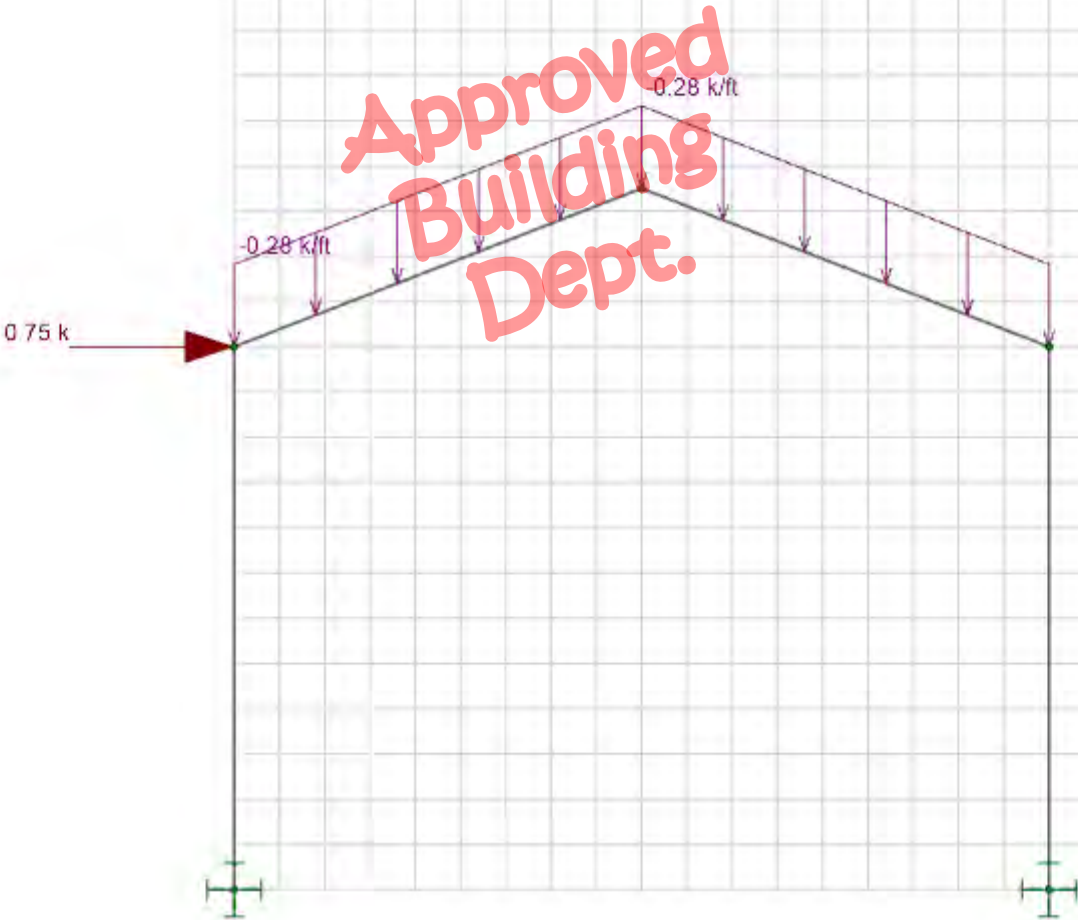
Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Nodal	Distributed
1	Dead	None		-1		2
2	Live	None				2
3	Seismic	None	0.106		1	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	D + L + E	Yes	Y	1	1	2	1	3	1
2	0.6D - E	Yes	Y	1	0.6	3	0.7		

Uniform DL = LL = 20 psf (7' trib) = 140 plf
 Seismic Force = 0.106(20 psf)(300 sf) = 636 lbs. - use 750 lbs.
 Program adds 0.106 to weight of framing for seismic load case.



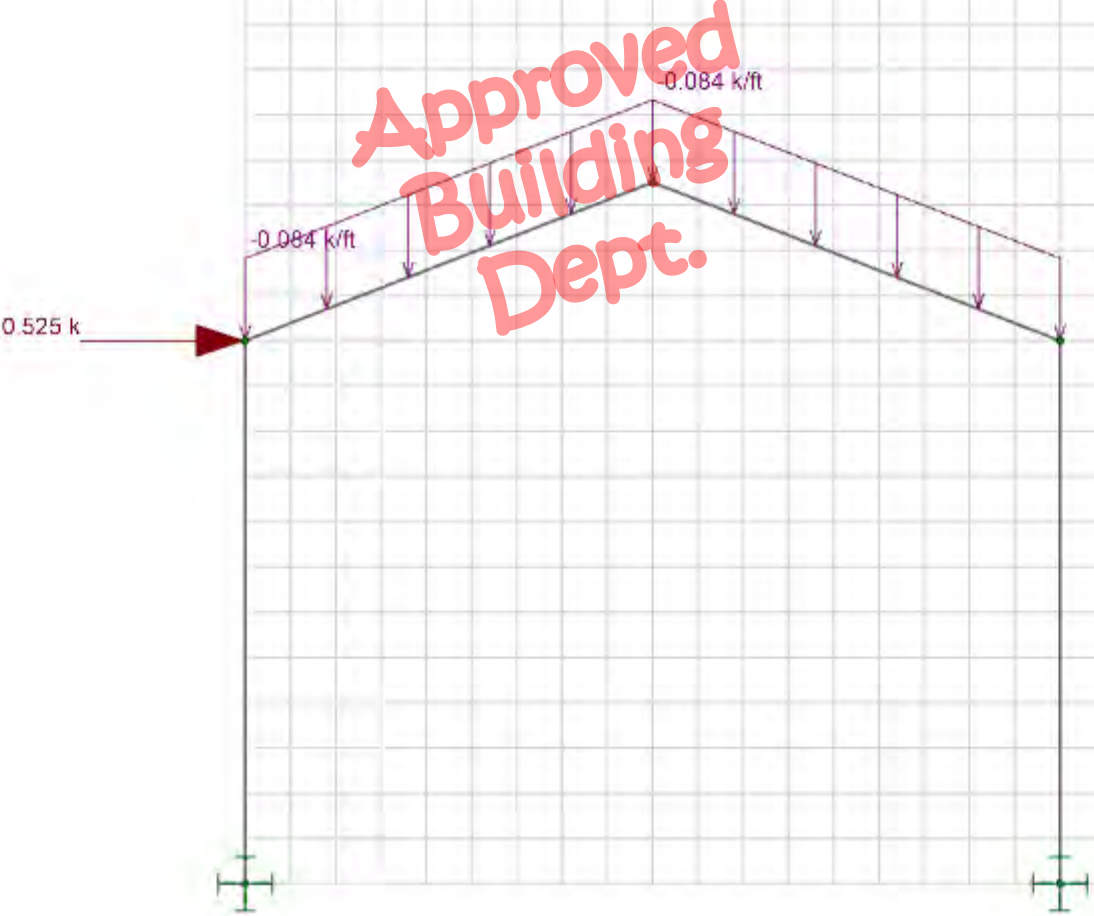
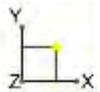
Loads: LC 1, D + L + E



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 D. Adams
 14033A.1.00

Generator Enclosure Moment Frames

SK-1
 Generator Frame.r3d



Loads: LC 2, 0.6D - E



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Generator Enclosure Moment Frames

SK-2
 Generator Frame.r3d



Company : BWE, Inc.
 Designer : D. Adams
 Job Number : 14033A.1.00
 Model Name : Generator Enclosure Moment Fra...

Checked By :

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	0.022	2.871	NC	NC	NC	0
2	1	N5	-0.935	4.07	NC	NC	NC	0
3	1	Totals:	-0.912	6.941	0			
4	1	COG (ft):	X: 9	Y: 12.802	Z: 0			

Node Displacements

	LC	Node Label	X [in]	Y [in]	Z [in]	X Rotation [rad]	Y Rotation [rad]	Z Rotation [rad]
1	1	N1	0	0	0	0	0	-1.728e-3
2	1	N2	0.253	-0.002	0	0	0	-1.838e-3
3	1	N3	0.292	-0.103	0	0	0	4.35e-4
4	1	N4	0.33	-0.002	0	0	0	3.32e-5
5	1	N5	0	0	0	0	0	-3.444e-3

AISC 15TH (360-16): ASD Member Steel Code Checks

	LC	Member	Shape	UC Max	Loc[ft]	Shear UC	Loc[ft]	Dir	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1	1	M1	HSS10X5X6	0.015	0	0.001	12	y	191.066	266.359	42.924	69.78	2.013	H1-1b*
2	1	M2	HSS10X5X6	0.169	12	0.009	0	y	191.066	266.359	42.924	69.78	1.655	H1-1b
3	1	M3	HSS10X5X6	0.091	6.639	0.019	0	y	214.8	266.359	42.924	69.78	1.155	H1-1b
4	1	M4	HSS10X5X6	0.164	9.657	0.03	9.657	y	214.8	266.359	42.924	69.78	2.61	H1-1b



Company : BWE, Inc.
 Designer : D. Adams
 Job Number : 14033A.1.00
 Model Name : Generator Enclosure Moment Fra...

Checked By :

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	-0.174	0.858	NC	NC	NC	0
2	2	N5	-0.465	1.684	NC	NC	NC	0
3	2	Totals:	-0.639	2.542	0			
4	2	COG (ft):	X: 9	Y: 12.196	Z: 0			

Node Displacements

	LC	Node Label	X [in]	Y [in]	Z [in]	X Rotation [rad]	Y Rotation [rad]	Z Rotation [rad]
1	2	N1	0	0	0	0	0	-1.522e-3
2	2	N2	0.19	0	0	0	0	-9.086e-4
3	2	N3	0.201	-0.031	0	0	0	2.997e-4
4	2	N4	0.212	-0.001	0	0	0	-3.348e-4
5	2	N5	0	0	0	0	0	-2.041e-3

AISC 15TH (360-16): ASD Member Steel Code Checks

	LC	Member	Shape	UC Max	Loc[ft]	Shear UC	Loc[ft]	Dir	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1	2	M1	HSS10X5X6	0.029	12	0.002	0	y	191.066	266.359	42.924	69.78	1.621	H1-1b
2	2	M2	HSS10X5X6	0.082	12	0.005	0	y	191.066	266.359	42.924	69.78	1.65	H1-1b
3	2	M3	HSS10X5X6	0.041	4.225	0.005	9.657	y	214.8	266.359	42.924	69.78	1.056	H1-1b
4	2	M4	HSS10X5X6	0.08	9.657	0.011	9.657	y	214.8	266.359	42.924	69.78	2.48	H1-1b



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 9449 Balboa Avenue, Suite 270 ▪ San Diego, CA 92123
 Phone (619) 299-5550 ▪ Fax (619) 299-9934
 www.bwesd.com

ENGINEER: Dave K. Adams, SE
 DATE: January 16, 2024
 PROJECT NUMBER: 14033A

**Approved
 Building
 Dept.**

**SUPPLEMENTAL
 STRUCTURAL CALCULATIONS
 FOR
 NEW MORGUE BUILDING
 TULARE COUNTY SHERIFF**

**SOUTH "O" STREET
 TULARE, CALIFORNIA**

COUNTY OF TULARE
 RESOURCE MANAGEMENT AGENCY
 BUILDING PERMIT NO. A2302173

APPROVED
 PLAN CHECK ONLY

THIS APPROVAL SHALL NOT BE CONSTRUED TO BE
 A PERMIT FOR AN APPROVAL OF ANY VIOLATION OF
 ANY OF THE PROVISIONS OF THE LATEST ADOPTED
 CALIFORNIA BUILDING CODE OR APPLICABLE
 OTHER STATE AND COUNTY LAWS

BY: kreynolds1 DATE: January 25, 2024



DECEMBER 11, 2024

Prepared for

**CHAS RHOADS
 PO BOX 889
 HANFORD, CA 93230**

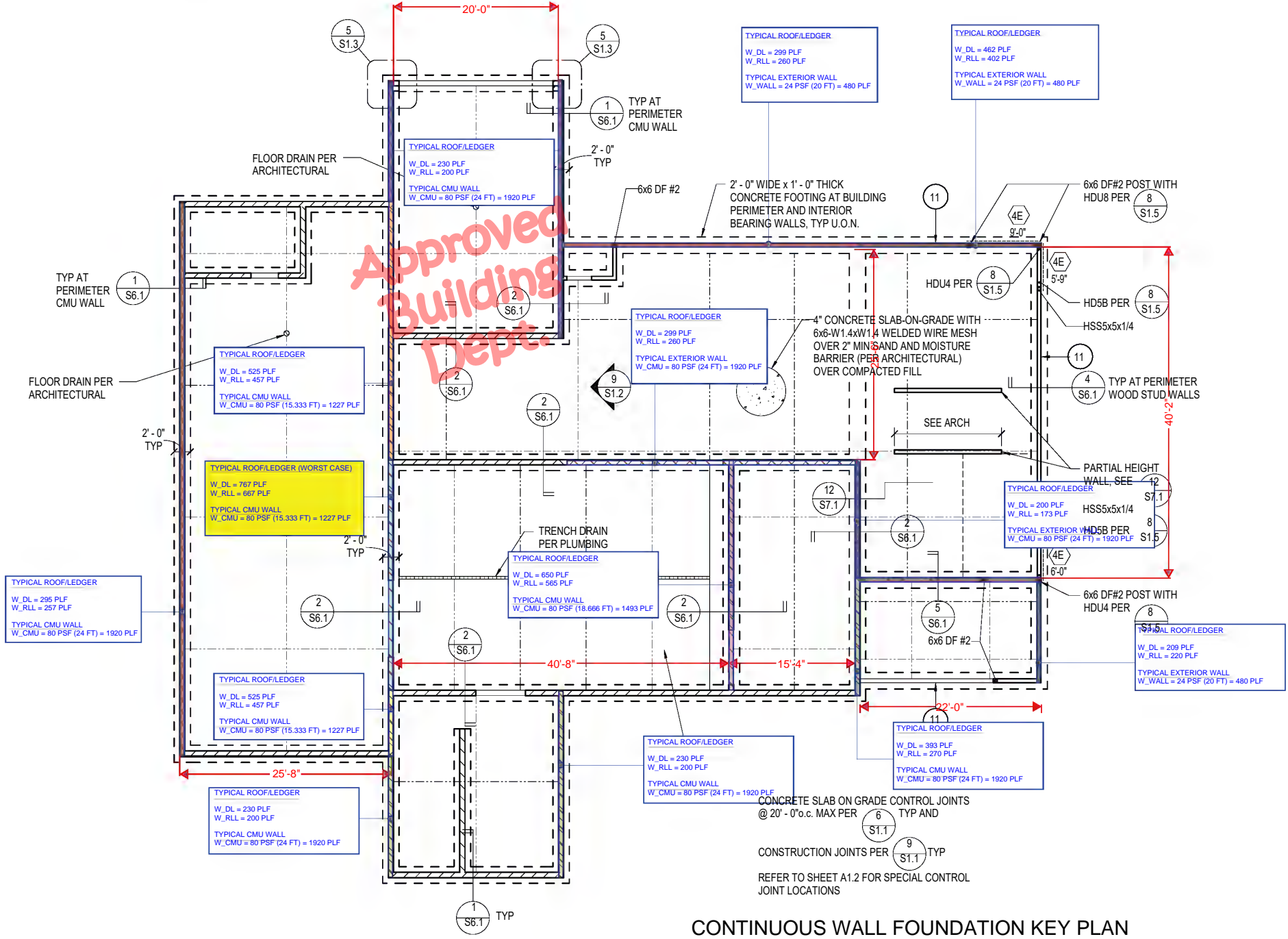


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TABLE OF CONTENTS

PLAN CHECK CALCULATIONS

GRAVITY DEAD AND LIVE LOADING MAP FOR FOUNDATION DESIGN	1
CONTINUOUS WALL FOUNDATION CALCULATIONS	4
GRAVITY DEAD AND LIVE LOADING MAP FOR ROOF FRAMING DESIGN.....	10
OPEN WEB WOOD TRUSS (RED-L) DESIGN.....	11
LEDGER ANCHORAGE TO CMU WALL (HILTI PROFIS)	15
SAWN LUMBER AND ENGINEERED LUMBER BEAM/HEADER/LEDGER DESIGN	19
LABELING TO CLARITY (MATCH BEAM SCHEDULE WITH RISA 3D INPUT/OUTPUTS)	21
STEEL HSS HEADER/JAMB/SILL FOR LARGE OPENING DESIGN	57



CONTINUOUS WALL FOUNDATION KEY PLAN



Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Horizontal Distribution of Seismic Forces - X Direction

(Per ASCE 7-16, Section 12.8.4)

2022 CBC

Level: Office Roof

Area = 2,494 ft²

F_x = 12.9 kips

Wall Line	Trib Area (ft ²)	F _{x,wall} (kips)	F _{x,wall total} (kips)	L _{shear wall} (ft)	V _{wall, ASD} (plf)	Out of Plane W _{wall, ASD} (plf)
1X	861	4.5	4.5	25	124.9	0
2X @ 3Y	769	4.0	4.0	6	0.0	464.8
3X	811	4.2	4.2	20	147.1	0
4X1	457	2.4	2.4	20	82.9	0
4X2	1477	7.7	7.7	32	167.4	0
5X @ 5Y	296	1.5	1.5	20	0.0	53.7
6X1	457	2.4	2.4	14	118.4	0
6X2	708	3.7	3.7	35	73.4	0
7X	862	4.5	4.5	24	130.3	0
8X	235	1.2	1.2	20	42.6	0

Total = 6933 35.9 CHECK

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Project: Tulare County Morgue
Location: Tulare, CA

By: BMM
Date: 5/17/2023
Project Number: 13436A.2.00

Horizontal Distribution of Seismic Forces - Y Direction

(Per ASCE 7-16, Section 12.8.4)

2022 CBC

Level: Office Roof

Area = 2,494 ft²

F_x = 12.9 kips

Wall Line	Trib Area (ft ²)	F _{x,wall} (kips)	F _{x,wall total} (kips)	L _{shear wall} (ft)	V _{wall, ASD} (plf)	Out of Plane W _{wall, ASD} (plf)
1Y	851	4.4	4.4	67	46.1	0.0
2Y	2161	11.2	11.2	77	101.8	0.0
3Y1	963	5.0	5.0	30	116.4	0.0
3Y2	237	1.2	1.2	22	39.1	0.0
4Y	818	4.2	4.2	10	296.6	0.0
5Y	1970	10.2	10.2	22	324.7	0.0
6Y	638	3.3	3.3			

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USE THIS TO DESIGN CMU SHEAR WALL

Total = 7638 39.6 CHECK

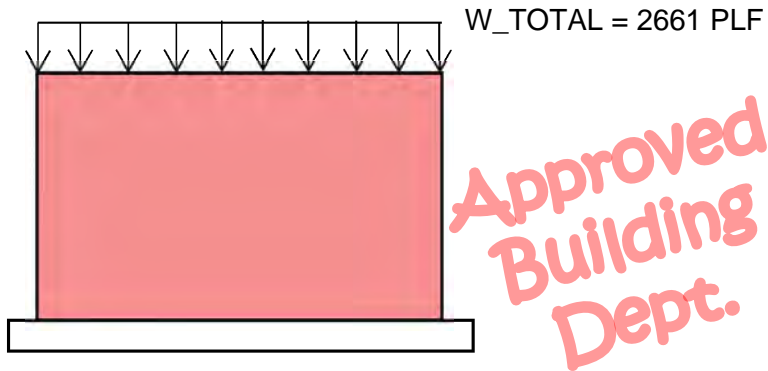




Project: Tulare County Morgue
Location: Tulare, CA

By: SOM
Date: 5/2/2023
Project Number: 13436A.2.00

CONTINUOUS WALL FOUNDATION CALCULATIONS



TYPICAL ROOF/LEDGER (WORST CASE)

W_DL = 767 PLF
W_RLL = 667 PLF

TYPICAL CMU WALL

W_CMU = 80 PSF (15.333 FT) = 1227 PLF

W_TOTAL = 2661 PLF

WIDTH OF FOOTING = 2'

BEARING PRESSURE REQUIRED = 2661 PLF / 2 FT = 1331 PSF < 2000 PSF OK!

PROVIDE 2'-0" WIDE X 1'-0" DEEP CONTINUOUS WALL FOOTING.

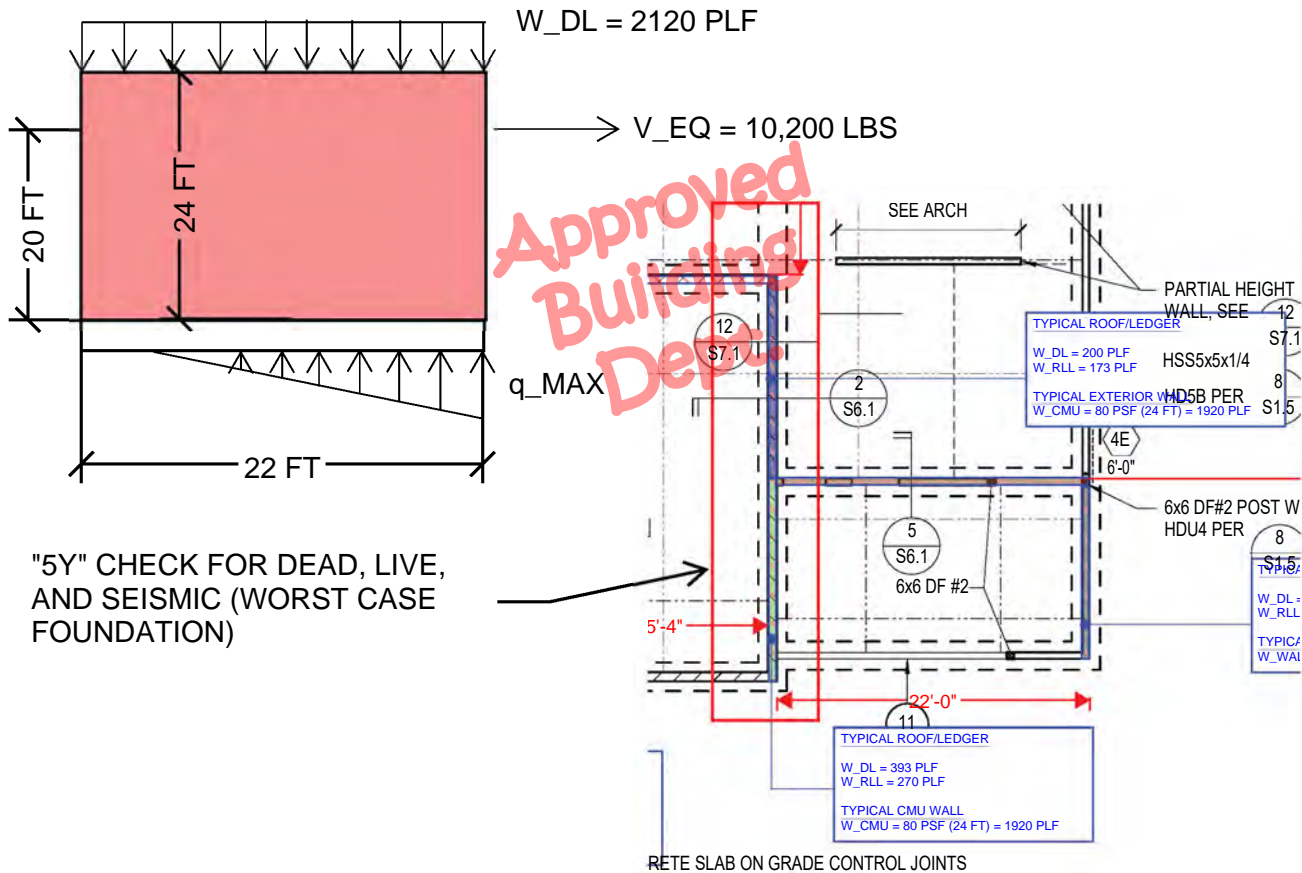
SEE NEXT PAGE ->



Project: Tulare County Morgue
Location: Tulare, CA

By: ~~ESM~~
Date: 5/17/2023
Project Number: ~~13436A-200~~
~~12/12/2023~~

CONTINUOUS WALL FOUNDATION CALCULATIONS CONT.



