

Phelan Piñon Hills Community Services District

4176 Warbler Road, Phelan, CA 92371



Project Manual For CIVIC CENTER DEVELOPMENT PHASE I PROJECT SHEEP CREEK ROAD/WARBLER ROAD

August 21, 2025

BID DUE

Thursday, October 9, 2025 at 3:00 PM, PST

**George Cardenas
Engineering Manager
(760) 868-1212 ext. 319**

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Phelan Piñon Hills Community Services District

4176 Warbler Road • P. O. Box 294049 • Phelan, CA 92329-4049 • (760) 868-1212 Fax (760) 868-2323

NOTICE INVITING SEALED BIDS

CIVIC CENTER DEVELOPMENT PHASE I PROJECT

NOTICE IS GIVEN that sealed bids will be received by the Phelan Piñon Hills Community Services District (District), at its office located at 4176 Warbler Road Phelan, California, until **Thursday, October 9, 2025, 3:00 p.m.**, for furnishing the work described in the contract documents. Bids will then and there be publicly opened and read aloud. Bids received after the time announced for the opening will not be considered. The contract documents may be examined at the office of the District.

The work will include a new 14,034 SF Civic Center building, which will include a 3,592 SF Community Emergency Response Center (EOC). This facility (located within the new Civic Center and will be located at the intersection of Warbler Road and Sheep Creek Road, Phelan, California,. This Project will be funded in part using federal funds from the Department of Homeland Security, Federal Emergency Management Agency, Fiscal Year 2023 Emergency Operations Center (EOC) Grant, administered by the County of San Bernardino. Bidders are advised that the successful Bidder shall comply with all County of San Bernardino and grant funding agency requirements.

A non-mandatory pre-bid meeting will be held at the date and time stated in Article 15 of the Instructions to Bidders.

Each bid must conform and be responsive to all pertinent Bidding and Contract Documents. Copies of the Contract Documents are on file and open for public inspection at Phelan Piñon Hills Community Service District at 4176 Warbler Rd, Phelan, CA 92371.

Prospective Bidders (Contractors and Subcontractors) may obtain electronic bid documents upon completion of the bidder registration process through A&I Reprographics, Inc. Bid documents are available from A&I Reprographics by logging on to: www.aandiplanroom.com or by calling 909-514-0704 or by email: bid@aandirepro.com. There is a non-refundable fee for obtaining a printed set of documents. A digital download of the documents is available at no cost upon completing bidder registration with A & I Reprographics. Any changes via addenda will be available on the A&I Reprographics site at www.aandiplanroom.com.

Printed bid documents can be purchased from A&I Reprographics, Inc. for a non-refundable print fee plus a non-refundable shipping fee (costs vary on location).

Bidders are asked to register with A&I Reprographics, Inc. no later than three (3) days before bid opening.

All registered plan holders with A&I Reprographics, Inc. will receive automatic notification of project addenda and other pertinent information.

The District may reject bids and waive irregularities or informalities in any of the bids. Each bid shall be submitted only on the prescribed bid form included with the contract documents.

The successful bidder is required to possess a valid Class B contractor's license (minimum).

Bidders' attention is directed to Part I Essential Requirements for Qualification as it relates to Bidder qualifications. Bidders must submit the "QUALIFICATIONS OF SUCCESSFUL BIDDER" form to the District with the Bid.

The successful bidder is required to pay prevailing wages as determined by the Division of Industrial Relations. A copy of the Division's wage determinations is available for inspection at the District's office. In all respects the successful bidder shall comply with requirements of law pertaining to public work contracts.

Dated: August 19, 2025



Donald J. Bartz, General Manager

CIVIC CENTER DEVELOPMENT PHASE I PROJECT

INSTRUCTIONS TO BIDDERS

1. PURPOSE

The Phelan Piñon Hills Community Services District (DISTRICT) is soliciting bids for the CIVIC CENTER DEVELOPMENT PHASE I Project. The work will include a new 14,034 SF Civic Center building, which will include a 3,592 SF Community Emergency Response Center (EOC). This facility is located within the new Civic Center and will be located at the intersection of Warbler Road and Sheep Creek Road, Phelan, California.

This Project is funded in part from the Emergency Operations Center Grant Program administered by the United States Department of Homeland Security (“DHS”) and the State of California Office of Emergency Services (“CalOES”). Consequently, Contractor shall also comply with any additional requirements that may be imposed upon the Work by DHS and/or CalOES. Refer to Section 5.G of the Special Provisions for additional requirements.

2. GENERAL

The work hereunder must be done in strict conformity with the plans and specifications adopted and approved by the District.