"5Y" CHECK FOR DEAD, LIVE,
AND SEISMIC (WORST CASE
FOUNDATION)

ALLOWABLE BEARING PRESSURE = 2000 PSF (1.333) = 2667 PSF

(0.6 - 0.14*SDS)DL + 0.7EQ LOAD CASE:

$$DL = 2120 \text{ PLF} \times 22 \text{ FT} + 22 \text{ FT} \times 2 \text{ FT} \times 2 \text{ FT} \times 150 \text{ PCF} = 59840 \text{ LBS}$$

$$Q = (0.6 - 0.14*SDS)DL = 31445 \text{ LBS}$$

$$M = 0.7EQ = 0.7 \times 10,200 \text{ LBS} \times 20 \text{ FT} = 142800 \text{ LBS-FT}$$

$$e = M/Q = 4.54 \text{ FT, THEREFORE } e > B/6 = 3.67 \text{ FT}$$

$$q_{\text{MAX}} = 4Q / 3L(B-2e) = 125780 \text{ LBS} / 77.52 \text{ SQFT} = 1623 \text{ PSF} < 2667 \text{ PSF OK!}$$

PROVIDE 2'-0" WIDE X 1'-0" DEEP CONTINUOUS WALL FOOTING.

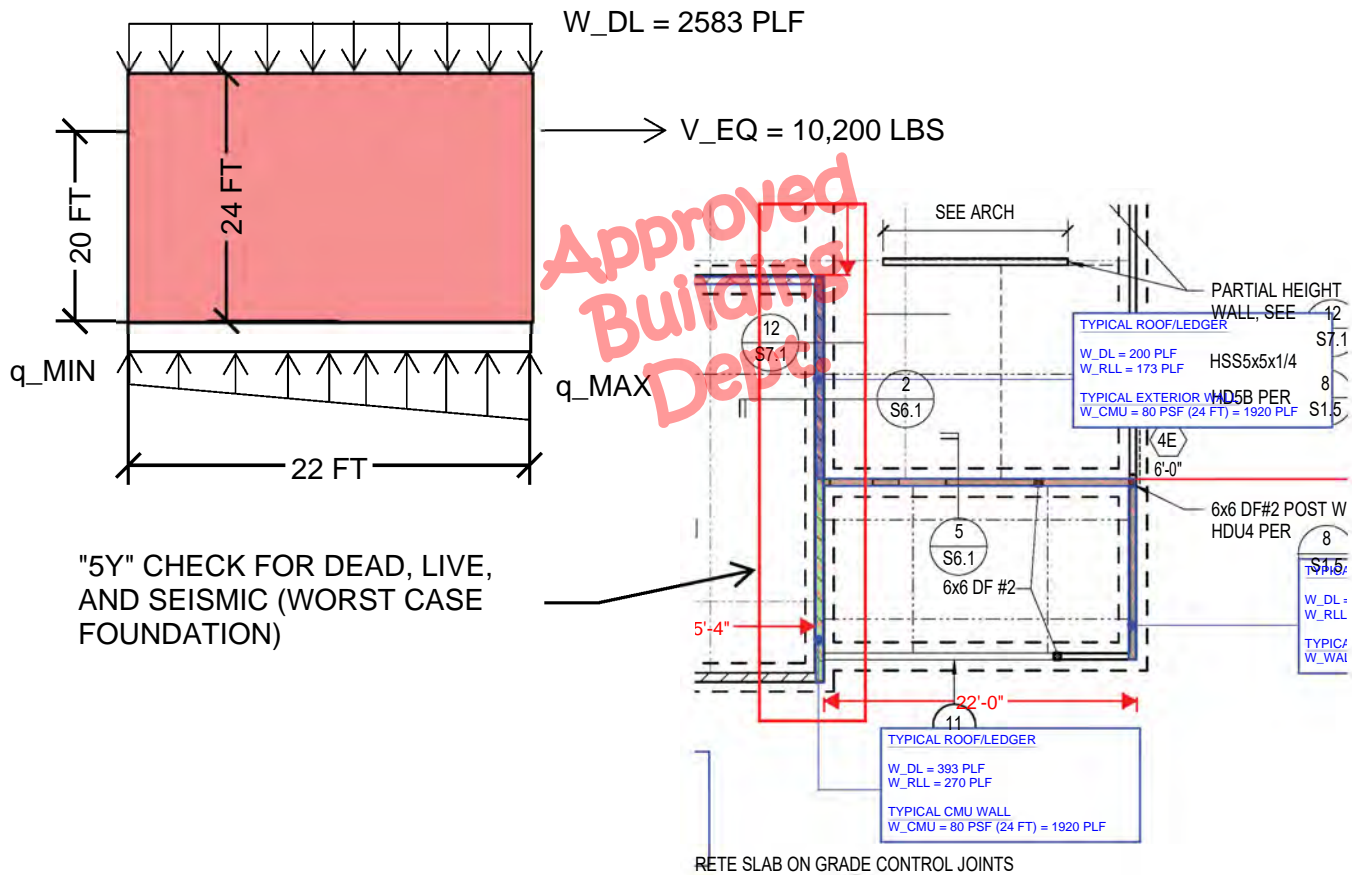
SEE NEXT PAGE ->



Project: Tulare County Morgue
Location: Tulare, CA

By: SOM
Date: 5/27/2023
Project Number: 13436A.2.00

CONTINUOUS WALL FOUNDATION CALCULATIONS CONT.



ALLOWABLE BEARING PRESSURE = 2000 PSF (1.333) = 2667 PSF

(1.0 + 0.14*SDS)DL + 0.7EQ LOAD CASE:

DL = 2583 PLF x 22 FT + 22 FT x 2 FT x 2 FT x 150 PCF = 70026 LBS

Q = (1.0 + 0.14*SDS)DL = 75242 LBS

M = 0.7EQ = 0.7*10,200 LBS x 20 FT = 142800 LBS-FT

e = M/Q = 1.90 FT, THEREFORE e < B/6 = 3.67 FT

q_MAX = (Q / BL)(1 + 6e/B) = (1710)(1.52) = 2599 PSF < 2667 PSF OK!

q_MIN = (Q / BL)(1 - 6e/B) = (1710)(0.48) = 824 PSF < 2667 PSF OK!

PROVIDE 2'-0" WIDE X 1'-0" DEEP CONTINUOUS WALL FOOTING.

Percent Passing 3- Inch Sieve	100
Percent Passing No. 4 Sieve	85-100
Percent Passing No. 200 Sieve	10-40
Expansion Index	Less than 16
R-Value (pavement only)	Minimum 50

9.0 Surface Drainage

9.1 Surface runoff from natural and graded areas should be controlled. Final grading around the structure should be such that there is positive and enduring drainage away from the foundations. For landscape areas without concrete flat slabs, a minimum five percent positive fall away from building perimeter to at least five feet is recommended.

10.0 Foundation Recommendations

10.1 Provided the site preparation procedures presented in this report are preformed, conventional spread footings, bearing in compacted or undisturbed native soil at a minimum depth of 12 inches below grade may be used for supporting the structural loads of the proposed structure.

10.2 Column spread footings may be sized according to a net bearing pressure of 2,500 pounds per square foot (psf). Wall footings may be sized according to a net bearing pressure of 2,000 pounds per square foot (psf), provided they are a minimum of one foot wide.

10.3 The recommended bearing pressure applies to combined dead and sustained live loads and may be increased by one third (1/3) to include transient loads due to wind and seismic effects.

10.4 Based on a column load of 60 kips, a total footing settlement on the order of 1.5 inch is anticipated. Differential settlement between two adjacent isolated footings is expected to be about 1/2 inch.

10.5 The building should be designed to allow differential movement equivalent to an angular distortion of 1/600. For structural design, a Modulus of Subgrade Reaction k- value of 100 pounds per cubic inch may be used

10.6 The proposed structure should be designed with construction specifications and structure properties to withstand the anticipated or probable effects of seismic ground motion, if a seismic event was to occur. The latitude is 36.19522 degrees and the longitude is -119.340423 degrees at the approximate center of the site. Probabilistic values of ground motion corresponding to various levels of seismic hazards have been established by CGS and USGS base on ASCE 7-16. Based on the new procedure in Section 1613 of 2019 California Building Code (CBC), the seismic design parameters are provided as follows.

SEISMIC DESGIN PARAMETERS 2019 CBC		
<u>Property</u>	<u>Symbol</u>	<u>Value</u>
Occupancy Category		III
Site Class		D
Mapped Acceleration Short Periods	S _s	0.607
Mapped Acceleration At 1 Second Periods	S ₁	0.234
Site Coefficient	F _a	1.314

Design Spectral Acceleration Parameter	S_{Ms}	0.798
Design Spectral Acceleration Parameter	S_{Ds}	0.532
Mapped Maximum Considered Earthquake MCE_G	PGA	0.265
Maximum Considered Earthquake MCE_G	PGA_M	0.354

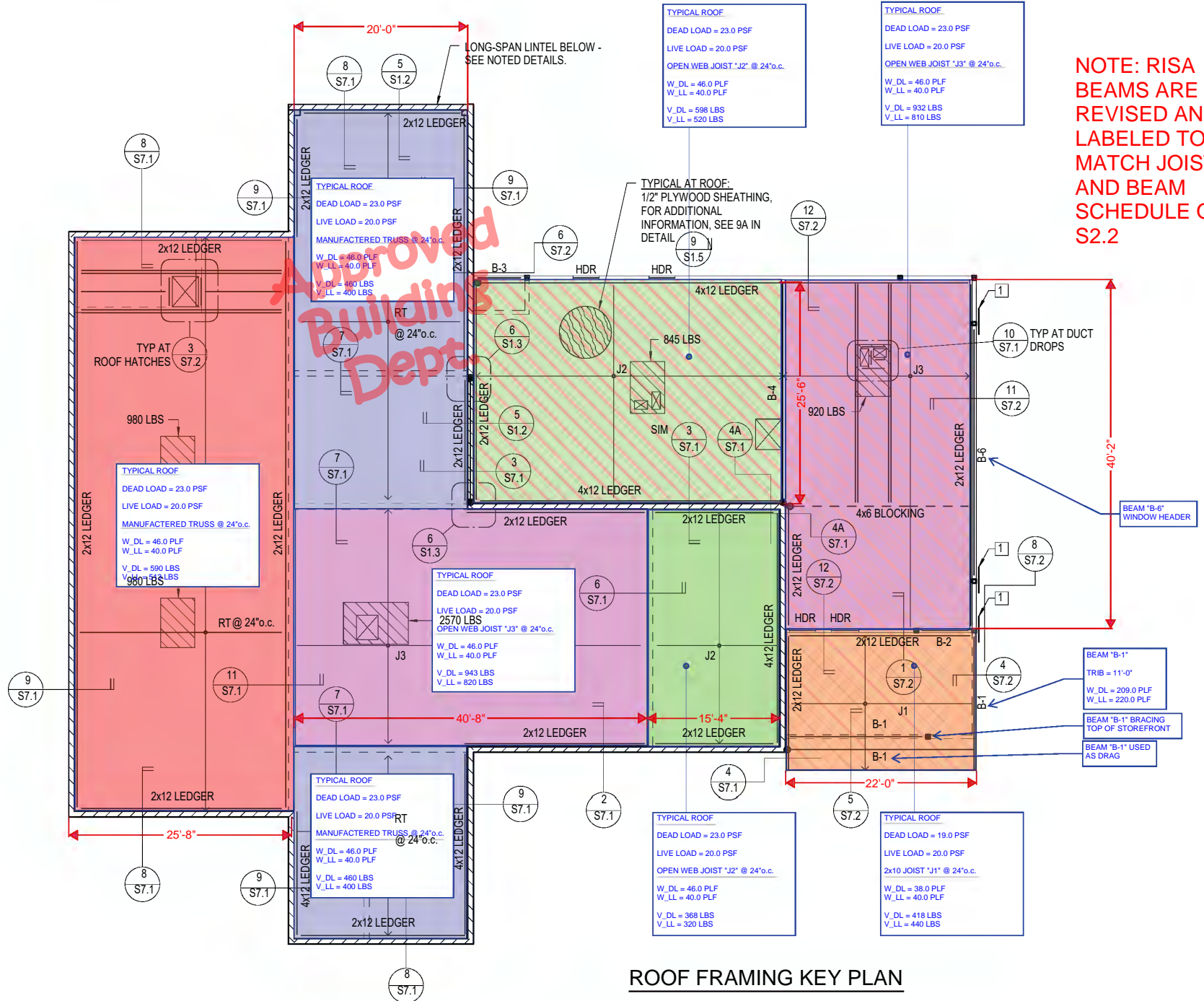
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11.0 Lateral Earth Pressure and Fractional Resistance:

For structures subject to lateral pressures from native soils and backfill at the Site, the following values are recommended:

LATERAL EARTH PRESSURE	
Lateral Pressure and Condition	Equivalent Fluid Pressure, pcf
Active case, drained	45
At-rest case, drained	60
Passive case, drained	360

11.1 Design values assume level, drained granular backfill. Pressures due to surcharge loads from adjacent footings, traffic, etc., should be analyzed separately. The upper one foot of soil of the adjacent grade should not be used in the passive pressure computation. A coefficient of friction of 0.40 may be used between subgrade soil and concrete footings. Vertical soil loads may be calculated based on soil bulk density of 120 pounds per cubic foot.



ROOF FRAMING KEY PLAN

RED-L™ TRUSS ALLOWABLE UNIFORM LOAD TABLE (PLF) / PARALLEL CHORD

SEE PAGE 4 FOR ECONOMICAL TRUSS DESIGN

Load Tables

J-2

Span	Depth														
	14"		16"		18"		20"		22"		24"		26"		
	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	
	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	
14'	292	341	329	383	376	400	380	412	340	390	309	360	299	356	
	208	370	254	395	323	412	367	429		422		385		386	
16'	265	306	306	340	341	361	342	366	335	369	338	351	305	350	
	143	311	190	361	232	370	270	376	318	380		375		380	
18'	215	250	200	286	232	319	309	328	301	332	315	334	301	332	
	110	271	145	306	180	329	215	333	250	340	278	336		339	
20'	184	208	171	245	184	275	203	295	227	297	283	299	291	297	
	84	229	109	260	139	292	167	298	197	303	226	305	255	310	
22'	158	177	142	204	160	233	177	260	200	272	220	271	270	275	
	66	192	84	217	110	252	134	269	155	271	184	276	196	280	
24'	133	150	133	174	143	199	157	223	173	239	185	247	202	249	
	52	164	68	189	88	215	106	241	126	251	146	252	167	254	
26'	106	131	113	152	129	173	136	189	151	213	166	225	176	230	
	43	137	55	160	70	188	86	210	103	222	123	231	140	236	
28'	86	111	109	129	118	148	125	163	136	181	151	199	163	212	
	34	111	45	142	57	158	69	181	86	200	102	214	117	213	
30'		91	93	114	108	128	121	145	127	158	140	173	150	192	
		91	37	121	47	140	58	155	69	175	81	192	93	202	
32'		76	76	100	95	113	107	125	118	142	127	155	136	169	
		76	31	102	39	124	48	140	58	155	68	170	78	184	
34'		63		85	83	101	99	114	105	126	120	138	127	151	
		64		85	33	110	41	124	49	136	58	150	67	164	
36'		55		73		87	86	98	97	108	107	117	114	129	
		55		73		94	35	102	42	117	50	128	58	140	
38'		47		62		78	75	86	85	97	92	105	97	116	
		47		62		80	30	91	36	104	43	115	50	126	
40'		40		53		69		79	79	87	81	96	94	103	
		41		53		69		86	31	94	37	100	43	114	
42'		35		46		60		72		78	79	87	85	95	
		35		47		60		73		82	32	92	38	103	
44'		31		40		50		65		70		80	77	82	
		31		39		52		66		74		85	33	94	
46'				36		45		58		66		73		79	
				36		45		58		69		79		86	
48'				32		40		52		61		67		73	
				32		41		52		62		68		79	
50'						36		45		54		62		65	
						36		45		56		62		73	
52'						32		40		49		57		61	
						33		39		50		59		63	
54'	EXCERPT FROM STRUCTURAL CALCULATIONS DATED JUNE 8, 2023								35		43		52		55
												36		43	
56'									32		40		48		54
												33		40	
58'											36		43		48
														36	
60'													33		46

- See page 5 for available depths and profiles. For depths and profiles not shown, contact your RedBuilt technical representative for assistance.
- Red numbers refer to 115% Total Load (TL).

General Notes

- Values shown demonstrate maximum allowable load capacities based on the following assumptions:
 - Simple span, uniformly loaded conditions, with provisions for positive drainage (¼:12 slope, minimum) in roof applications.
 - Span indicates distance from inside face to inside face of bearing.
 - Top chord no-notch bearing clips with 1¾" bearing. Higher values may be possible with other types of bearing clips.
- Straight line interpolations may be made between depths and spans.
- Values in shaded areas may be increased 7% for repetitive-member use.
- Bold italic values are controlled by minimum concentrated load analysis of 2,000 lbs. Higher loads are possible where minimum concentrated load analysis is not required by code. Contact your RedBuilt technical representative for assistance.

General Notes continued on page 7

Trusses delivered to the jobsite are custom manufactured to resist only project specific application loads provided by the design professional. Actual trusses may not be able to resist the maximum loads shown in the tables above. For questions regarding actual truss capacity contact your RedBuilt technical representative.

RED-L™ TRUSS ALLOWABLE UNIFORM LOAD TABLE (PLF) / PARALLEL CHORD

Continued from page 6

SEE PAGE 4 FOR ECONOMICAL TRUSS DESIGN

Span	Depth													
	28"		30"		32"		34"		36"		38"		40"	
	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL
	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL
14'	295	353	294	324	290	308	277	309	262	300	264	304	243	280
		374		367		365		336		308		318		301
16'	303	347	266	306	264	288	265	305	255	271	256	273	240	275
		380		359		331		332		288		282		283
18'	263	341	266	317	261	279	261	287	237	271	239	250	231	263
		339		345		308		314		297		276		303
20'	270	303	285	298	239	287	242	281	221	259	219	264	221	250
	250	311	267	309		307		327		284		289		274
22'	259	279	257	279	241	266	233	259	228	258	224	253	223	236
	208	282	232	282		279		281		281		278		259
24'	219	255	252	255	242	259	237	258	227	259	218	246	213	246
	185	257	190	260	211	263	228	264		263		264		252
26'	195	231	205	233	233	238	227	237	221	238	232	228	212	230
	158	235	175	242	177	239	198	242	214	243	231	241		237
28'	175	216	214	215	216	220	216	218	218	222	198	222	210	215
	132	220	137	221	152	221	169	224	184	224	195	221		218
30'	159	201	167	204	200	205	194	208	204	208	201	208	204	205
	111	205	124	204	133	207	145	208	159	207	174	205	191	202
32'	149	184	158	191	170	191	181	191	190	195	192	192	189	191
	89	191	99	191	113	193	123	192	137	194	152	190	163	191
34'	138	162	147	174	157	181	165	189	169	182	179	179	180	179
	77	176	87	177	95	174	108	189	119	181	130	182	144	180
36'	123	138	132	146	140	160	151	166	161	170	169	170	170	166
	66	151	75	162	84	171	94	178	103	170	113	169	125	166
38'	113	116	115	134	127	144	136	152	144	161	152	161	159	157
	57	136	64	147	72	157	82	161	91	161	99	161	109	154
40'	102	110	110	122	117	130	125	139	129	147	140	153	148	151
	49	122	55	132	63	142	71	150	79	151	87	151	95	149
42'	92	102	99	108	107	114	114	125	121	129	128	141	133	142
	43	112	49	120	55	127	62	136	69	145	77	145	83	143
44'	78	92	91	96	96	107	103	114	109	121	116	129	121	131
	38	97	43	109	49	117	55	125	61	133	68	137	75	134
46'	77	84	82	92	89	98	95	105	101	112	105	118	112	120
	33	93	38	100	43	106	48	114	54	121	60	128	66	127
48'	70	79	73	85	82	91	87	97	91	102	98	108	103	113
	30	86	34	92	38	98	43	105	48	111	54	118	59	122
50'		72	69	78	71	83	80	89	85	94	90	100	95	105
		79	30	85	34	86	39	96	43	103	48	108	52	115
52'		66		72	70	77	74	82	79	87	83	92	88	97
		73		78	31	84	34	89	39	95	43	100	48	106
54'		62		65		67	69	76	73	81	77	86	82	90
		68		71		78	31	83	34	88	38	93	42	94
56'		57		62		69		72	68	78	72	81	76	86
		65		68		71		78	31	83	35	88	38	93
58'		55		57		62		68		73	67	77	71	82
		58		62		68		75		79	31	83	35	88
60'		52		55		60		64		68		71	66	75
		50		61		65		70		74		78	32	83

J-3

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- See page 5 for available depths and profiles. For depths and profiles not shown, contact your RedBuilt technical representative for assistance.
- Red numbers refer to 115% Total Load (TL).

EXCERPT FROM STRUCTURAL CALCULATIONS DATED JUNE 8, 2023

General Notes continued from page 6

To size floor trusses:

Check both total load (100% TL) and live load (100% LL). When live load is not shown, total load will control. Total load values limit deflection to L/240. Live load values are based on the **Commercial Floor Deflection Limit** shown on page 35, and assume a nailed floor system. Live load (100% LL) values may be increased with a glue-nailed floor system; contact your RedBuilt technical representative for assistance.

To size roof trusses:

Check the appropriate snow load area (115% TL) or non-snow load area (125% TL) value to determine the maximum allowable total load. Total load (115% TL and 125% TL) values limit truss deflection to L/180.

Consult local codes to verify deflection limits required for specific applications.

Trusses delivered to the jobsite are custom manufactured to resist only project specific application loads provided by the design professional. Actual trusses may not be able to resist the maximum loads shown in the tables above. For questions regarding actual truss capacity contact your RedBuilt technical representative.

Wall and Strap Ties for Open-Web Trusses

Listed below is a small sample of the various nail-based straps and ties offered by Simpson Strong-Tie® Company Inc. Please consult their catalog or the USP Structural Connectors® catalog for additional options.

Strap Tension Tie Nailing and Allowable Tension Loads

Design Category	Maximum Ledger Size	Model No.	Non-Cracked Concrete			Cracked Concrete			CMU Wall		
			Nail Qty.	Nail Size	Tension (lbs)	Nail Qty.	Nail Size	Tension (lbs)	Nail Qty.	Nail Size	Tension (lbs)
Wind and SDC A-B	4x	PAI18 ⁽¹⁾	9	10d x 1½"	1,820	9	10d x 1½"	1,820	9	10d x 1½"	1,055
		PAI23 ⁽¹⁾	14	10d x 1½"	2,835	14	10d x 1½"	2,360	14	10d x 1½"	1,805
		PAI28 ⁽¹⁾	16	10d x 1½"	3,370	16	10d x 1½"	2,360	16	10d x 1½"	2,705
		PAI35 ⁽¹⁾	18	10d x 1½"	3,370	18	10d x 1½"	2,360	18	10d x 1½"	2,815
		MPAI32	16	10d x 1½"	2,335	-	-	-	16	10d x 1½"	2,355
		MPAI44	24	10d x 1½"	2,865	-	-	-	24	10d x 1½"	2,865
SDC C-F	4x	PAI18 ⁽¹⁾	9	10d x 1½"	1,820	9	10d x 1½"	1,820	9	10d x 1½"	1,055
		PAI23 ⁽¹⁾	14	10d x 1½"	2,830	14	10d x 1½"	1,980	14	10d x 1½"	1,805
		PAI28 ⁽¹⁾	20	10d x 1½"	2,830	16	10d x 1½"	1,980	16	10d x 1½"	2,705
		PAI35 ⁽¹⁾	20	10d x 1½"	2,830	18	10d x 1½"	1,980	18	10d x 1½"	2,815
		MPAI32	-	-	-	-	-	-	16	10d x 1½"	2,355
		MPAI44	-	-	-	-	-	-	24	10d x 1½"	2,865

(1) LSL cap plate required for strap nailing.

- Table information adapted from Simpson Strong-Tie® catalog *Wood Construction Connectors 2017-2018*, page 89.
- For applicable notes and additional information, see the Simpson Strong-Tie catalog.

Strap Ties

Simpson Tie	Required Nails	Nail Size	Allowable Load (lbs) at 160%
MST37 ⁽¹⁾⁽²⁾	42	16d x 2½"	5,080
MST48 ⁽¹⁾⁽²⁾	50	16d x 2½"	5,310
MSTI48 ⁽¹⁾	48	10d x 1½"	5,065
MSTI60 ⁽¹⁾	60	10d x 1½"	5,080
MSTI72 ⁽¹⁾	72	10d x 1½"	5,080
LSTI49	32	10d x 1½"	2,975
LSTI73	48	10d x 1½"	4,205
LSTA36 ⁽¹⁾	24	10d x 3"	1,640
MSTA36 ⁽¹⁾	26	10d x 3"	2,050

(1) LSL cap plate required for strap nailing.

(2) Not suitable for Red-S™ trusses.

- Values consider full strap nailing.
- Table information adapted from Simpson Strong-Tie® catalog *Wood Construction Connectors 2017-2018*, pages 301-304.

Bolted Wall Ties

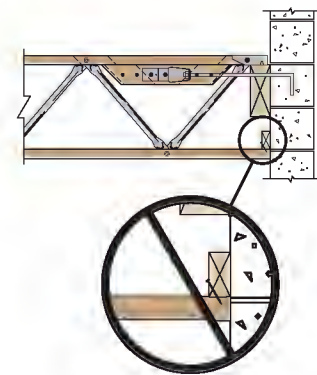
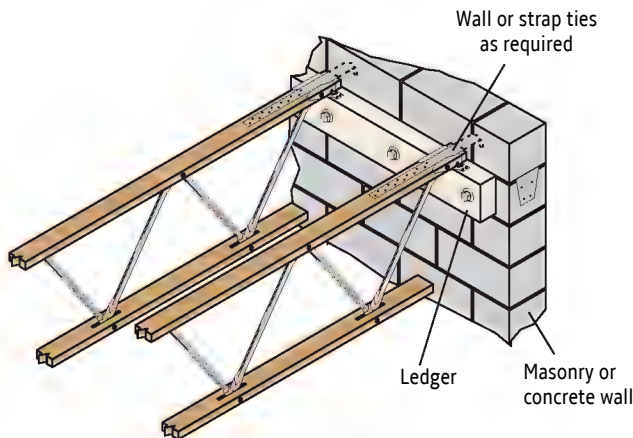
Simpson Tie	Required Fasteners	Allowable Tension Load (lbs) at 160%		
		10d x 1½" Nails	16d x 2½" Nails	SD #10 x 1½" Screws
LTT19	8	1,310		
LTT20B ⁽¹⁾	10	1,355		
LTTI31	18	1,350		
HTT4 ⁽¹⁾	18	3,610	4,235	4,455
HTT5 ⁽¹⁾	26	4,350	5,090	4,555
HTT5KT ⁽¹⁾	26			5,445
HTT5-¾ ⁽¹⁾	26	4,065	5,090	4,830

(1) LSL cap plate required for strap nailing.

• Information adapted from Simpson Strong-Tie® catalog *Wood Construction Connectors 2017-2018*, pages 80-81.

• For applicable notes and additional information, see the Simpson Strong-Tie catalog.

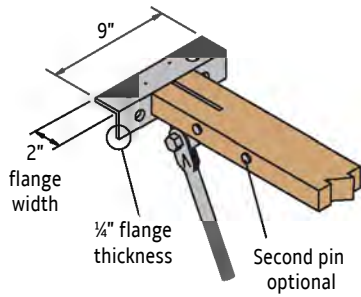
58 Wall and Strap Ties for Red-L™, Red-W™, Red-S™, Red-M™ and Red-H™ Trusses



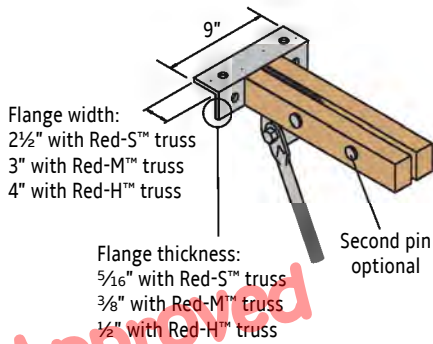
Also see detail 6 on page 13 for more information.

DO NOT attach bottom chord to wall when using any top chord bearing truss

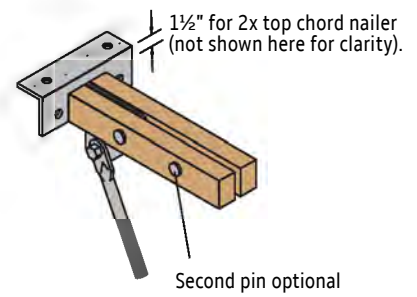
62 Single Chord Flush-Mount Bearing Clip



63 Double Chord Flush-Mount Bearing Clip



64 Double Chord Flush-Mount Bearing Clip with Nailer



Axial Tension or Compression Capacity

Truss Series	Capacity at 133% or 160% (lbs)	
	1 Pin	2 Pin
Red-L™	2,705	4,450
Red-W™	3,700	6,115
Red-S™(1)	4,320	8,125
Red-M™(1)	5,115	10,235
Red-H™(1)	6,325	12,220

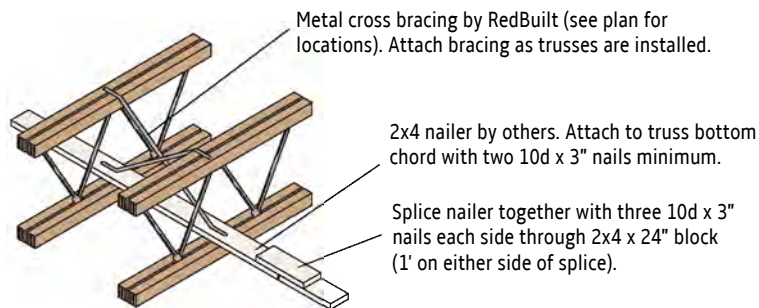
(1) With or without top chord nailer.

- Design professional of record shall provide attachment for clip to bearing.

WIND BRACING

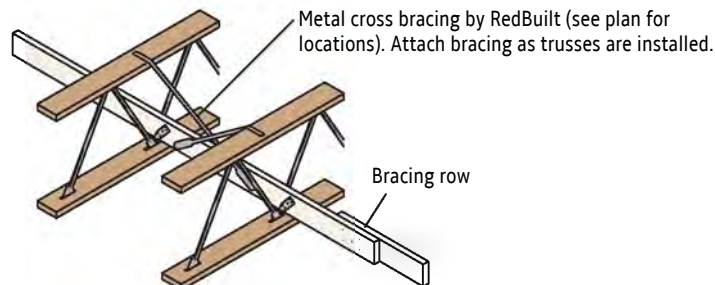
Truss bottom chord bracing may be required by building code provisions for wind uplift design when roof trusses do not have directly applied ceilings. Project engineer shall specify wind load; contact your RedBuilt representative for specific wind bracing stability requirements.

60 Cross Bracing with 2x4 Nailer



For wind bracing on Red-S™, Red-M™ and Red-H™ trusses. Cross bracing may not actually cross.

61 Cross Bracing with Bridging Row



For wind bracing on Red-L™ and Red-W™ trusses. Cross bracing may not actually cross.

LEDGER ANCHORAGE TO CMU WALL

www.hilti.com

Company: BWE, Inc
Address: 9449 Balboa Ave, Suite 270
Phone | Fax: 6192995550 |
Design: Masonry - Feb 28, 2023 (1)
Fastening point:

Page: 1
Specifier: S.C.
E-Mail: scong@bwesd.com
Date: 2/28/2023

Specifier's comments:

1 Input data

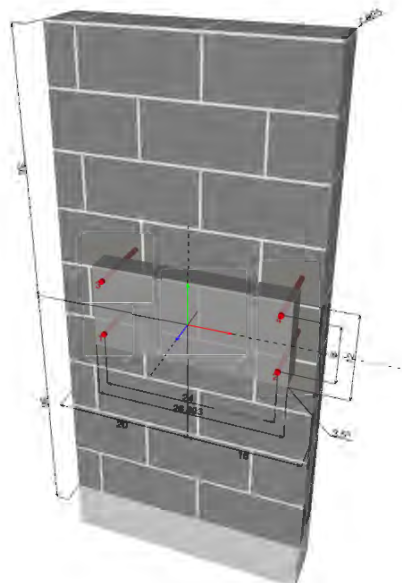
Anchor type and diameter:	HY 100 + threaded rod 5.8 3/4
Item number:	385434 HAS 5.8 3/4"x12" (element) / 2078494 HIT-HY 100 (adhesive)
Effective embedment depth:	$h_{ef} = 6.750$ in.
Material:	5.8
Evaluation Service Report:	ER-547
Issued Valid:	5/16/2022 5/31/2023
Proof:	Design Method ASD Masonry
Stand-off installation:	$e_b = 0.000$ in. (no stand-off); $t = 3.500$ in.
Anchor plate ^R :	$l_x \times l_y \times t = 26.693$ in. x 12.000 in. x 3.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	Grout-filled CMU, L x W x H: 16.000 in. x 8.000 in. x 8.000 in.; Joints: vertical: 0.375 in.; horizontal: 0.375 in. Base material temperature: 68 °F
Installation:	Face installation
Seismic loads	yes



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Dept.

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.]



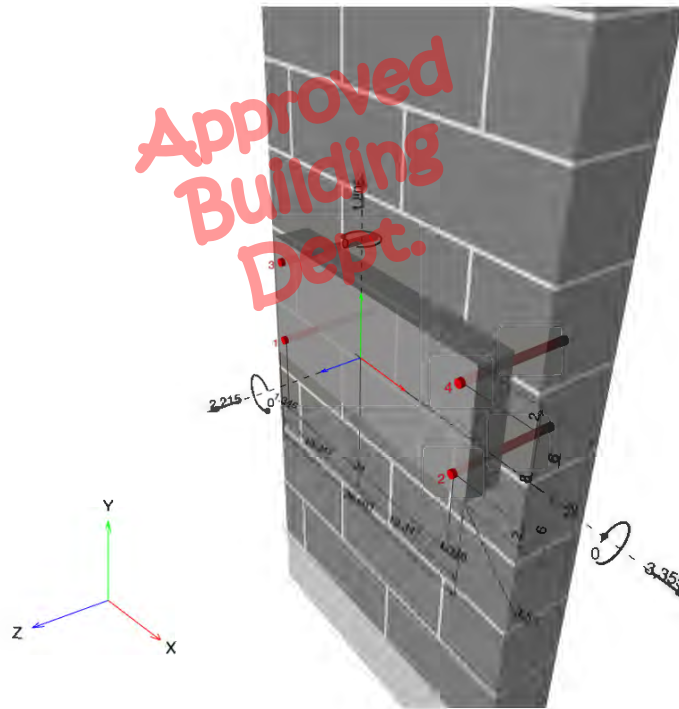
Hilti PROFIS Engineering 3.0.83

www.hilti.com

Company: BWE, Inc
 Address: 9449 Balboa Ave, Suite 270
 Phone | Fax: 6192995550 |
 Design: Masonry - Feb 28, 2023 (1)
 Fastening point:

Page: 2
 Specifier: S.C.
 E-Mail: scong@bwesd.com
 Date: 2/28/2023

Geometry [in.] & Loading [lb, in.lb]



1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 2,215; V _x = 3,355; V _y = 1,806; M _x = 0; M _y = 0; M _z = 0;	yes	94

Hilti PROFIS Engineering 3.0.83
www.hilti.com

Company:	BWE, Inc	Page:	3
Address:	9449 Balboa Ave, Suite 270	Specifier:	S.C.
Phone Fax:	6192995550	E-Mail:	scong@bwesd.com
Design:	Masonry - Feb 28, 2023 (1)	Date:	2/28/2023
Fastening point:			

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Bond strength	554	1,586	35 / -	OK
Shear	Bond strength	-	-	- / 59	OK

Loading	β_N	β_V	α	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.349	0.381	1.000	94	OK

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 Dept.

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

Hilti PROFIS Engineering 3.0.83**www.hilti.com**

Company:	BWE, Inc	Page:	4
Address:	9449 Balboa Ave, Suite 270	Specifier:	S.C.
Phone Fax:	6192995550	E-Mail:	scong@bwesd.com
Design:	Masonry - Feb 28, 2023 (1)	Date:	2/28/2023
Fastening point:			

4 Remarks; Your Cooperation Duties

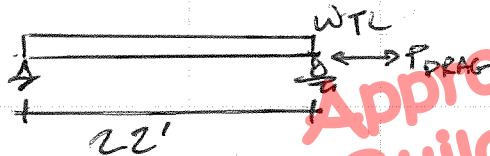
- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
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DATE 2/22/2023**BWE**
ENGINEERED TO EXCEED EXPECTATIONS

SHEET _____

ENGR SC

JOB NO _____

PROJECT TULARE MORGUEBEAMS

$$P_{DRAG} = 0.183 [24(22)(10/2) + 24(12/2)(15/2) + 19(4+12/2)(22)]$$

$$W_{DL} = 19(12/2+4) = 190 \text{ PLF} = 1,446 \text{ LBS}$$

$$W_{LL} = 20(12/2+4) = 200 \text{ PLF} \quad \Omega P_{DRAG} = \frac{2.5(1,446)}{1000 \text{ LBS}} = 3.6 \text{ KIPS}$$

$$W_{TL} = 390 \text{ PLF}$$

CHECK WIND:

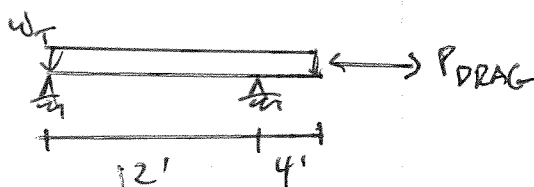
$$G_{CP} = (-1.4, 1.0)$$

$$P = q_n [G_{CP} + G_{Cpi}] = 13.46(-1.4 + -0.18) = 21.3 \text{ PSF}$$

$$W_{WL} = 21.3(10/2) = 106 \text{ PLF}$$

PER RISA 3D, USE 4 X 10 DF #1 B-1

PROVIDE 2X10 BLOCKING @ 48" o.c. TO REDUCE COMPRESSION LENGTH IN WEAK AXIS



$$P_{DRAG} = 0.183 [19(185) + 24(11)(10/2) + 24(12)(15/2)]$$

$$= 1,280 \text{ LBS}$$

$$W_{DL} = 19(2) = 38 \text{ PLF}$$

$$W_{LL} = 20(2) = 40 \text{ PLF}$$

$$W_{WL} = 21.3(15/2) = 160 \text{ PLF}$$

$$\Omega P_{DRAG} = \frac{2.5(1,280)}{1000} = 3.2 \text{ KIPS}$$

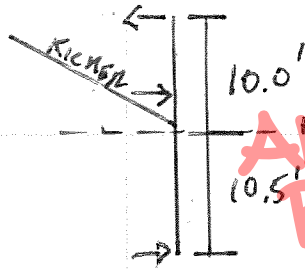
PER RISA 3D, USE 4 X 10 DF #1 B-1

DATE 2/22/2023**BWE**
ENGINEERED TO EXCEED EXPECTATIONS

SHEET _____

ENGR SC

JOB NO _____

PROJECT TULARE MORQUEHEADER

$$W_{WALL} = 21.3 \left(\frac{5'}{2} \right) = 53.3 \text{ PLF}$$

$$W_{HEADER} = 107 \text{ PLF}$$

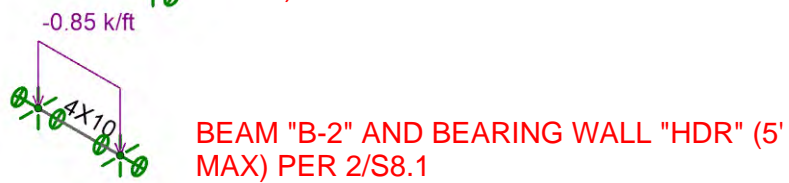
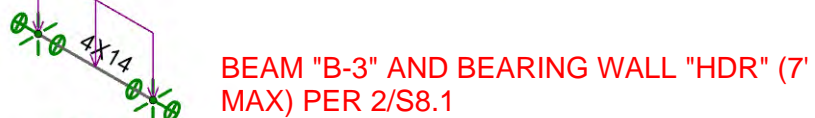
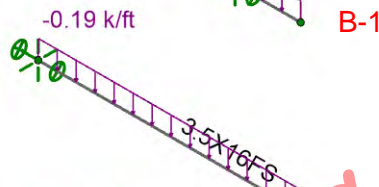
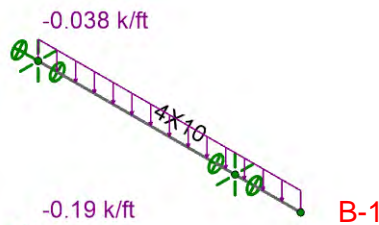
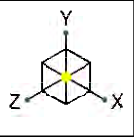
$$W_{SILL} = 21.3 (10.5/2) = 111.8 \text{ PLF}$$

$$P_{ROOF} = -46.5 \text{ PSF OR } 6.6 \text{ PSF FIG 30.4-1}$$

$$\text{LOAD CASE A} = 13.46 (1.0) + 46.5 = 60 \text{ PSF}$$

$$\text{LOAD CASE B} = 13.46 (1.4) + 6.6 = 25.5 \text{ PSF}$$

USE 60 PSF FOR PARABETS



Loads: BLC 1, DEAD
Envelope Only Solution

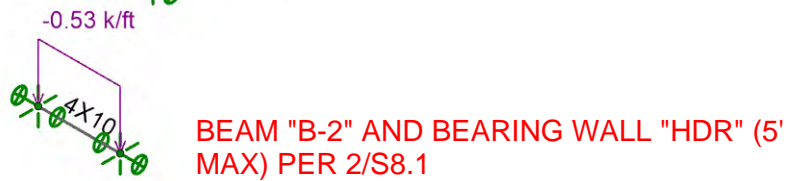
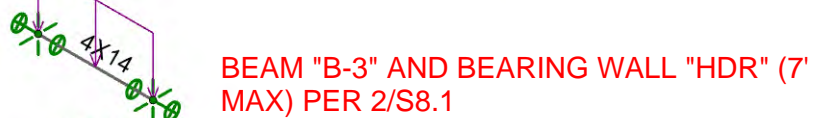
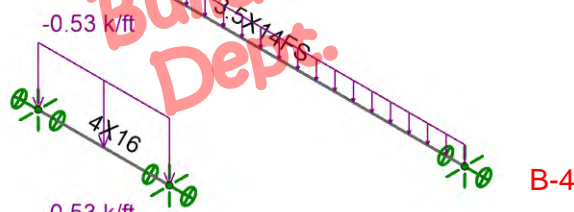
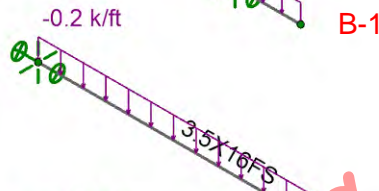
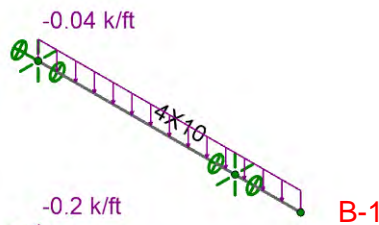
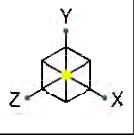
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SK-1

May 17, 2023

BEAMS.r3d



Loads: BLC 2, LIVE
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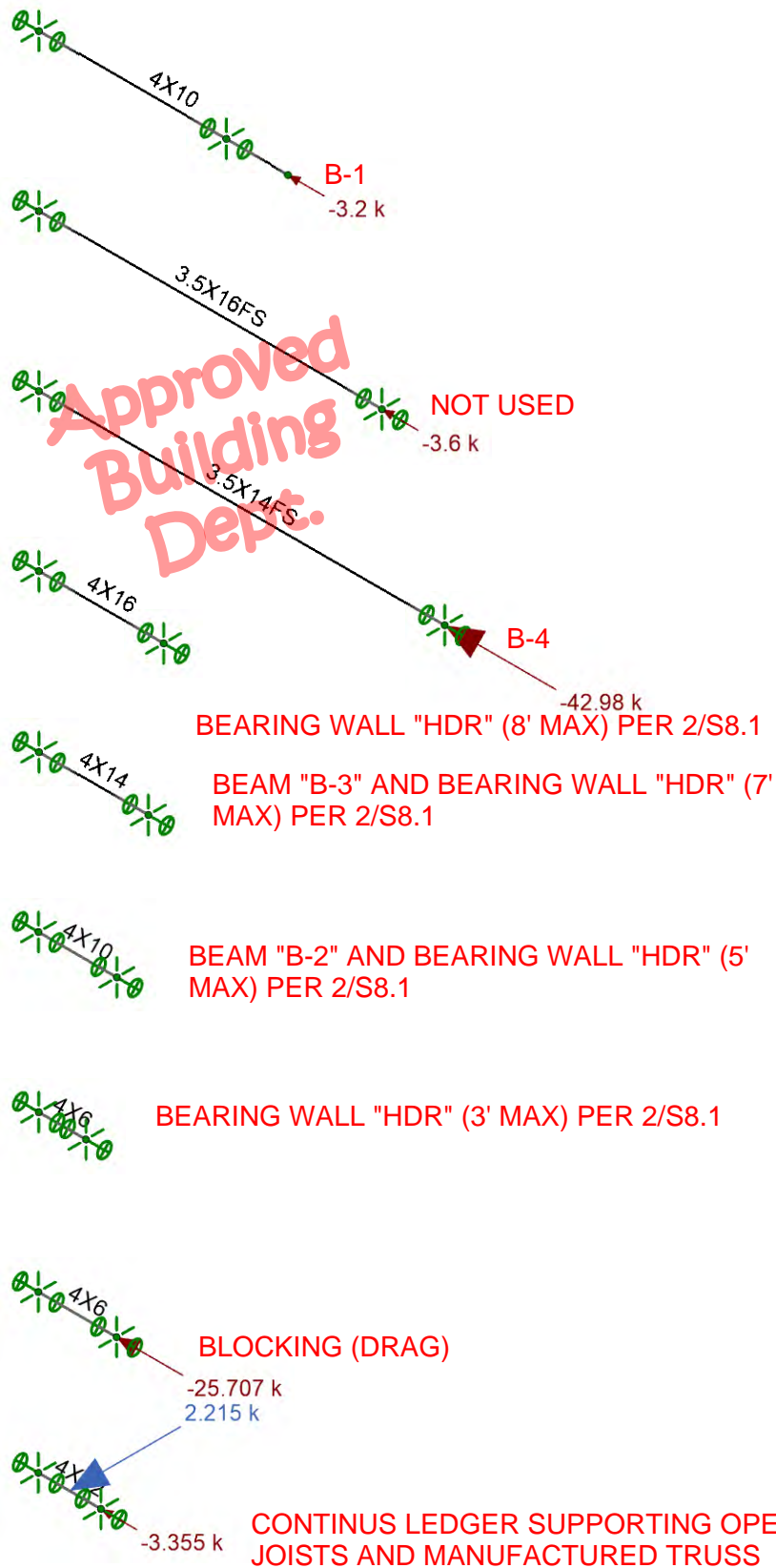
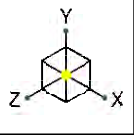
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SK-2