3. CONTRACT DOCUMENTS

(a) The contract documents shall consist of the following:

- Notice Inviting Sealed Bids
- Instructions for Bidders
- Bid
- Project Bid Form *
- Agreement
- Payment Bond
- Performance Bond
- Workers’ Compensation Certificate *
- Non-collusion Affidavit *
- Plans and Technical Specifications
- General Provisions and Special Provisions
- Attachments
- Addenda issued by the District
- * Contained in Bid

(b) Terms and conditions contained in the contract documents are part of the contract. The governing board of the District may reject bids and waive informalities in bids. No bidder may withdraw a bid until the District has made a final award to the successful bidder or has rejected all bids.

4. BIDS

Bids shall be made upon the form of bid furnished by the District and are a part of the contract

documents. Bids shall be properly executed and with all items filled in; the signatures of persons signing shall be in longhand. Erasures, inter-lineation or other corrections shall be authenticated by affixing in the margin immediately opposite the correction, the initials of a person signing the bid. If the unit price and the total amount named by a bidder for an item are not in agreement, the unit price alone shall be considered as representing the bidder's intention, and the totals shall be corrected to conform.

Persons bidding may submit bids on any of the schedules set forth in the bid form. Bids shall not contain recapitulation of the work to be done. Alternative bids will not be considered except as called for. No oral, telegraphic or telephonic bids or modifications will be considered.

Before submitting a bid, bidders shall carefully examine all contract documents, shall visit the site of the work, shall fully inform themselves as to all the existing conditions and limitations, and shall include in the bid a sum to cover the cost of all items included in the contract. No allowance will be made because of lack of such examination or knowledge. Bid prices shall include all applicable federal, state, and local taxes.

The original bid and two additional copies shall be sealed in an envelope marked **BID FOR Civic Center Development Phase I Project**, addressed to the Mr. George Cardenas, Engineering Manager, and be delivered thereto on or before the day and hour set for the opening of bids in the notice inviting sealed bids, and shall bear the name of the bidder. It is the SOLE responsibility of the bidder to see that his bid is delivered and received in proper time. Any bid received after that scheduled closing time for receipt of bids shall be returned to the bidder unopened.

The District shall have a period of 60 days after the opening of bids within which to accept or reject the bids.

5. CONTRACTOR'S LICENSE

In accordance with the provisions of the California Public Contract Code Section 3300, and Business and Professions Code Section 7028.15(e), the District has determined that the Prime Contractor shall possess a valid Class B contractor's license (minimum). Failure to possess the specified license shall render the bid as non-responsive.

6. DISTRICT CONTACT

All request for information, clarification or related inquires shall be submitted in writing to Mr. George Cardenas, Engineering Manager (hereon referred as Project Director), Phelan Piñon Hills Community Services District, via U.S. Mail at the address below, or e-mail to gcardenas@pphcsd.org by **3:00 p.m. on October 1, 2025**. All answers and clarifications shall be made available to all Bidders who provide contact information.

**Mr. George Cardenas, Engineering Manager
Phelan Piñon Hills Community Services District
4176 Warbler Road, Phelan, CA 92371
Phone: 760-868-1212 ext. 319, Fax: 760-868-2323**

All persons obtaining bid packets should immediately supply the District contact with their email and facsimile contact information in order to receive addenda and other information in a timely manner.

7. BIDDER'S SECURITY

Bids shall be accompanied by a Bid Bond in a form acceptable to the District or cash in the amount of 10% of the base bid price.

8. CONTRACT PERIOD/CONSTRUCTION COMPLETION DATE

Bidder's attention is called to the provisions set forth in the special provisions, pertaining to the contract period and liquidated damages for avoidable delays.

The Contractor shall begin work within ten (10) calendar days after the date of the Notice to Proceed, and shall diligently prosecute said work to completion before the expiration of five hundred forty five **(545) calendar days**. The Contractor shall pay to the District the sum of **\$1,000.00** per day, for each and every calendar days delay in finishing the work in excess of the number of calendar days prescribed.

9. INSPECTION OF SITE OF WORK

Bidders are required to inspect the site of the work in order to satisfy themselves, by personal examination or by such other means as they may prefer, of the location of the proposed work and as to the actual conditions of and at the site of work. If, during the course of the examination, a bidder finds facts or conditions which appear to him/her to conflict with the letter or spirit of the contract documents, or with any other data furnished him/her, he/she may apply to the District in writing in accordance with Section 11 INTERPRETATION OF CONTRACT DOCUMENTS for additional information and explanation before submitting a bid.