May 17, 2023

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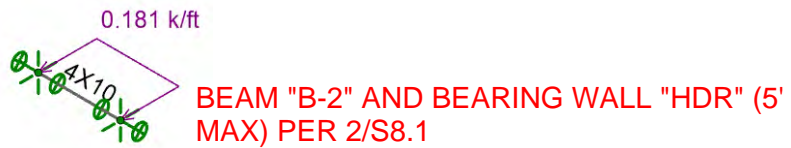
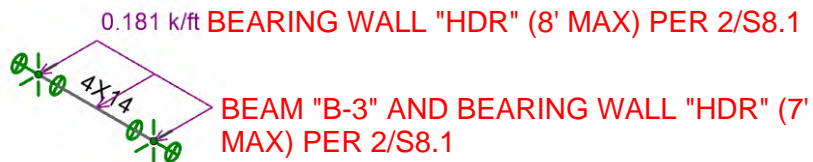
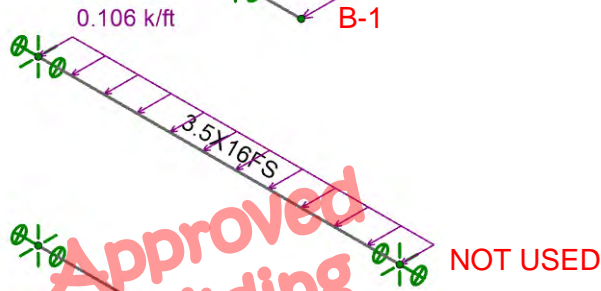
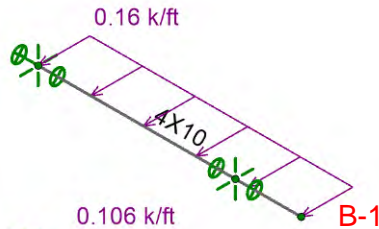
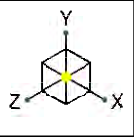


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Loads: BLC 3, DRAG
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SK-3
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Loads: BLC 4, WIND
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SK-4

May 17, 2023

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Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	22	0	0	
3	N3	0	10	0	
4	N4	16	10	0	
5	N5	12	10	0	
6	N6	0	-10	0	
7	N7	26	-10	0	
8	N8	0	-20	0	
9	N9	8	-20	0	
10	N10	0	-30	0	
11	N11	7	-30	0	
12	N12	0	-40	0	
13	N13	5	-40	0	
14	N14	0	-50	0	
15	N15	3	-50	0	
16	N16	0	-60	0	
17	N17	5	-60	0	
18	N18	0	-70	0	
19	N19	4	-70	0	

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Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction
2	N2		Reaction	Reaction	Reaction
3	N3	Reaction	Reaction	Reaction	Reaction
4	N5		Reaction	Reaction	Reaction
5	N6	Reaction	Reaction	Reaction	Reaction
6	N7		Reaction	Reaction	Reaction
7	N8	Reaction	Reaction	Reaction	Reaction
8	N9		Reaction	Reaction	Reaction
9	N10	Reaction	Reaction	Reaction	Reaction
10	N11		Reaction	Reaction	Reaction
11	N12	Reaction	Reaction	Reaction	Reaction
12	N13		Reaction	Reaction	Reaction
13	N14	Reaction	Reaction	Reaction	Reaction
14	N15		Reaction	Reaction	Reaction
15	N16	Reaction	Reaction	Reaction	Reaction
16	N17		Reaction	Reaction	Reaction
17	N18	Reaction	Reaction	Reaction	Reaction
18	N19		Reaction	Reaction	Reaction

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	E _{mod}	Nu	Therm. Coeff. [1e ⁻⁵ F ⁻¹]	Density [k/ft ³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.1			1	0.3	0.3	0.035
2	SP	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.1			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.1			1	0.3	0.3	0.035
5	24F-1.8E DF Balanced	Glulam	NDS Table 5A	24F-1.8E_DF_BAL	na			1	0.3	0.3	0.035
6	24F-1.8E DF Unbalanced	Glulam	NDS Table 5A	24F-1.8E_DF_UNBAL	na			1	0.3	0.3	0.035
7	24F-1.8E SP Balanced	Glulam	NDS Table 5A	24F-1.8E_SP_BAL	na			1	0.3	0.3	0.035
8	24F-1.8E SP Unbalanced	Glulam	NDS Table 5A	24F-1.8E_SP_UNBAL	na			1	0.3	0.3	0.035
9	1.3E-1600F_VERSALAM	SCL	Boise Cascade	1.3E-1600F_VERSALAM	na			1	0.3	0.3	0.035

Wood Properties (Continued)

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e°F ⁻¹]	Density [k/ft ³]
10	1.35E LSL_SolidStart	SCL	Louisiana Pacific	1.35E LSL_SolidStart	na			1	0.3	0.3	0.035
11	1.3E_RIGIDLAM LVL	SCL	Roseburg Forest Products	1.3E_RIGIDLAM LVL	na			1	0.3	0.3	0.035
12	2.0E_DF Parallam PSL	SCL	TrusJoist	2.0E_DF Parallam PSL	na			1	0.3	0.3	0.035
13	LVL_PRL_1.5E_2250F	Custom	N/A	LVL_PRL_1.5E_2250F	na			1	0.3	0.3	0.035
14	LVL_Microlam_1.9E_2600F	Custom	N/A	LVL_Microlam_1.9E_2600F	na			1	0.3	0.3	0.035
15	PSL_Parallam_2.0E_2900F	Custom	N/A	PSL_Parallam_2.0E_2900F	na			1	0.3	0.3	0.035
16	LSL_TimberStrand_1.55E_2325F	Custom	N/A	LSL_TimberStrand_1.55E_2325F	na			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	WOOD1	2X6	Beam	Rectangular Double	DF	Typical	8.25	1.547	20.797	5.125

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K z-z	Cr	y sway	z sway
1	M1	3.5X16FS	22	2	2	Lbyy	2	0.5			
2	M2	4X10	16	2	2	Lbyy	2	0.5			
3	M3	3.5X14FS	26	2	2	Lbyy	2	0.5			
4	M4	4X16	8	2	2	Lbyy	2	0.5			
5	M5	4X14	7	2	2	Lbyy	2	0.5			
6	M6	4X10	5	2	2	Lbyy	2	0.5			
7	M7	4X6	3	2	2	Lbyy	2	0.5			
8	M8	4X6	5	2	2	Lbyy	2	0.5			
9	M9	4X12	4	2	2	Lbyy	2	0.5			

Member Distributed Loads (BLC 1 : DEAD)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.19	-0.19	0	%100
2	M2	Y	-0.038	-0.038	0	%100
3	M3	Y	-0.038	-0.038	0	%100
4	M4	Y	-0.85	-0.85	0	%100
5	M5	Y	-0.85	-0.85	0	%100
6	M6	Y	-0.85	-0.85	0	%100
7	M7	Y	-0.85	-0.85	0	%100

Member Distributed Loads (BLC 2 : LIVE)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.2	-0.2	0	%100
2	M2	Y	-0.04	-0.04	0	%100
3	M3	Y	-0.04	-0.04	0	%100
4	M4	Y	-0.53	-0.53	0	%100
5	M5	Y	-0.53	-0.53	0	%100
6	M6	Y	-0.53	-0.53	0	%100
7	M7	Y	-0.53	-0.53	0	%100

Member Distributed Loads (BLC 4 : WIND)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.106	0.106	0	%100
2	M2	Z	0.16	0.16	0	%100
3	M5	Z	0.181	0.181	0	%100

Member Distributed Loads (BLC 4 : WIND) (Continued)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
4 M6	Z	0.181	0.181	0	%100
5 M4	Z	0.181	0.181	0	%100
6 M7	Z	0.181	0.181	0	%100

Member Point Loads (BLC 1 : DEAD)

Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1 M9	Y	-0.966	%50

Member Point Loads (BLC 2 : LIVE)

Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1 M9	Y	-0.84	%50

Member Point Loads (BLC 3 : DRAG)

Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1 M9	Z	2.215	%50

Basic Load Cases

BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1 DEAD	DL	-1		1	7
2 LIVE	RLL			1	7
3 DRAG	EL		5	1	
4 WIND	WL				6

Load Combinations

Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1 Deflection 1	Yes	Y	DL	1				
2 Deflection 2	Yes	Y	RLL	1				
3 Deflection 3	Yes	Y	DL	1	RLL	1		
4 IBC 16-8	Yes	Y	DL	1				
5 IBC 16-9	Yes	Y	DL	1	RLL	1		
6 IBC 16-10 (a)	Yes	Y	DL	1	RLL	1		
7 IBC 16-11 (a)	Yes	Y	DL	1	RLL	0.75		
8 IBC 16-12 (b) (a)	Yes	Y	DL	1	EL	0.7		
9 IBC 16-12 (b) (b)	Yes	Y	DL	1	EL	-0.7		
10 IBC 16-14 (a)	Yes	Y	DL	1	EL	0.525	RLL	0.75
11 IBC 16-14 (b)	Yes	Y	DL	1	EL	-0.525	RLL	0.75
12 IBC 16-16 (a)	Yes	Y	DL	0.6	EL	0.7		
13 IBC 16-16 (b)	Yes	Y	DL	0.6	EL	-0.7		
14 IBC 16-12 (a) (a)	Yes	Y	DL	1	WL	0.6		
15 IBC 16-13 (a) (a)	Yes	Y	DL	1	WL	0.45	RLL	0.75
16 IBC 16-15 (a)	Yes	Y	DL	0.6	WL	0.6		

Load Combination Design

Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1 Deflection 1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2 Deflection 2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3 Deflection 3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
4	IBC 16-8	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-9		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-10 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-12 (b) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (b) (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-14 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-14 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-16 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-16 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-12 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-13 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-15 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	2.52	12	4.44	6	0	13	0	16	0	16	0	16
2		min	-2.52	9	1.344	12	-0.7	14	0	1	0	1	0	1
3	N2	max	0	16	4.44	6	0	13	0	16	0	16	0	16
4		min	0	1	1.344	12	-0.7	14	0	1	0	1	0	1
5	N3	max	2.24	12	0.458	6	0	13	0	16	0	16	0	16
6		min	-2.24	9	0.147	13	-0.512	14	0	1	0	1	0	1
7	N5	max	0	16	0.916	6	0	13	0	16	0	16	0	16
8		min	0	1	0.293	12	-1.024	14	0	1	0	1	0	1
9	N6	max	30.086	12	1.169	6	0	16	0	16	0	16	0	16
10		min	-30.086	9	0.389	12	0	1	0	1	0	1	0	1
11	N7	max	0	16	1.169	6	0	16	0	16	0	16	0	16
12		min	0	1	0.389	12	0	1	0	1	0	1	0	1
13	N8	max	0	16	5.572	6	0	13	0	16	0	16	0	16
14		min	0	1	2.071	12	-0.434	14	0	1	0	1	0	1
15	N9	max	0	16	5.572	6	0	13	0	16	0	16	0	16
16		min	0	1	2.071	12	-0.434	14	0	1	0	1	0	1
17	N10	max	0	16	4.869	6	0	13	0	16	0	16	0	16
18		min	0	1	1.809	12	-0.38	14	0	1	0	1	0	1
19	N11	max	0	16	4.869	6	0	13	0	16	0	16	0	16
20		min	0	1	1.809	12	-0.38	14	0	1	0	1	0	1
21	N12	max	0	16	3.47	6	0	13	0	16	0	16	0	16
22		min	0	1	1.287	12	-0.271	14	0	1	0	1	0	1
23	N13	max	0	16	3.47	6	0	13	0	16	0	16	0	16
24		min	0	1	1.287	12	-0.272	14	0	1	0	1	0	1
25	N14	max	0	16	2.077	6	0	13	0	16	0	16	0	16
26		min	0	1	0.769	12	-0.163	14	0	1	0	1	0	1
27	N15	max	0	16	2.077	6	0	13	0	16	0	16	0	16
28		min	0	1	0.769	12	-0.163	14	0	1	0	1	0	1
29	N16	max	17.995	12	0.012	15	0	16	0	16	0	16	0	16
30		min	-17.995	9	0	2	0	1	0	1	0	1	0	1
31	N17	max	0	16	0.012	15	0	16	0	16	0	16	0	16
32		min	0	1	0	2	0	1	0	1	0	1	0	1
33	N18	max	2.349	12	0.922	6	0.775	13	0	16	0	16	0	16
34		min	-2.349	9	0.301	12	-0.775	8	0	1	0	1	0	1
35	N19	max	0	16	0.922	6	0.775	13	0	16	0	16	0	16
36		min	0	1	0.301	12	-0.775	8	0	1	0	1	0	1
37	Totals:	max	55.189	12	46.435	6	1.55	13						
38		min	-55.189	9	16.395	12	-5.433	14						

Envelope Node Displacements

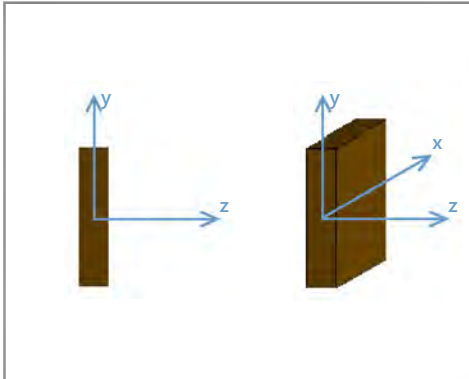
	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	13	0	16	0	16	0	16	0	13	-3.439e-3	16
2		min	0	8	0	3	0	1	0	1	-3.741e-2	14	-1.136e-2	3
3	N2	max	0.006	13	0	16	0	16	0	16	3.741e-2	16	1.136e-2	6
4		min	-0.006	8	0	3	0	1	0	1	0	1	3.439e-3	12
5	N3	max	0	13	0	13	0	16	0	16	0	13	-5.645e-4	13
6		min	0	8	0	3	0	1	0	1	-1.378e-2	14	-1.768e-3	3
7	N4	max	0.008	13	0.048	6	0	13	0	16	7.214e-3	16	9.211e-4	6
8		min	-0.008	8	0.015	13	-0.377	14	0	1	0	1	2.89e-4	13
9	N5	max	0.006	13	0	12	0	16	0	16	9.838e-3	16	1.257e-3	6
10		min	-0.006	8	0	3	0	1	0	1	0	1	3.988e-4	13
11	N6	max	0	13	0	16	0	16	0	16	0	16	-2.077e-3	16
12		min	0	8	0	3	0	1	0	1	0	1	-6.235e-3	3
13	N7	max	0.101	13	0	16	0	16	0	16	0	16	6.235e-3	6
14		min	-0.101	8	0	3	0	1	0	1	0	1	2.077e-3	12
15	N8	max	0	16	0	16	0	16	0	16	0	13	-9.045e-4	16
16		min	0	1	0	3	0	1	0	1	-3.602e-3	14	-2.433e-3	3
17	N9	max	0	16	0	16	0	16	0	16	3.602e-3	16	2.433e-3	6
18		min	0	1	0	3	0	1	0	1	0	1	9.045e-4	12
19	N10	max	0	16	0	16	0	16	0	16	0	13	-9.22e-4	16
20		min	0	1	0	3	0	1	0	1	-2.777e-3	14	-2.482e-3	3
21	N11	max	0	16	0	16	0	16	0	16	2.777e-3	16	2.482e-3	6
22		min	0	1	0	3	0	1	0	1	0	1	9.22e-4	12
23	N12	max	0	16	0	16	0	16	0	16	0	13	-9.837e-4	16
24		min	0	1	0	3	0	1	0	1	-1.45e-3	14	-2.652e-3	3
25	N13	max	0	16	0	16	0	16	0	16	1.45e-3	16	2.652e-3	6
26		min	0	1	0	3	0	1	0	1	0	1	9.837e-4	12
27	N14	max	0	16	0	16	0	16	0	16	0	13	-1.007e-3	16
28		min	0	1	0	3	0	1	0	1	-5.266e-4	14	-2.719e-3	3
29	N15	max	0	16	0	16	0	16	0	16	5.266e-4	16	2.719e-3	6
30		min	0	1	0	3	0	1	0	1	0	1	1.007e-3	12
31	N16	max	0	13	0	2	0	16	0	16	0	16	0	2
32		min	0	8	0	1	0	1	0	1	0	1	-4.254e-5	1
33	N17	max	0.033	13	0	2	0	16	0	16	0	16	4.254e-5	15
34		min	-0.033	8	0	1	0	1	0	1	0	1	0	2
35	N18	max	0	13	0	16	0	12	0	16	3.267e-3	13	-1.213e-4	16
36		min	0	8	0	3	0	9	0	1	-3.267e-3	8	-3.736e-4	3
37	N19	max	0.002	13	0	16	0	12	0	16	3.267e-3	12	3.736e-4	6
38		min	-0.002	8	0	3	0	9	0	1	-3.267e-3	9	1.213e-4	12

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Detail Report: M1

Load Combination: Envelope

Code check: 0.757 (LC 5)



Input Data

Shape:	3.5X16FS (nominal)	I Node:	N1
Member Type:	Beam	J Node:	N2
Length (ft):	22	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

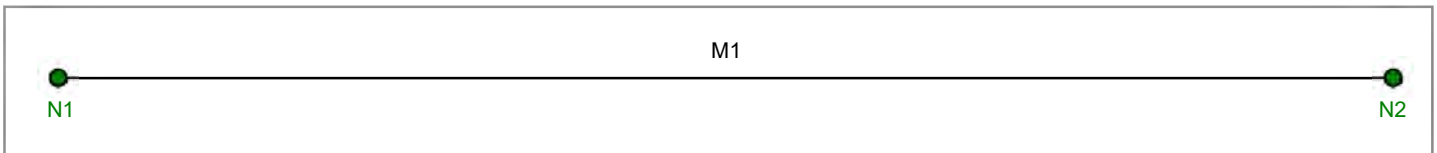
Material:	LVL_Microlam_1.9E_2600F	Grade:	na	Nu:	0.3
Type:	Custom	Cm:	No	Alpha (1e⁵⁰-1):	0.3
Database:	N/A	Ci:	No	Density (k/ft³):	0.035
Species:	LVL_Microlam_1.9E_2600F	Emod:	1		

Shape Properties

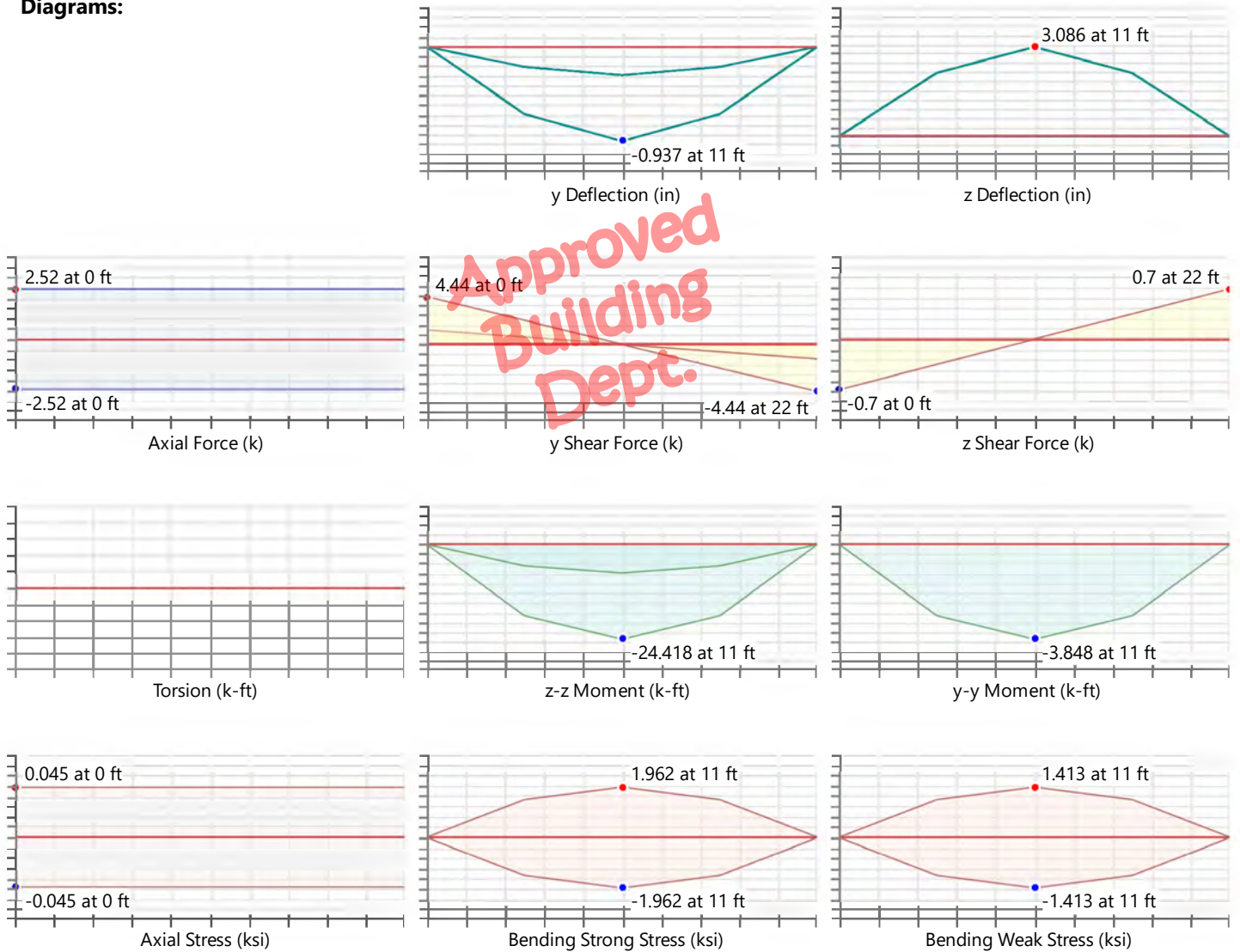
F_b (ksi):	2.6	E (ksi):	1900	b (actual) (in):	3.5
F_t (ksi):	1.555	Emod:	1	d (actual) (in):	16
F_v (ksi):	0.285	COV_E (Table F1):	0.1		
F_c (ksi):	2.51	E_{min} (ksi):	1004.11		

Design Properties

le₂ (ft):	2	y sway:	No	C_r:	1
le₁ (ft):	2	z sway:	No	C_{fu}:	1
le-bend top:	Lbyy	C_D:	1	C_P:	0.984
le-bend bot (ft):	2	R_B:	5.599	Max Defl Ratio:	L/281
K_{y-y}:	1	C_L:	0.996	Max Defl Location:	11
K_{z-z}:	0.5	C_V:	1	Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.47 ksi	-	-
Axial Tension Analysis	-	0 ksi	1.555 ksi	-	-
Flexural Analysis, Fb1'	-	1.962 ksi	2.591 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	2.6 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.757	PASS
Bending & Axial Tension Analysis	-	-	-	0.757	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 32 of 74
5/17/2023
10:35:57 AM
Checked By : _____

Shear Analysis	-	0.119 ksi	0.285 ksi	0.417	PASS
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Detail Report: M2

Load Combination: Envelope

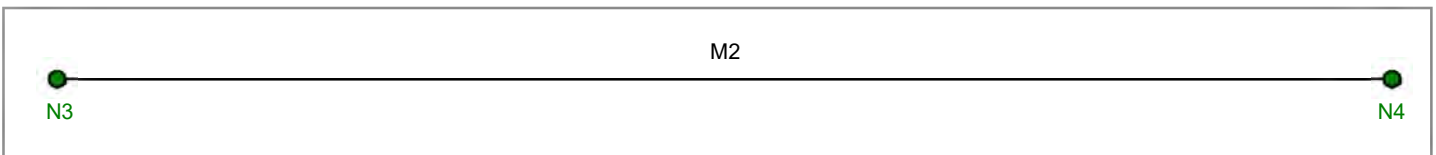
Code check: 0.493 (LC 14)

	Input Data	
	Shape: 4X10 (nominal) Member Type: Beam Length (ft): 16 Material Type: Wood Design Rule: Typical Internal Sections: 97 Design Code: AWC NDS-18: ASD	I Node: N3 J Node: N4 I Release: Fixed J Release: Fixed I Offset: N/A J Offset: N/A T/C Only: Both Way

Material Properties			
Material:	DF	Grade:	No.1
Type:	Solid Sawn	Cm:	No
Database:	Visually Graded	Ci:	No
Species:	Douglas Fir-Larch	Emod:	1
		Nu:	0.3
		Alpha (1e⁵⁰ F⁻¹):	0.3
		Density (k/ft³):	0.035

Shape Properties			
F_b (ksi):	1	E (ksi):	1700
F_t (ksi):	0.675	E_{mod}:	1
F_v (ksi):	0.18	COV_E (Table F1):	0.25
F_c (ksi):	1.5	E_{min} (ksi):	621.025
		b (actual) (in):	3.5
		d (actual) (in):	9.25

Design Properties			
le2 (ft):	2	y sway:	No
le1 (ft):	2	z sway:	No
le-bend top:	Lbyy	C_D:	1.6
le-bend bot (ft):	2	R_B:	4.257
K_{y-y}:	1	C_L:	0.998
K_{z-z}:	0.5	C_r:	1
		C_{fu}:	1
		C_P:	0.95
		Max Defl Ratio:	L/1918
		Max Defl Location:	5.667
		Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	14	-	-	-	-
Applied Loading - Shear + Torsion	15	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.279 ksi	-	-
Axial Tension Analysis	-	0 ksi	1.188 ksi	-	-
Flexural Analysis, Fb1'	-	0.157 ksi	1.915 ksi	-	-
Flexural Analysis, Fb2'	-	0.867 ksi	2.112 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.493	PASS
Bending & Axial Tension Analysis	-	-	-	0.493	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 35 of 74
5/17/2023
10:35:58 AM
Checked By : _____

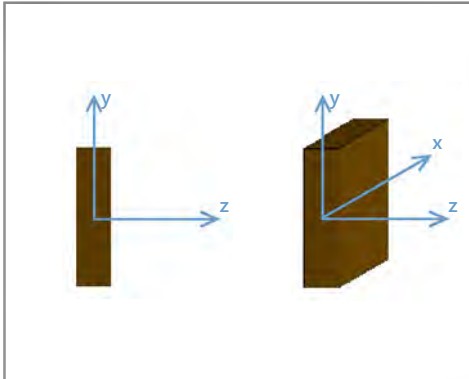
Shear Analysis	-	0.027 ksi	0.18 ksi	0.147	PASS
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Detail Report: M3

Load Combination: Envelope

Code check: 0.355 (LC 11)



Input Data

Shape:	3.5X14FS (nominal)	I Node:	N6
Member Type:	Beam	J Node:	N7
Length (ft):	26	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

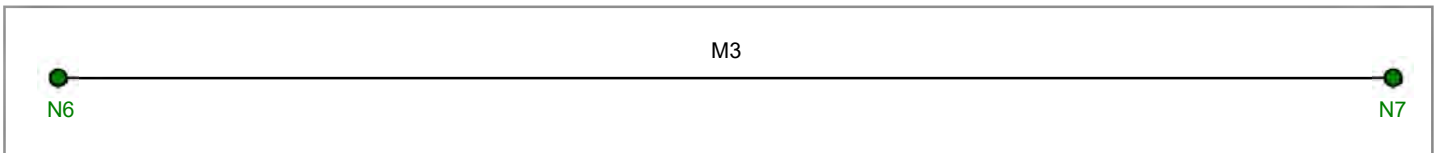
Material:	LVL_Microlam_1.9E_2600F	Grade:	na	Nu:	0.3
Type:	Custom	Cm:	No	Alpha (1e⁵⁰-1):	0.3
Database:	N/A	Ci:	No	Density (k/ft³):	0.035
Species:	LVL_Microlam_1.9E_2600F	Emod:	1		

Shape Properties

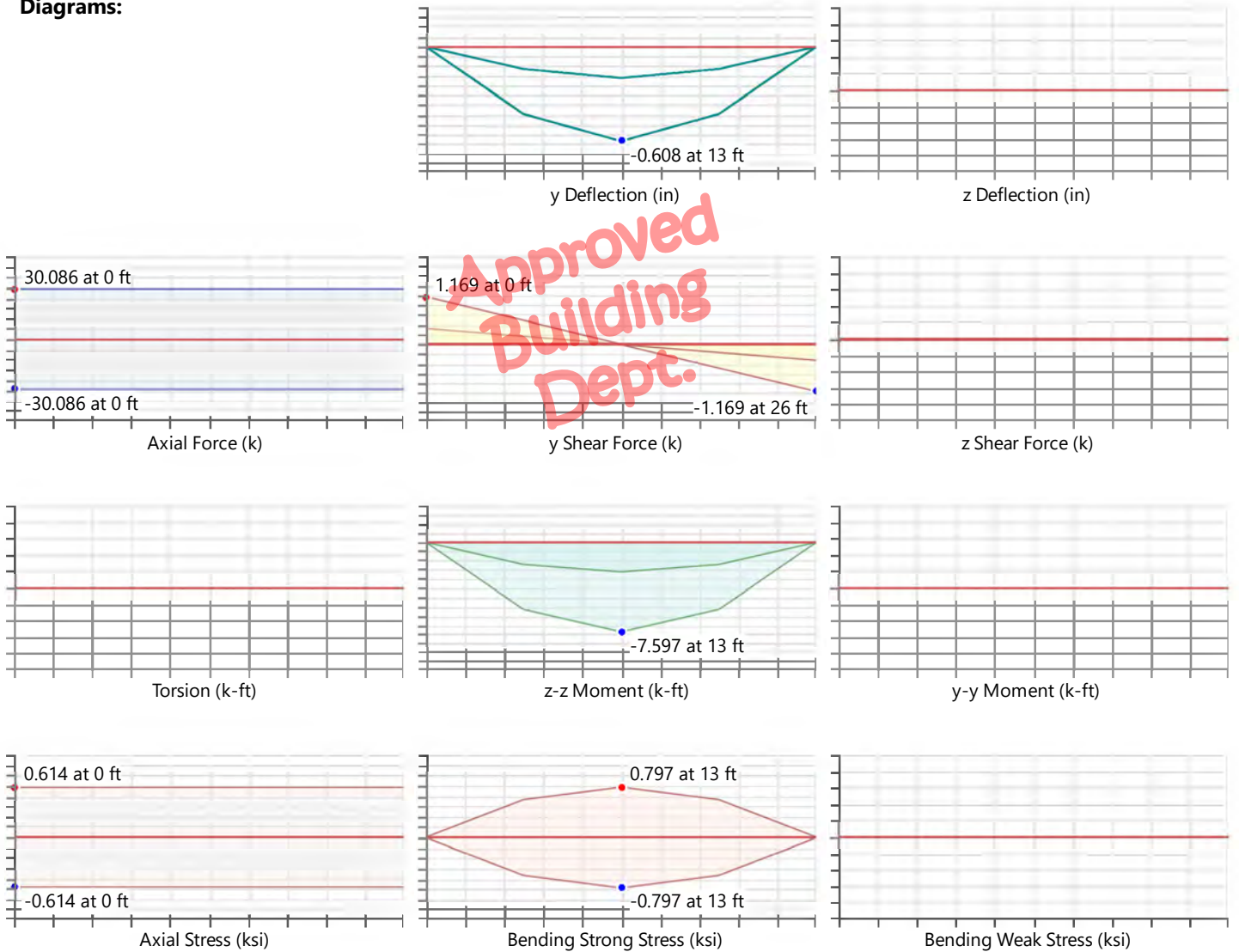
F_b (ksi):	2.6	E (ksi):	1900	b (actual) (in):	3.5
F_t (ksi):	1.555	Emod:	1	d (actual) (in):	14
F_v (ksi):	0.285	COV_E (Table F1):	0.1		
F_c (ksi):	2.51	E_{min} (ksi):	1004.11		

Design Properties

le2 (ft):	2	y sway:	No	C_r:	1
le1 (ft):	2	z sway:	No	C_{fu}:	1
le-bend top:	Lbyy	C_D:	1.6	C_P:	0.972
le-bend bot (ft):	2	R_B:	5.237	Max Defl Ratio:	L/513
K_{y-y}:	1	C_L:	0.995	Max Defl Location:	13
K_{z-z}:	0.5	C_v:	1	Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	11	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	3.904 ksi	-	-
Axial Tension Analysis	-	-0.461 ksi	2.488 ksi	-	-
Flexural Analysis, Fb1'	-	0.709 ksi	4.138 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	4.16 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.171	PASS
Bending & Axial Tension Analysis	-	-	-	0.355	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 38 of 74
5/17/2023
10:36:00 AM
Checked By : _____

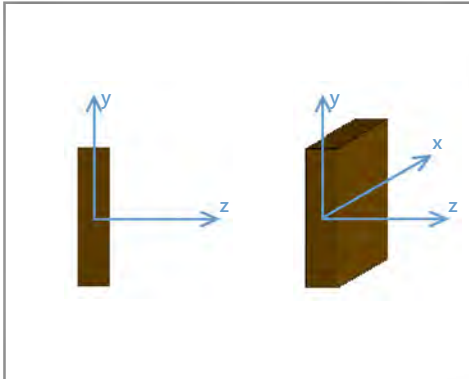
Shear Analysis	-	0.036 ksi	0.285 ksi	0.126	PASS
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Detail Report: M4

Load Combination: Envelope

Code check: 0.988 (LC 5)



Input Data

Shape:	4X16 (nominal)	I Node:	N8
Member Type:	Beam	J Node:	N9
Length (ft):	8	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

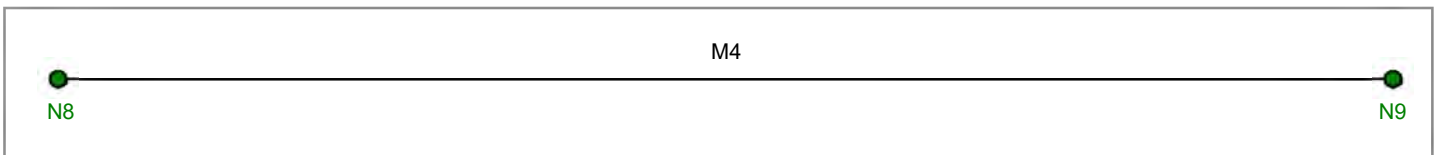
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵⁰ F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

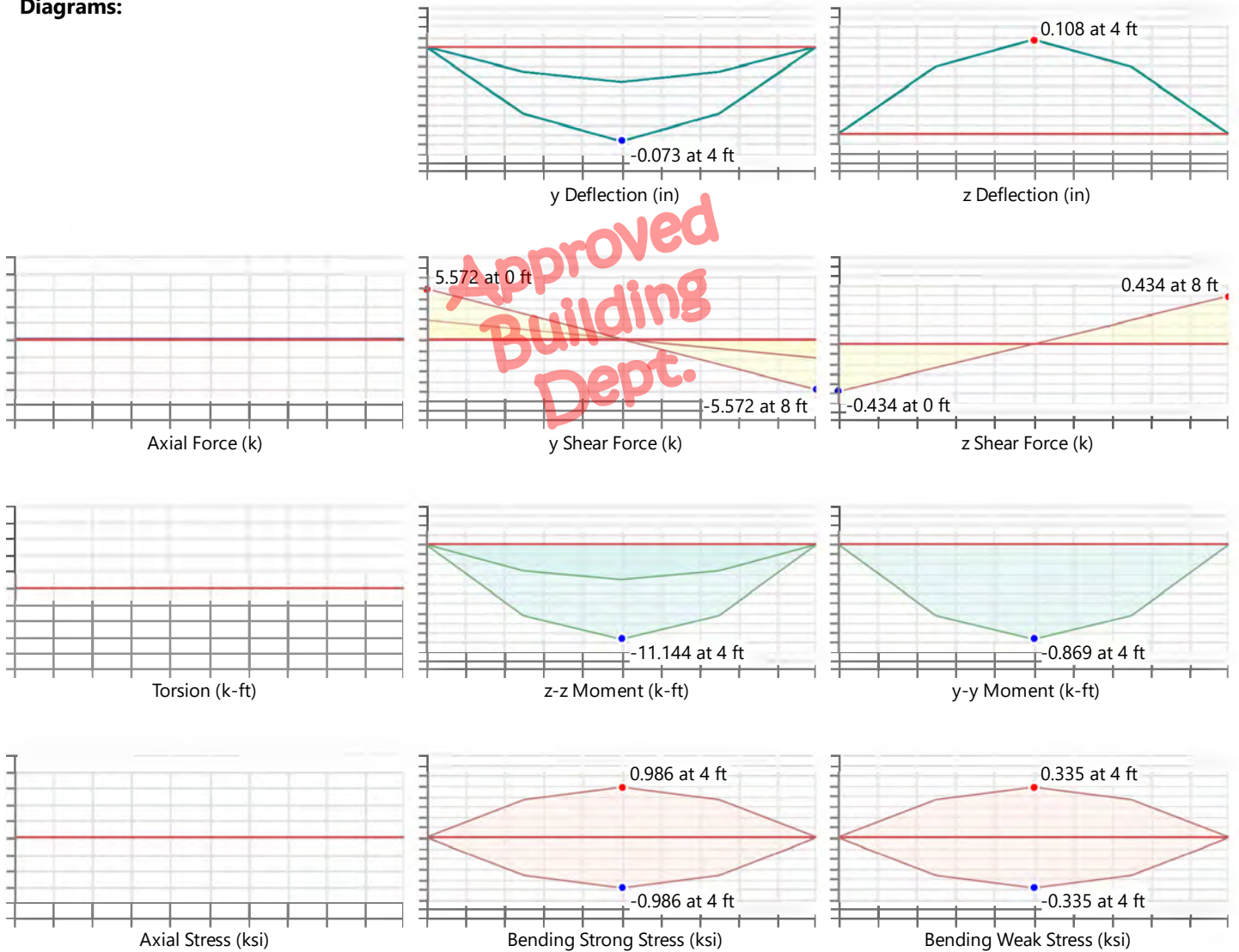
F_b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F_t (ksi):	0.675	E_{mod}:	1	d (actual) (in):	15.25
F_v (ksi):	0.18	COV_E (Table F1):	0.25		
F_c (ksi):	1.5	E_{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C_{fu}:	1
le1 (ft):	2	z sway:	No	C_p:	0.973
le-bend top:	Lbyy	C_D:	1	Max Defl Ratio:	L/1315
le-bend bot (ft):	2	R_B:	5.466	Max Defl Location:	4
K_{y-y}:	1	C_L:	0.998	Span:	1
K_{z-z}:	0.5	C_r:	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.314 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.608 ksi	-	-
Flexural Analysis, Fb1'	-	0.986 ksi	0.998 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.988	PASS
Bending & Axial Tension Analysis	-	-	-	0.988	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 41 of 74
5/17/2023
10:36:02 AM
Checked By : _____

Shear Analysis	-	0.157 ksi	0.18 ksi	0.87	PASS
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Detail Report: M5

Load Combination: Envelope

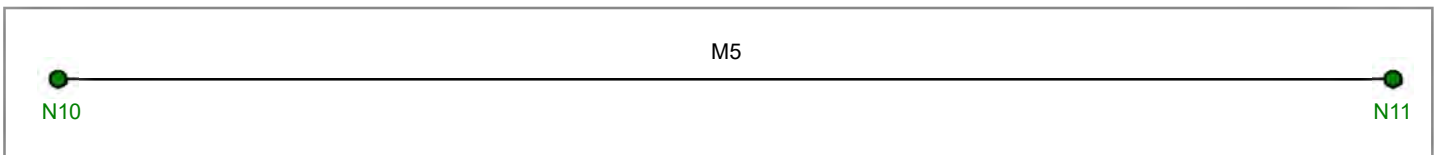
Code check: 1.000 (LC 5)

	Input Data	
	Shape: 4X14 (nominal) Member Type: Beam Length (ft): 7 Material Type: Wood Design Rule: Typical Internal Sections: 97 Design Code: AWC NDS-18: ASD	I Node: N10 J Node: N11 I Release: Fixed J Release: Fixed I Offset: N/A J Offset: N/A T/C Only: Both Way

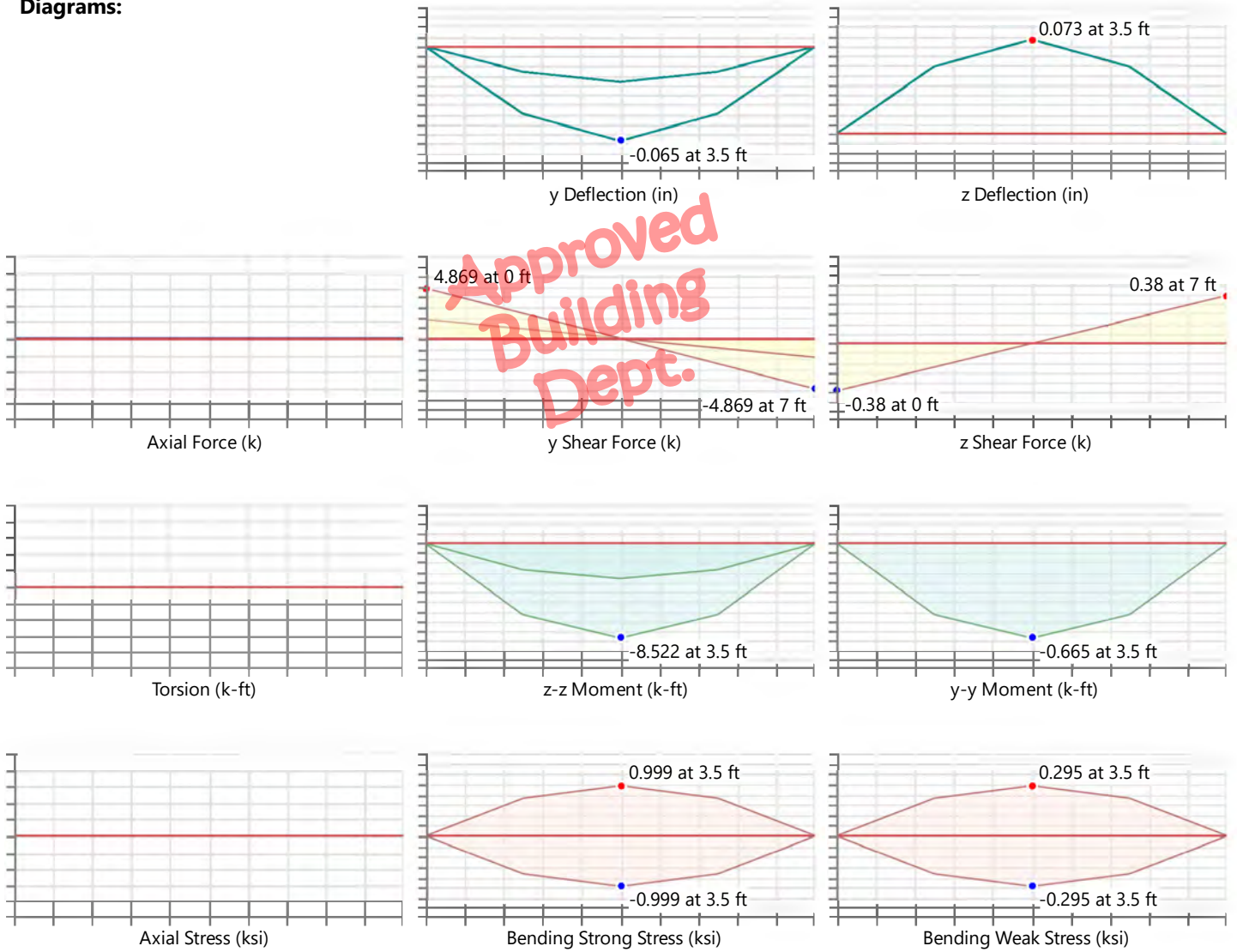
Material Properties			
Material:	DF	Grade:	No.1
Type:	Solid Sawn	Cm:	No
Database:	Visually Graded	Ci:	No
Species:	Douglas Fir-Larch	Emod:	1
		Nu:	0.3
		Alpha (1e⁵⁰ F⁻¹):	0.3
		Density (k/ft³):	0.035

Shape Properties			
F_b (ksi):	1	E (ksi):	1700
F_t (ksi):	0.675	E_{mod}:	1
F_v (ksi):	0.18	COV_E (Table F1):	0.25
F_c (ksi):	1.5	E_{min} (ksi):	621.025
		b (actual) (in):	3.5
		d (actual) (in):	13.25

Design Properties			
le2 (ft):	2	y sway:	No
le1 (ft):	2	z sway:	No
le-bend top:	Lbyy	C_D:	1
le-bend bot (ft):	2	R_B:	5.095
K_{y-y}:	1	C_L:	0.998
K_{z-z}:	0.5	C_r:	1
		C_{fu}:	1
		C_P:	0.973
		Max Defl Ratio:	L/1289
		Max Defl Location:	3.5
		Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.314 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.608 ksi	-	-
Flexural Analysis, Fb1'	-	0.999 ksi	0.998 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	1	FAIL
Bending & Axial Tension Analysis	-	-	-	1	FAIL



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 44 of 74
5/17/2023
10:36:04 AM
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Shear Analysis	-	0.158 ksi	0.18 ksi	0.875	PASS
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Detail Report: M6

Load Combination: Envelope

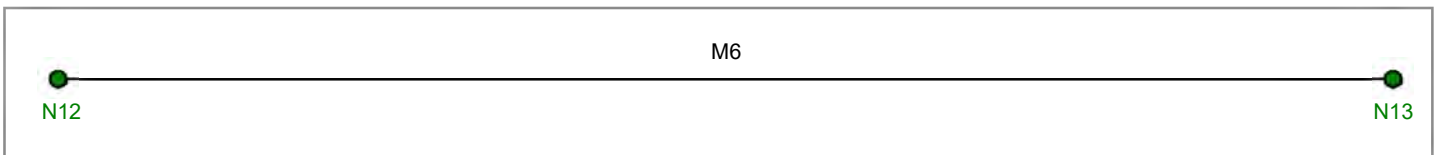
Code check: 0.893 (LC 5)

	Input Data	
	Shape: 4X10 (nominal) Member Type: Beam Length (ft): 5 Material Type: Wood Design Rule: Typical Internal Sections: 97 Design Code: AWC NDS-18: ASD	I Node: N12 J Node: N13 I Release: Fixed J Release: Fixed I Offset: N/A J Offset: N/A T/C Only: Both Way

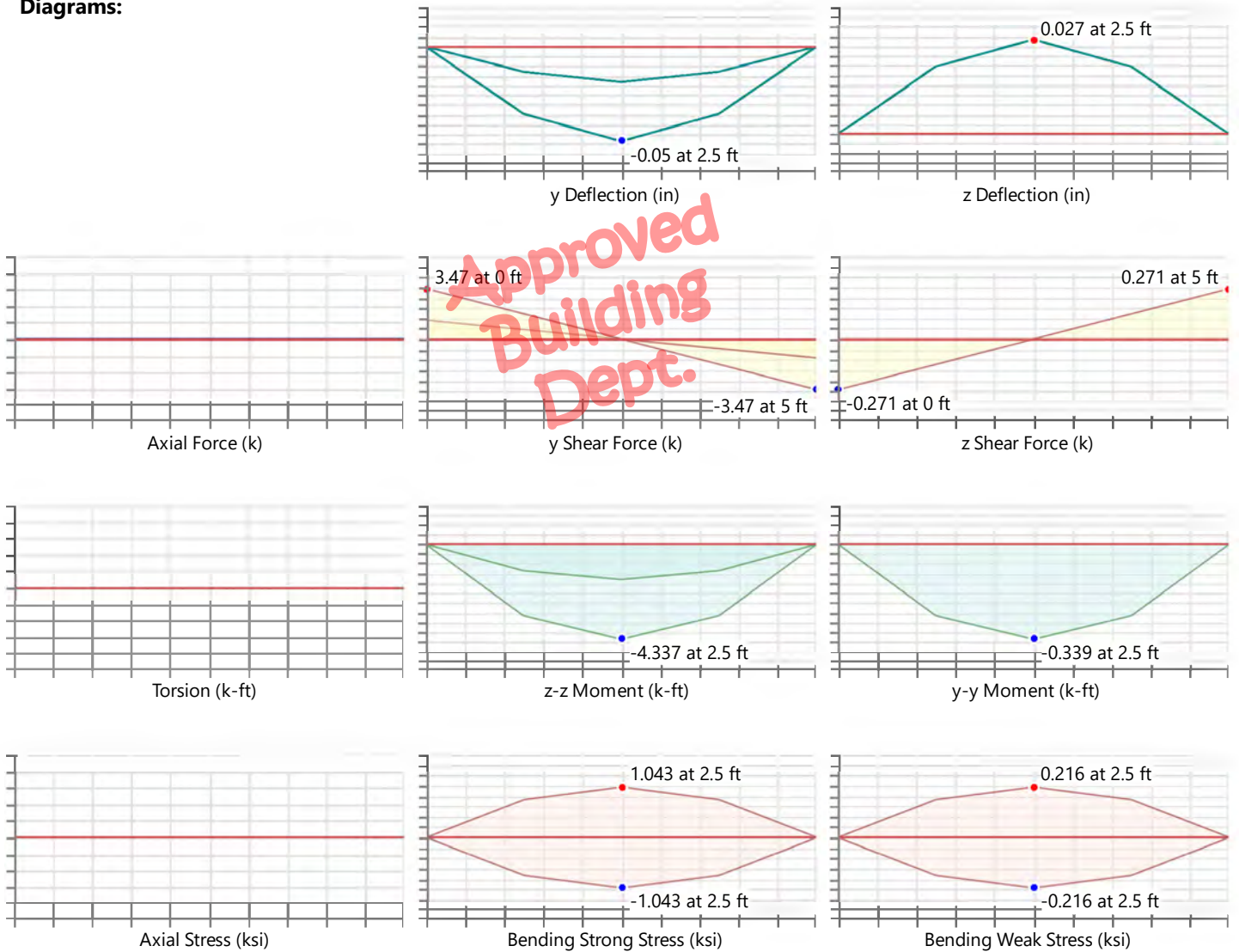
Material Properties			
Material:	DF	Grade:	No.1
Type:	Solid Sawn	Cm:	No
Database:	Visually Graded	Ci:	No
Species:	Douglas Fir-Larch	Emod:	1
		Nu:	0.3
		Alpha (1e⁵⁰ F⁻¹):	0.3
		Density (k/ft³):	0.035

Shape Properties			
F_b (ksi):	1	E (ksi):	1700
F_t (ksi):	0.675	E_{mod}:	1
F_v (ksi):	0.18	COV_E (Table F1):	0.25
F_c (ksi):	1.5	E_{min} (ksi):	621.025
		b (actual) (in):	3.5
		d (actual) (in):	9.25

Design Properties			
le2 (ft):	2	y sway:	No
le1 (ft):	2	z sway:	No
le-bend top:	Lbyy	C_D:	1
le-bend bot (ft):	2	R_B:	4.257
K_{y-y}:	1	C_L:	0.999
K_{z-z}:	0.5	C_r:	1
		C_{fu}:	1
		C_P:	0.97
		Max Defl Ratio:	L/1206
		Max Defl Location:	2.5
		Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.455 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.743 ksi	-	-
Flexural Analysis, Fb1'	-	1.043 ksi	1.198 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.87	PASS
Bending & Axial Tension Analysis	-	-	-	0.87	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 47 of 74
5/17/2023
10:36:05 AM
Checked By : _____

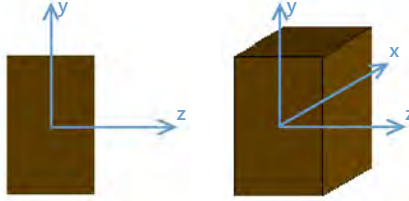
Shear Analysis	-	0.161 ksi	0.18 ksi	0.893	PASS
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Detail Report: M7

Load Combination: Envelope

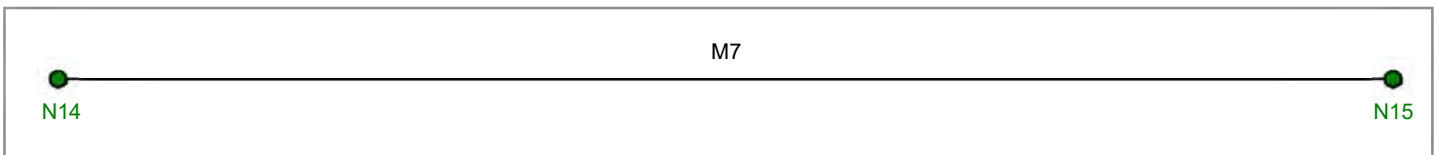
Code check: 0.899 (LC 5)

	Input Data	
	Shape: 4X6 (nominal) Member Type: Beam Length (ft): 3 Material Type: Wood Design Rule: Typical Internal Sections: 97 Design Code: AWC NDS-18: ASD	I Node: N14 J Node: N15 I Release: Fixed J Release: Fixed I Offset: N/A J Offset: N/A T/C Only: Both Way

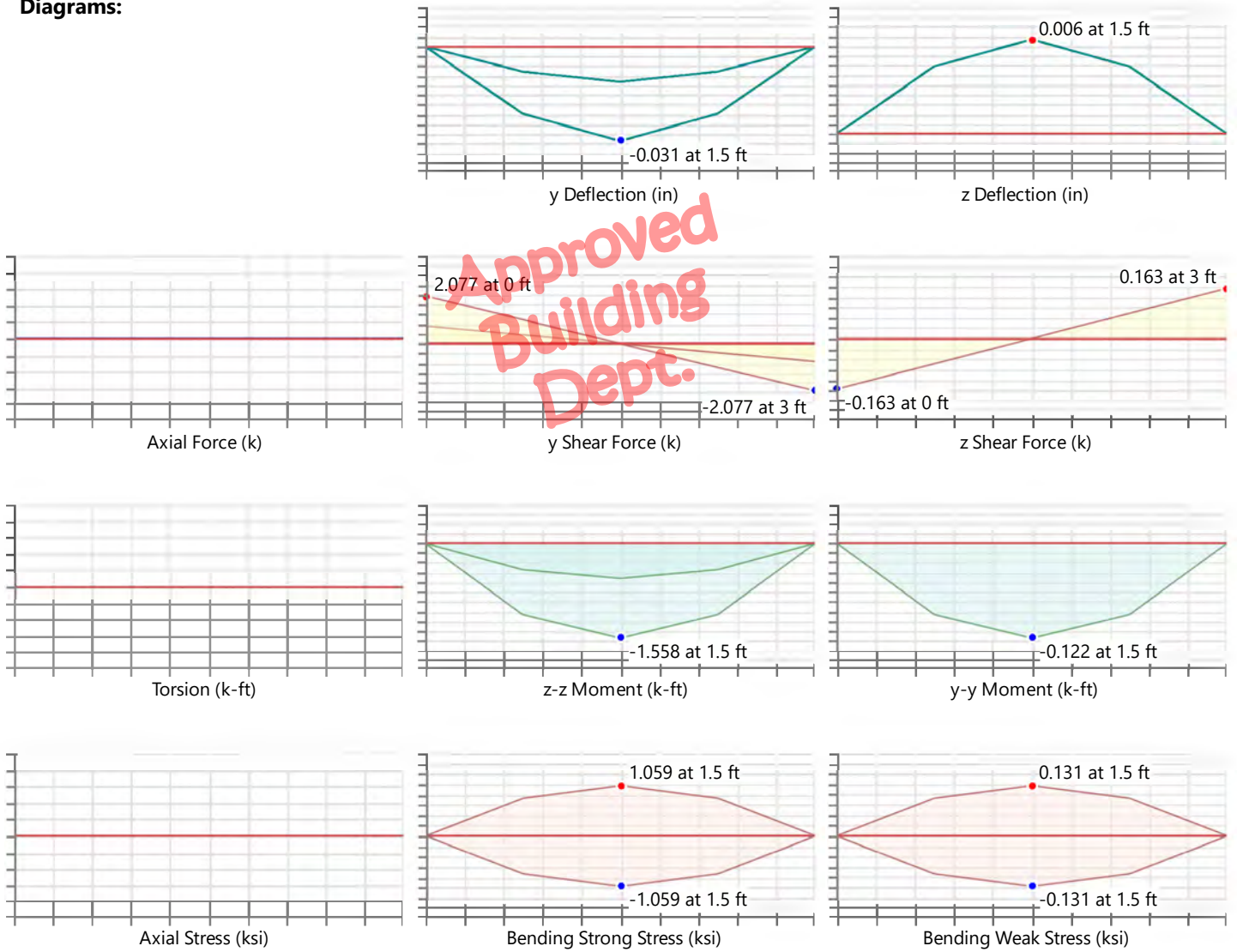
Material Properties			
Material:	DF	Grade:	No.1
Type:	Solid Sawn	Cm:	No
Database:	Visually Graded	Ci:	No
Species:	Douglas Fir-Larch	Emod:	1
		Nu:	0.3
		Alpha (1e⁵⁰ F⁻¹):	0.3
		Density (k/ft³):	0.035

Shape Properties			
F_b (ksi):	1	E (ksi):	1700
F_t (ksi):	0.675	Emod:	1
F_v (ksi):	0.18	COV_E (Table F1):	0.25
F_c (ksi):	1.5	E_{min} (ksi):	621.025
		b (actual) (in):	3.5
		d (actual) (in):	5.5

Design Properties			
le2 (ft):	2	y sway:	No
le1 (ft):	2	z sway:	No
le-bend top:	Lbyy	C_D:	1
le-bend bot (ft):	2	R_B:	3.283
K_{y-y}:	1	C_L:	0.999
K_{z-z}:	0.5	C_r:	1
		C_{fu}:	1
		C_P:	0.967
		Max Defl Ratio:	L/1176
		Max Defl Location:	1.5
		Span:	1



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Compression Analysis	-	0 ksi	1.595 ksi	-	-
Axial Tension Analysis	-	0 ksi	0.877 ksi	-	-
Flexural Analysis, Fb1'	-	1.059 ksi	1.299 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	1.3 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.816	PASS
Bending & Axial Tension Analysis	-	-	-	0.816	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 50 of 74
5/17/2023
10:36:07 AM
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Shear Analysis	-	0.162 ksi	0.18 ksi	0.899	PASS
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Detail Report: M8

Load Combination: Envelope

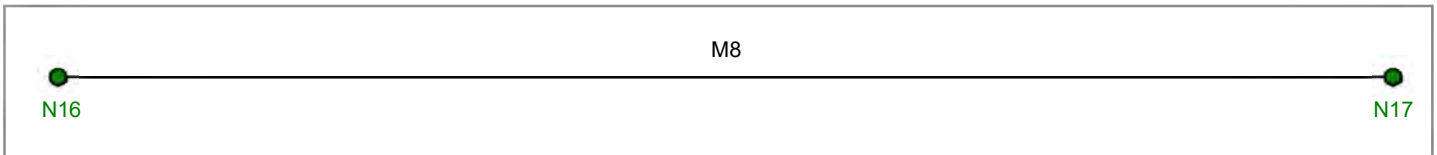
Code check: 0.671 (LC 9)

	Input Data	
	Shape: 4X6 (nominal) Member Type: Beam Length (ft): 5 Material Type: Wood Design Rule: Typical Internal Sections: 97 Design Code: AWC NDS-18: ASD	I Node: N16 J Node: N17 I Release: Fixed J Release: Fixed I Offset: N/A J Offset: N/A T/C Only: Both Way

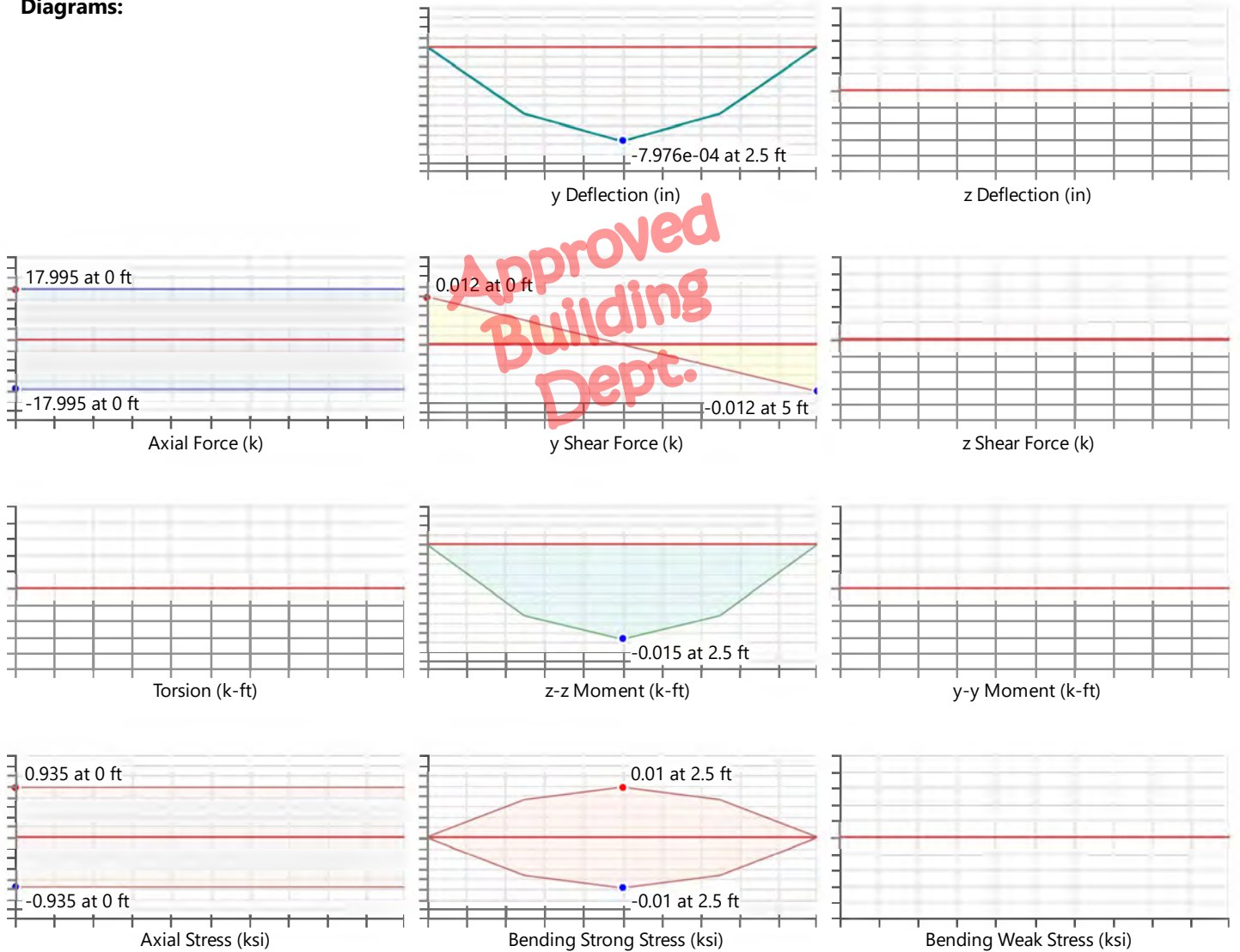
Material Properties			
Material:	DF	Grade:	No.1
Type:	Solid Sawn	Cm:	No
Database:	Visually Graded	Ci:	No
Species:	Douglas Fir-Larch	Emod:	1
		Nu:	0.3
		Alpha (1e⁵⁰ F⁻¹):	0.3
		Density (k/ft³):	0.035

Shape Properties			
F_b (ksi):	1	E (ksi):	1700
F_t (ksi):	0.675	Emod:	1
F_v (ksi):	0.18	COV_E (Table F1):	0.25
F_c (ksi):	1.5	E_{min} (ksi):	621.025
		b (actual) (in):	3.5
		d (actual) (in):	5.5

Design Properties			
le2 (ft):	2	y sway:	No
le1 (ft):	2	z sway:	No
le-bend top:	Lbyy	C_D:	1.6
le-bend bot (ft):	2	R_B:	3.283
K_{y-y}:	1	C_L:	0.998
K_{z-z}:	0.5	C_r:	1
		C_{fu}:	1
		C_p:	0.944
		Max Defl Ratio:	L/10000
		Max Defl Location:	0
		Span:	N/A



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	9	-	-	-	-
Applied Loading - Shear + Torsion	4	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.492 ksi	-	-
Axial Tension Analysis	-	-0.935 ksi	1.404 ksi	-	-
Flexural Analysis, Fb1'	-	0.01 ksi	2.077 ksi	-	-
Flexural Analysis, Fb2'	-	0 ksi	2.08 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.005	PASS
Bending & Axial Tension Analysis	-	-	-	0.671	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 53 of 74
5/17/2023
10:36:09 AM
Checked By : _____

Shear Analysis	-	0.0009115 ksi	0.162 ksi	0.006	PASS
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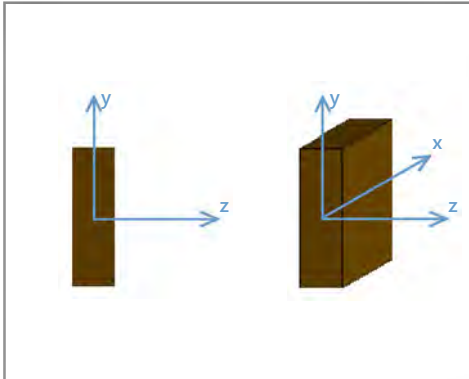
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LEDGER & DRAG

Detail Report: M9

Load Combination: Envelope

Code check: 0.565 (LC 9)



Input Data

Shape:	4X12 (nominal)	I Node:	N18
Member Type:	Beam	J Node:	N19
Length (ft):	4	I Release:	Fixed
Material Type:	Wood	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18: ASD	T/C Only:	Both Way

Material Properties

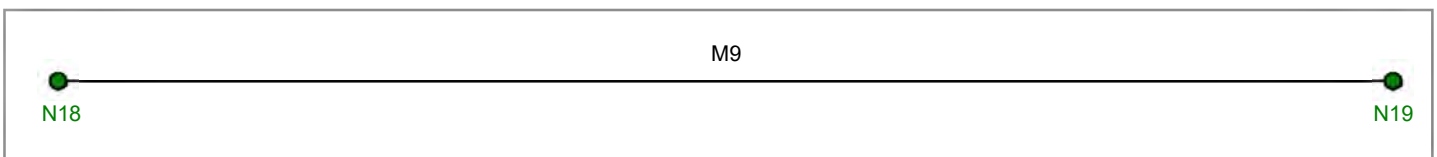
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e ⁵⁰ F ⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft ³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

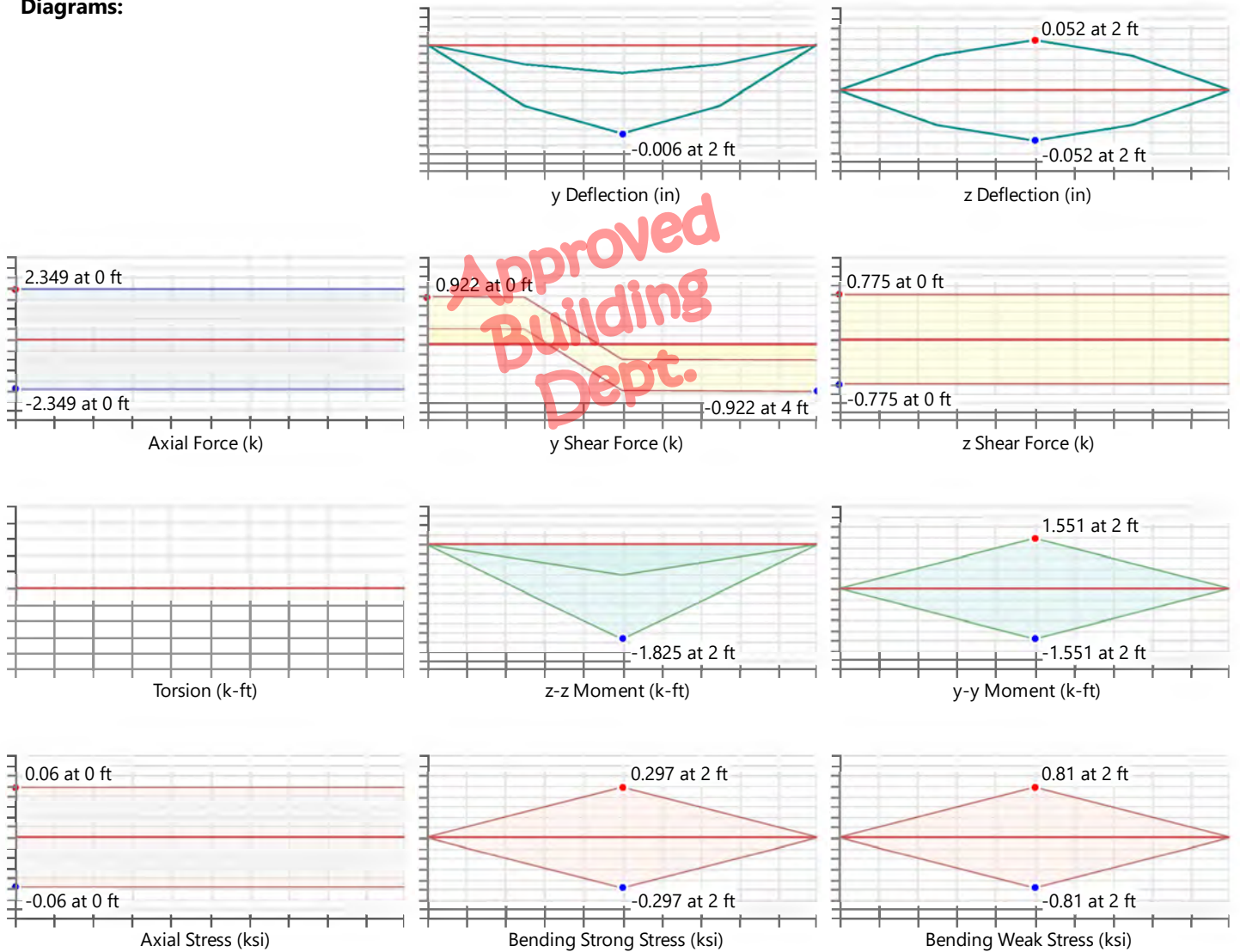
F _b (ksi):	1	E (ksi):	1700	b (actual) (in):	3.5
F _t (ksi):	0.675	Emod:	1	d (actual) (in):	11.25
F _v (ksi):	0.18	COV _E (Table F1):	0.25		
F _c (ksi):	1.5	E _{min} (ksi):	621.025		

Design Properties

le2 (ft):	2	y sway:	No	C _{fu} :	1.1
le1 (ft):	2	z sway:	No	C _p :	0.95
le-bend top:	Lbyy	C _D :	1.6	Max Defl Ratio:	L/8037
le-bend bot (ft):	2	R _B :	4.695	Max Defl Location:	2
K _{y-y} :	1	C _L :	0.997	Span:	1
K _{z-z} :	0.5	C _r :	1		



Diagrams:



AWC NDS-18: ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	9	-	-	-	-
Applied Loading - Shear + Torsion	10	-	-	-	-
Axial Compression Analysis	-	0 ksi	2.279 ksi	-	-
Axial Tension Analysis	-	-0.06 ksi	1.08 ksi	-	-
Flexural Analysis, Fb1'	-	0.16 ksi	1.755 ksi	-	-
Flexural Analysis, Fb2'	-	0.81 ksi	1.936 ksi	-	-
Bending & Axial Compression Analysis	-	-	-	0.51	PASS
Bending & Axial Tension Analysis	-	-	-	0.565	PASS

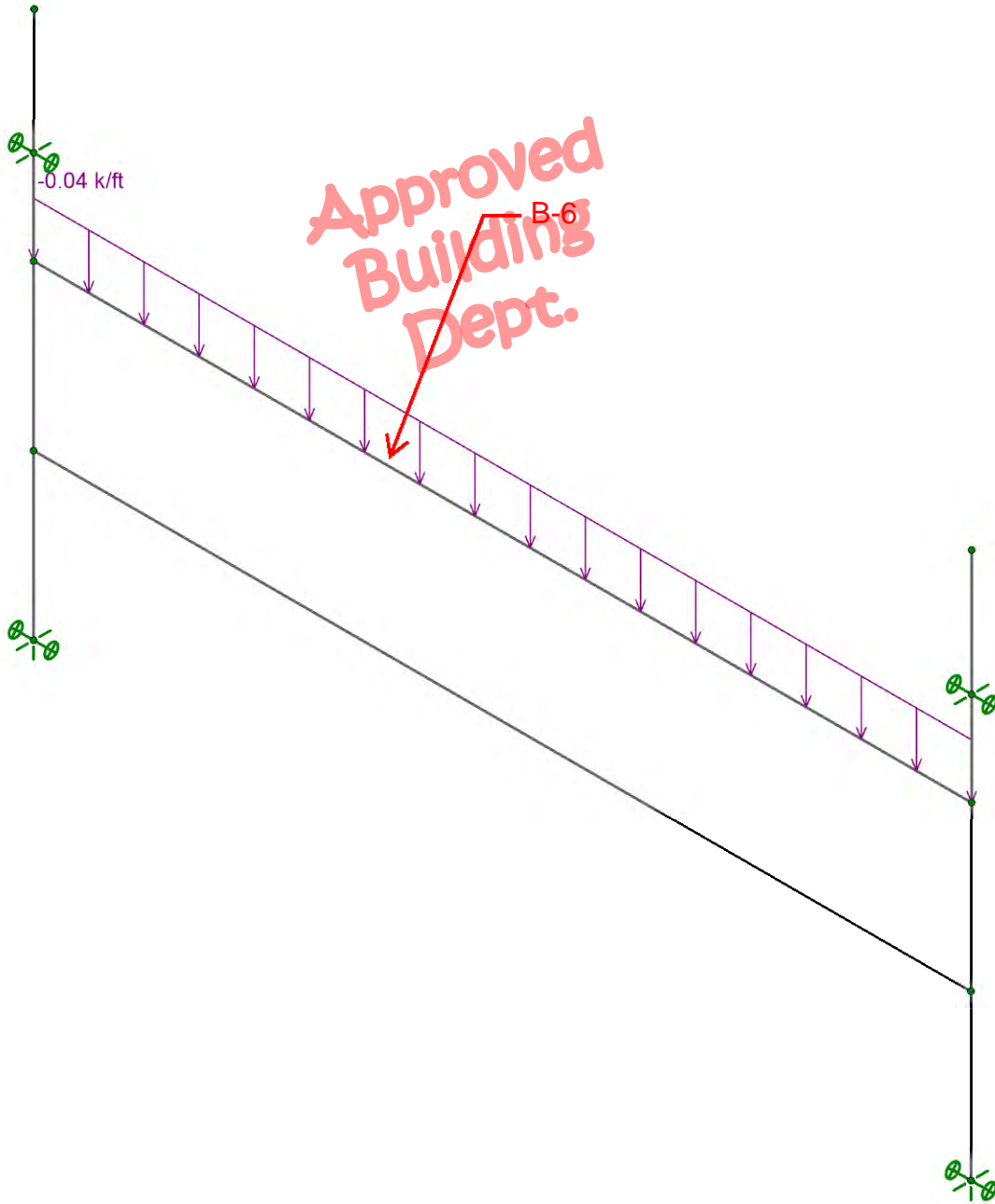
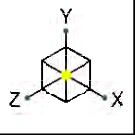


Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 56 of 74
5/17/2023
10:36:11 AM
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Shear Analysis	-	0.035 ksi	0.18 ksi	0.195	PASS
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Loads: BLC 2, LIVE
Envelope Only Solution

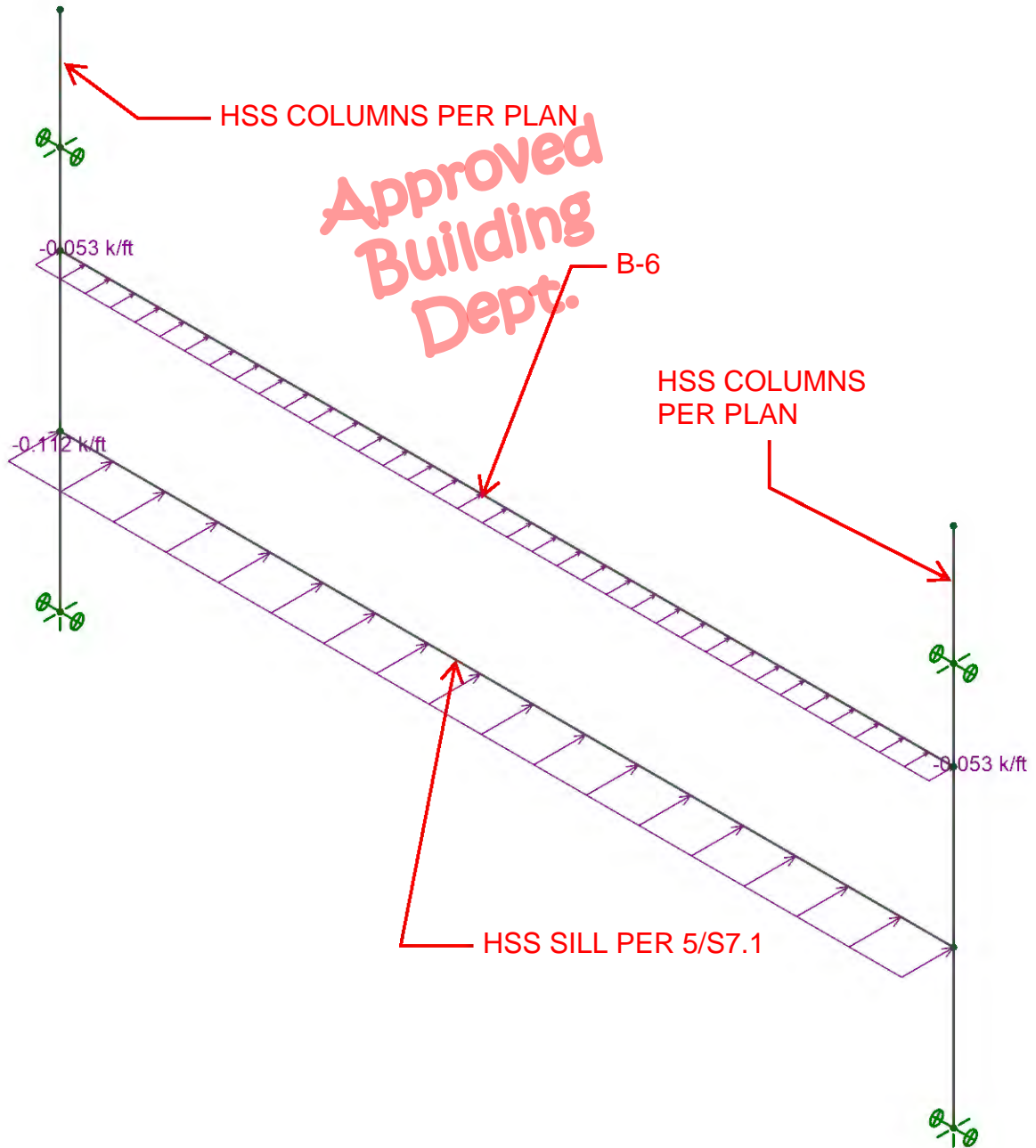
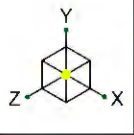
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SK-2

May 17, 2023

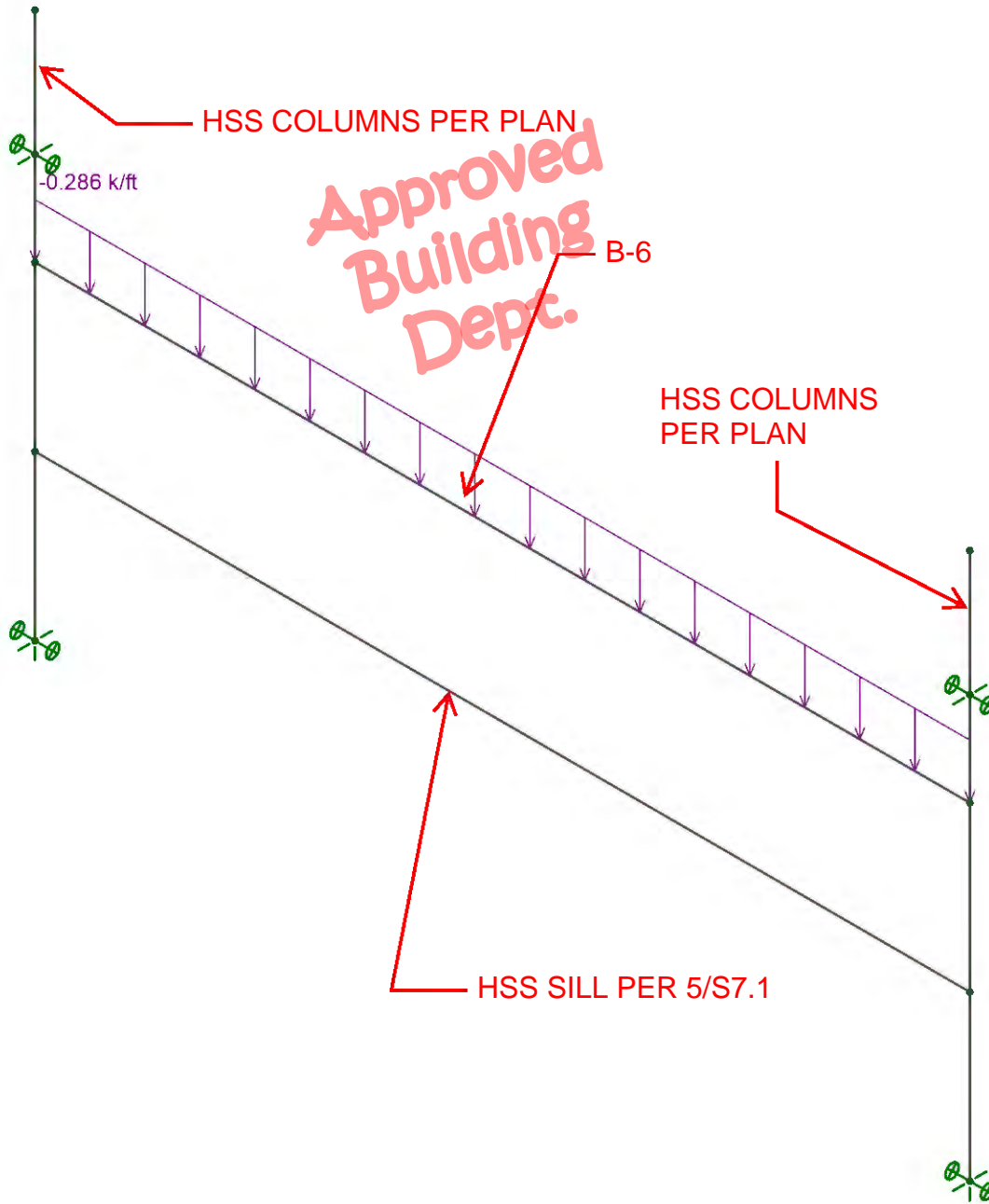
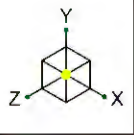
OPENING.r3d



Loads: BLC 4, WIND
Envelope Only Solution

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SK-3
May 17, 2023
OPENING.r3d



Loads: BLC 1, DEAD
Envelope Only Solution

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SK-1
May 17, 2023
OPENING.r3d

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N8	0	-20	0	
2	N9	30	-20	0	
3	N3	0	-17	0	
4	N4	30	-17	0	
5	N5	0	-13	0	
6	N6	30	-13	0	
7	N7	0	-30.5	0	
8	N10	30	-30.5	0	
9	N11	0	-25.25	0	
10	N12	30	-25.25	0	

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Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]
1	N3	Reaction	Reaction	Reaction	Reaction
2	N4			Reaction	Reaction
3	N7	Reaction	Reaction	Reaction	Reaction
4	N10		Reaction	Reaction	Reaction

Member Distributed Loads (BLC 1 : DEAD)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	Y	-0.286	-0.286	0 %100

Member Distributed Loads (BLC 2 : LIVE)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	Y	-0.04	-0.04	0 %100

Member Distributed Loads (BLC 4 : WIND)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	Z	-0.053	-0.053	0 %100
2	M5	Z	-0.112	-0.112	0 %100

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1				
2	Deflection 2	Yes	Y	RLL	1				
3	Deflection 3	Yes	Y	DL	1	RLL	1		
4	IBC 16-8	Yes	Y	DL	1				
5	IBC 16-9	Yes	Y	DL	1	RLL	1		
6	IBC 16-10 (a)	Yes	Y	DL	1	RLL	1		
7	IBC 16-11 (a)	Yes	Y	DL	1	RLL	0.75		
8	IBC 16-12 (b) (a)	Yes	Y	DL	1	EL	0.7		
9	IBC 16-12 (b) (b)	Yes	Y	DL	1	EL	-0.7		
10	IBC 16-14 (a)	Yes	Y	DL	1	EL	0.525	RLL	0.75
11	IBC 16-14 (b)	Yes	Y	DL	1	EL	-0.525	RLL	0.75
12	IBC 16-16 (a)	Yes	Y	DL	0.6	EL	0.7		
13	IBC 16-16 (b)	Yes	Y	DL	0.6	EL	-0.7		
14	IBC 16-12 (a) (a)	Yes	Y	DL	1	WL	0.6		
15	IBC 16-13 (a) (a)	Yes	Y	DL	1	WL	0.45	RLL	0.75

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
16	IBC 16-15 (a)	Yes	Y	DL	0.6	WL	0.6		
17	Deflection - Wind	Yes	Y	WL	0.42				

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-8	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-9		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-10 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-12 (b) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (b) (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-14 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-14 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-16 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-16 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-12 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-13 (a) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-15 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Deflection - Wind	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N3	max	0	17	4.512	6	0.758	14	0	13	0	17	0	17
2		min	-0.178	3	0	17	0	1	-2.123	16	0	1	0	1
3	N4	max	0	17	0	17	0.757	14	0	13	0	17	0	17
4		min	0	1	0	1	0	1	-2.133	14	0	1	0	1
5	N7	max	0.178	6	1.494	6	0.729	16	2.227	14	0	17	0	17
6		min	0	17	0	17	0	1	0	1	0	1	0	1
7	N10	max	0	17	5.817	6	0.729	16	2.246	14	0	17	0	17
8		min	0	1	0	17	0	1	0	1	0	1	0	1
9	Totals:	max	0	17	11.822	6	2.973	16						
10		min	0	3	0	17	0	1						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N8	max	0	17	0	17	0	13	1.153e-3	16	1.003e-2	14	0	17
2		min	-0.323	3	-0.002	3	-0.03	16	0	1	0	1	-9.257e-3	3
3	N9	max	0	17	0	17	0	13	1.161e-3	14	0	13	9.64e-3	6
4		min	-0.328	3	-0.007	3	-0.03	14	0	1	-1.003e-2	16	0	17
5	N3	max	0	6	0	17	0	13	0	16	1.003e-2	14	0	17
6		min	0	17	0	3	0	14	0	1	0	1	-8.838e-3	3
7	N4	max	0	17	0	17	0	13	0	14	0	13	9.645e-3	6
8		min	-0.675	3	-0.007	3	0	14	0	1	-1.003e-2	16	0	17
9	N5	max	0.424	6	0	17	0	16	0	16	1.003e-2	14	0	17
10		min	0	17	0	3	0	1	0	1	0	1	-8.839e-3	3
11	N6	max	0	17	0	17	0	14	0	14	0	13	9.646e-3	6
12		min	-1.138	3	-0.007	3	0	1	0	1	-1.003e-2	16	0	17
13	N7	max	0	17	0	17	0	13	0	13	1.523e-2	14	5.092e-3	6
14		min	0	3	0	3	0	16	0	14	0	1	0	17



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Model Name :

Page 62 of 74
5/17/2023
11:05:14 AM
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Envelope Node Displacements (Continued)

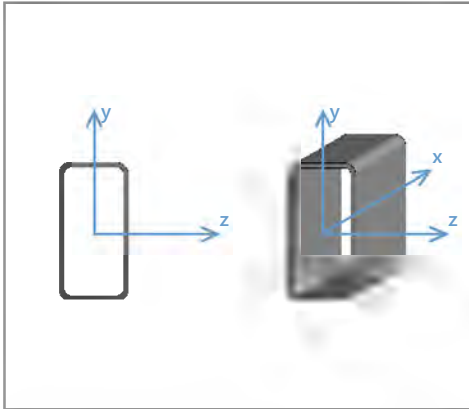
	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
15	N10	max	0	17	0	17	0	13	0	13	0	13	0	17
16		min	-0.48	3	0	3	0	16	0	14	-1.523e-2	16	-3.061e-3	3
17	N11	max	0	17	0	17	0	13	0	13	1.523e-2	14	4.082e-3	6
18		min	-0.3	3	-0.001	3	-0.063	14	-6.29e-4	16	0	1	0	17
19	N12	max	0	17	0	17	0	13	0	13	0	13	0	17
20		min	-0.29	3	-0.004	3	-0.063	14	-6.325e-4	14	-1.523e-2	16	-2.912e-3	3

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Detail Report: M4

Load Combination: Envelope

Code check: 0.424 (LC 14)



Input Data

Shape:	HSS10X5X6	I Node:	N8
Member Type:	Beam	J Node:	N9
Length (ft):	30	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

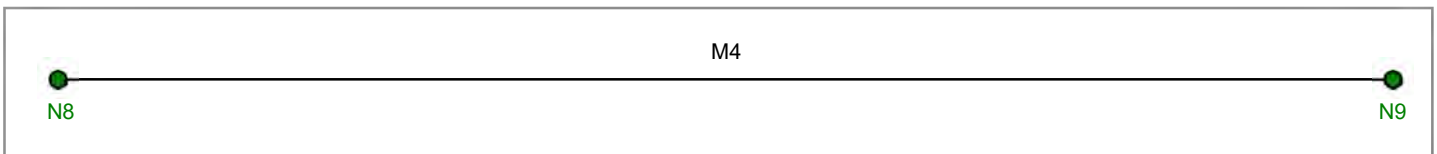
Material:	A992	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	65
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.1
G (ksi):	11154	F_y (ksi):	50		
Nu:	0.3	R_y:	1.1		

Shape Properties

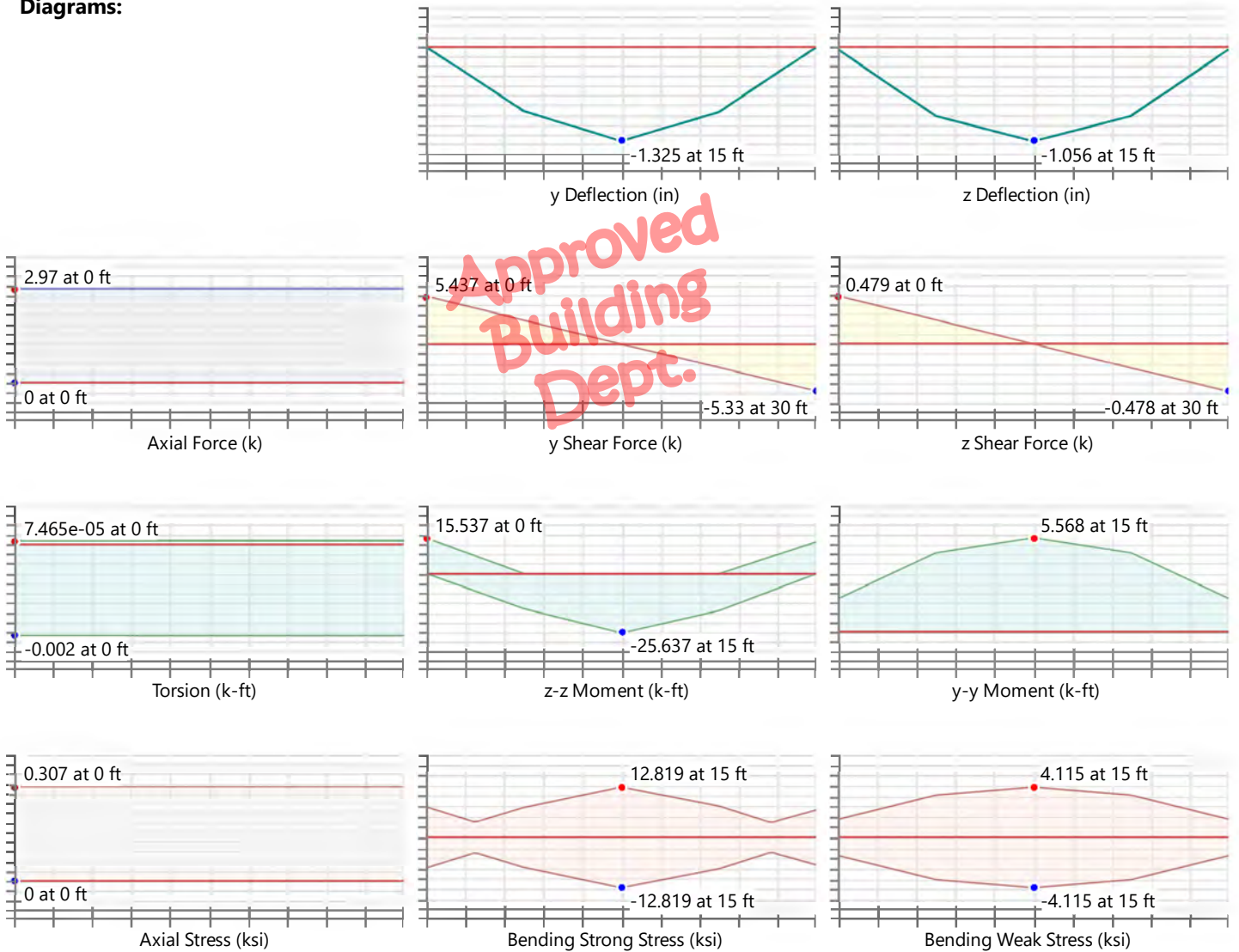
d (in):	10	I_{yy} (in⁴):	40.6	J (in⁴):	100
b_f (in):	5	I_{zz} (in⁴):	120		
t (in):	0.349	Area (in²):	9.67		

Design Properties

L_{b y-y} (ft):	2	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	2	K_{z-z} (ft):	0.5	Max Defl Ratio:	L/272
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	15
L_{comp bot} (ft):	2	z sway:	No	Span:	1
L_{torque} (ft):	30	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	14	-	-	-	-
Applied Loading - Shear + Torsion	6	-	-	-	-
Axial Tension Analysis	14	0 k	289.521 k	-	-
Axial Compression Analysis	14	2.664 k	286.631 k	-	-
Flexural Analysis (Strong Axis)	14	22.753 k-ft	75.848 k-ft	-	-
Flexural Analysis (Weak Axis)	-	5.568 k-ft	46.657 k-ft	-	-
Shear Analysis (Major Axis y)	6	5.437 k	112.261 k	0.048	PASS
Shear Analysis (Minor Axis z)	6	0 k	49.566 k	0	PASS



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Designer : scong
Job Number :
Model Name :

Page 65 of 74
5/17/2023
11:05:17 AM
Checked By : _____

Bending & Axial Interaction Check (UC Bending Max)	14	-	-	0.424	PASS
Torsional Analysis	14	0.002 k-ft	46.657 k-ft	3.986e-5	PASS

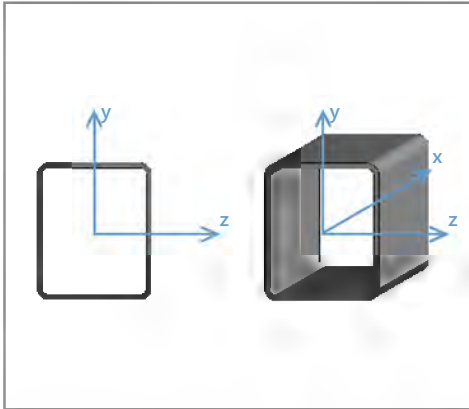
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SILL BEAM

Detail Report: M5

Load Combination: Envelope

Code check: 0.296 (LC 14)



Input Data

Shape:	HSS6X5X4	I Node:	N11
Member Type:	Beam	J Node:	N12
Length (ft):	30	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

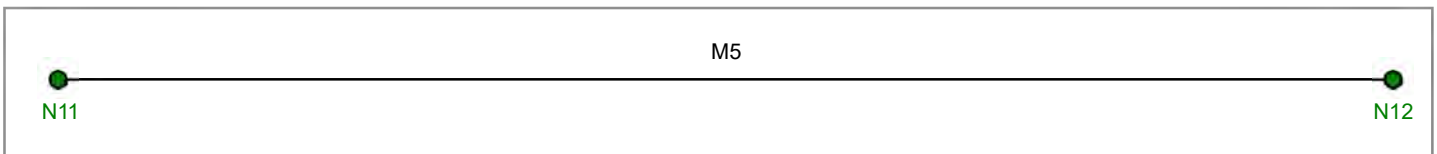
Material:	A500 Gr.B RECT	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.527	R_t:	1.3
G (ksi):	11154	F_y (ksi):	46		
Nu:	0.3	R_y:	1.4		

Shape Properties

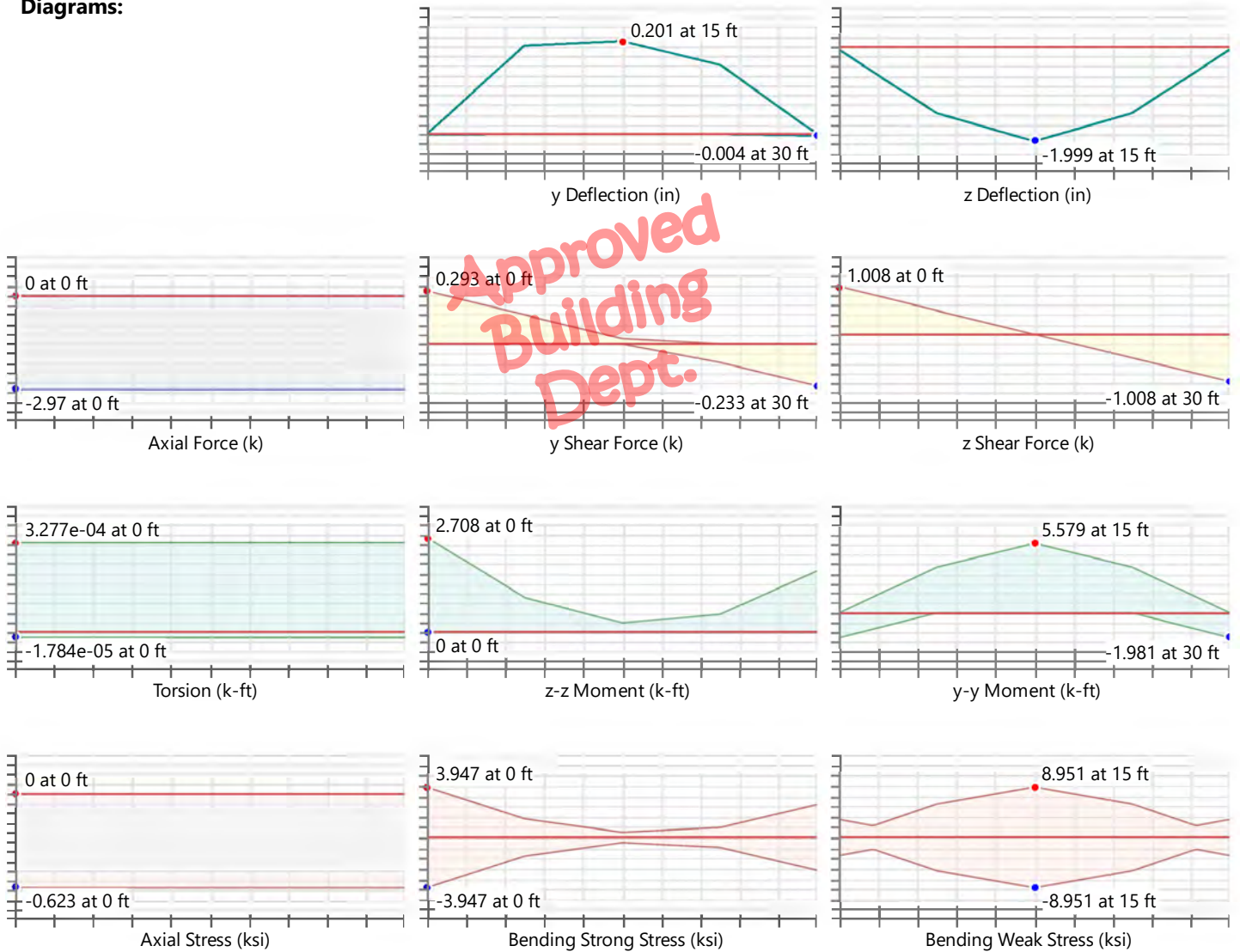
d (in):	6	I_{yy} (in⁴):	18.7	J (in⁴):	34.2
b_f (in):	5	I_{zz} (in⁴):	24.7		
t (in):	0.233	Area (in²):	4.77		

Design Properties

L_{b y-y} (ft):	30	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	30	K_{z-z}:	1	Max Defl Ratio:	L/1713
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	11.562
L_{comp bot} (ft):	30	z sway:	No	Span:	1
L_{torque} (ft):	30	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	14	-	-	-	-
Applied Loading - Shear + Torsion	14	-	-	-	-
Axial Tension Analysis	14	2.664 k	131.389 k	-	-
Axial Compression Analysis	14	0 k	21.688 k	-	-
Flexural Analysis (Strong Axis)	14	0.171 k-ft	22.656 k-ft	-	-
Flexural Analysis (Weak Axis)	-	5.566 k-ft	20.016 k-ft	-	-
Shear Analysis (Major Axis y)	14	0.233 k	40.826 k	0.006	PASS
Shear Analysis (Minor Axis z)	14	1.009 k	33.124 k	0.03	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 68 of 74
5/17/2023
11:05:19 AM
Checked By : _____

Bending & Axial Interaction Check (UC Bending Max)	14	-	-	0.296	PASS
Torsional Analysis	14	0.0003277 k-ft	17.577 k-ft	1.865e-5	PASS

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Detail Report: M2

Load Combination: Envelope

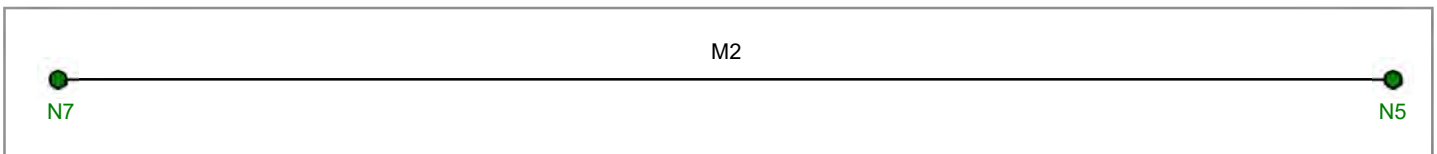
Code check: 0.838 (LC 6)

	<p>Input Data</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">Shape:</td> <td style="width: 33%;">HSS5X5X4</td> <td style="width: 33%;">I Node:</td> <td>N7</td> </tr> <tr> <td>Member Type:</td> <td>Column</td> <td>J Node:</td> <td>N5</td> </tr> <tr> <td>Length (ft):</td> <td>17.5</td> <td>I Release:</td> <td>Fixed</td> </tr> <tr> <td>Material Type:</td> <td>Hot Rolled Steel</td> <td>J Release:</td> <td>Fixed</td> </tr> <tr> <td>Design Rule:</td> <td>Typical</td> <td>I Offset:</td> <td>N/A</td> </tr> <tr> <td>Internal Sections:</td> <td>97</td> <td>J Offset:</td> <td>N/A</td> </tr> <tr> <td>Design Code:</td> <td>AISC 15th (360-16): ASD</td> <td>T/C Only:</td> <td>Both Way</td> </tr> </table>	Shape:	HSS5X5X4	I Node:	N7	Member Type:	Column	J Node:	N5	Length (ft):	17.5	I Release:	Fixed	Material Type:	Hot Rolled Steel	J Release:	Fixed	Design Rule:	Typical	I Offset:	N/A	Internal Sections:	97	J Offset:	N/A	Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way
Shape:	HSS5X5X4	I Node:	N7																										
Member Type:	Column	J Node:	N5																										
Length (ft):	17.5	I Release:	Fixed																										
Material Type:	Hot Rolled Steel	J Release:	Fixed																										
Design Rule:	Typical	I Offset:	N/A																										
Internal Sections:	97	J Offset:	N/A																										
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way																										

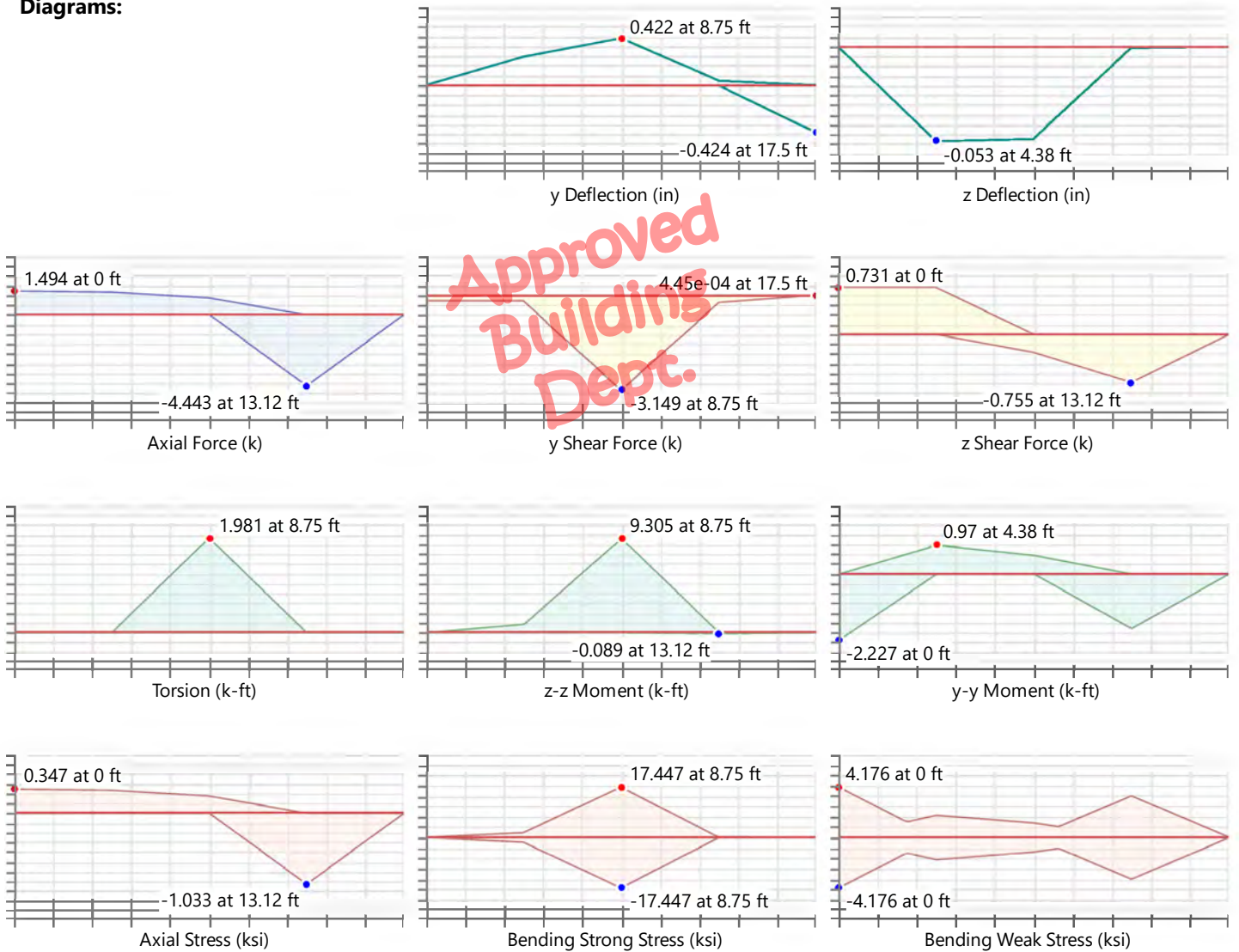
Material Properties			
Material:	A500 Gr.B RECT	Therm. Coeff. (/1E5 F):	0.65
E (ksi):	29000	Density (k/ft³):	0.527
G (ksi):	11154	F_y (ksi):	46
Nu:	0.3	R_y:	1.4
		F_u (ksi):	58
		R_t:	1.3

Shape Properties			
d (in):	5	I_{yy} (in⁴):	16
b_f (in):	5	I_{zz} (in⁴):	16
t (in):	0.233	Area (in²):	4.3
		J (in⁴):	25.8

Design Properties			
L_{b y-y} (ft):	17.5	K_{y-y}:	1
L_{b z-z} (ft):	17.5	K_{z-z}:	1
L_{comp top}:	L _{byy}	y sway:	No
L_{comp bot} (ft):	17.5	z sway:	No
L_{torque} (ft):	17.5	Function:	Lateral
		Seismic DR:	None
		Max Defl Ratio:	L/331
		Max Defl Location:	8.75
		Span:	N/A
		τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	6	-	-	-	-
Applied Loading - Shear + Torsion	14	-	-	-	-
Axial Tension Analysis	6	0 k	118.443 k	-	-
Axial Compression Analysis	6	1.037 k	53.366 k	-	-
Flexural Analysis (Strong Axis)	6	14.471 k-ft	17.468 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	17.468 k-ft	-	-
Shear Analysis (Major Axis y)	14	7.328 k	33.124 k	0.221	PASS
Shear Analysis (Minor Axis z)	14	4.779 k	33.124 k	0.144	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 71 of 74
5/17/2023
11:05:21 AM
Checked By : _____

Bending & Axial Interaction Check (UC Bending Max)	6	-	-	0.838	PASS
Torsional Analysis	6	0 k-ft	14.517 k-ft	0	PASS

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Detail Report: M3

Load Combination: Envelope

Code check: 0.768 (LC 6)

Input Data			
Shape:	HSS5X5X4	I Node:	N10
Member Type:	Column	J Node:	N6
Length (ft):	17.5	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): ASD	T/C Only:	Both Way

Material Properties

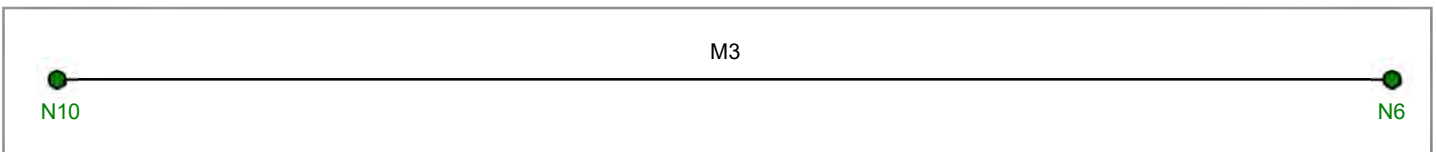
Material:	A992	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	65
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.1
G (ksi):	11154	F_y (ksi):	50		
Nu:	0.3	R_y:	1.1		

Shape Properties

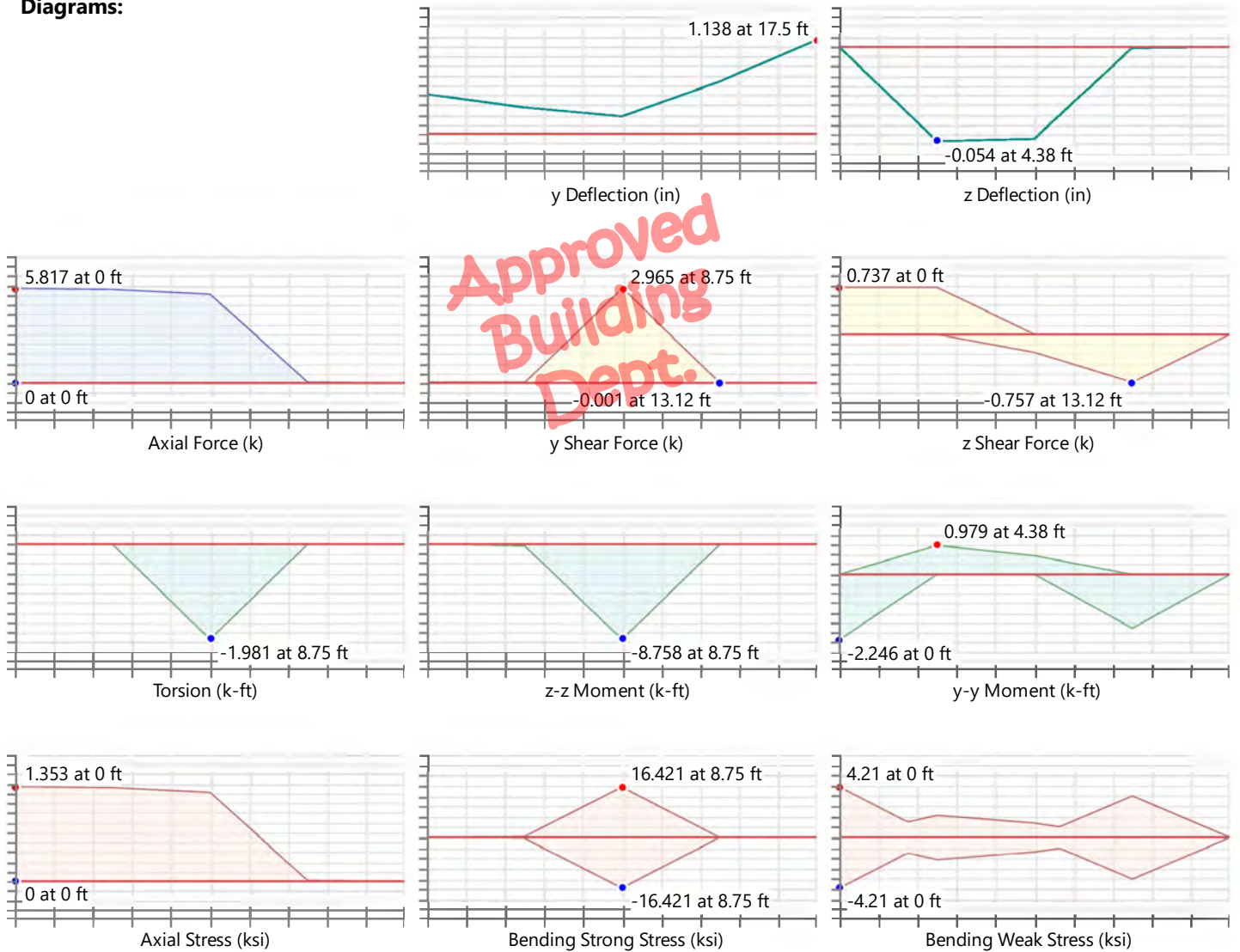
d (in):	5	I_{yy} (in⁴):	16	J (in⁴):	25.8
b_f (in):	5	I_{zz} (in⁴):	16		
t (in):	0.233	Area (in²):	4.3		

Design Properties

L_{b y-y} (ft):	17.5	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	17.5	K_{z-z}:	1	Max Defl Ratio:	L/319
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	17.5
L_{comp bot} (ft):	17.5	z sway:	No	Span:	N/A
L_{torque} (ft):	17.5	Function:	Lateral	τ_b:	1



Diagrams:



AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	6	-	-	-	-
Applied Loading - Shear + Torsion	14	-	-	-	-
Axial Tension Analysis	6	0 k	128.743 k	-	-
Axial Compression Analysis	6	5.434 k	54.122 k	-	-
Flexural Analysis (Strong Axis)	6	13.623 k-ft	18.987 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	18.987 k-ft	-	-
Shear Analysis (Major Axis y)	14	7.159 k	36.005 k	0.199	PASS
Shear Analysis (Minor Axis z)	14	4.782 k	36.005 k	0.133	PASS



Company : <Licensed Company>
Designer : scong
Job Number :
Model Name :

Page 74 of 74
5/17/2023
11:05:23 AM
Checked By : _____

Bending & Axial Interaction Check (UC Bending Max)	6	-	-	0.768	PASS
Torsional Analysis	6	0 k-ft	15.779 k-ft	0	PASS

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