The submission of a bid by the bidder shall constitute the acknowledgement that, if awarded the contract, he/she has relied and is relying on his/he own examination of (a) the site of the work, (b) the access to the site, (c) and all other data, matters, and things requisite to the fulfillment of the work. No claim for additional compensation will be allowed which is based upon a lack of knowledge of the above items.

10. EXAMINATION OF THE CONTRACT DOCUMENTS

Each bidder shall thoroughly examine and be familiar with all legal and procedural documents, general conditions, specifications, special provisions, and drawings, etc., and addenda (if any). The submission of a bid shall constitute an acknowledgement upon which the District may rely that the bidder has thoroughly examined and is familiar with the contract documents. The failure or neglect of a bidder to receive or examine any of the contract documents shall in no way relieve him/her from any obligations with respect to his/her bid or to the contract. No claim for additional compensation will be allowed which is based upon a lack of knowledge of any contract document.

11. INTERPRETATION OF THE CONTRACT DOCUMENTS

No oral interpretations will be made to any bidder as to the meaning of the contract documents. Request for an interpretation shall be made in writing and delivered to the District contact by the time and date specified in Section 6. Interpretations by the District will be in the form of an addendum to the contract, and, when issued, will be sent as promptly as is practical to all parties to whom have provided their contact information to the District contact per Section 6, DISTRICT CONTACT. The District makes no guarantees that all bidders will receive all addenda. Copies of addenda will be made available for inspection at the District office. All such addenda shall become part of the contract. The District shall not be held responsible for oral interpretations.

12. AGREEMENT, BONDS AND INSURANCE

The form of contract which the successful bidder, as Contractor, will be required to execute is included in the contract documents, and should be carefully examined by the bidder. The agreement, bonds, and other documents to be executed by the Contractor shall be executed in original triplicates stamped according to law, one of which original triplicate shall be filed with the District, and the others with the District's Attorney and the District's Engineer.

The successful bidder, simultaneously with the execution of the agreement, shall furnish and maintain a payment bond in an amount equal to one hundred percent (100%) of the contract price and change order prices, and a faithful performance bond in an amount equal to one hundred percent (100%) of the contract price and change order prices. The successful bidder shall also furnish and maintain a Maintenance and Guarantee bond as described in the General Conditions, Section 6-8.3. The bonds shall be secured from a surety company satisfactory to the District and whose name is on file with the County Clerk of San Bernardino County as an approved and financially sound surety company, authorized to transact business in this State.

The bonds shall meet all of the requirements and contain the conditions required by Sections 3247 and 3248 inclusive, of the Civil Code, and other applicable provisions of the law and regulations of the State of California.

Failure to execute the contract and file acceptable bonds and proof of insurance coverage as provided therein within the time set forth herein shall be just cause for the annulment of the award and forfeiture of the proposed guarantee.

The insurance requirements for this project are listed in the General Conditions, and if required, the Special Provisions.

13. PERMITS

Contractor's attention is directed to Permits required as part of this Project. All such permits are included in the Exhibits download folder, and these permits and associated permit conditions are all part of the Work, to be included on Contractor's Bid for the Project, at no additional cost to Owner.

Per Section 7-5 of the General Conditions, the Contractor shall pay for any other required permits.

14. OTHER REQUIREMENTS

Before award of the contract, a bidder upon request shall furnish a recent statement of financial condition and previous construction experience or other evidence of qualifications.

Before entering into a contract, the bidder to whom the contract has been awarded shall furnish satisfactory evidence of workers' compensation insurance and public liability and property damage insurance as specified in the general conditions and special provisions.

14.1 FEDERAL REQUIREMENTS

14.1.1 Non-Collusion Affidavit. Section 7106 of the Public Contract Code requires that each bidder execute a Non-collusion Affidavit on all public works contracts. Bidder shall execute the Non-collusion

Affidavit included with the Contract Documents and submit it to the District with the Bid. If there is a reason to believe that collusion exists among any of the bidders, none of the bids of the participants in such collusion will be considered, and the OWNER may likewise elect to reject all bids received.

14.1.2 Debarment and Suspension. No contractor or subcontractor who is ineligible to bid work on, or be awarded, a public works project under Labor Code sections 1771.1 or 1777.7 can bid on, be awarded or perform work as a subcontractor on the Project. The Contractor is prohibited from performing work on the Project with a subcontractor who is ineligible to perform work on a public works project under these sections of the Labor Code.

Also refer to the Special Provisions, and Addendum to Agreement, for all grant funding requirements.

15. PRE-BID MEETING

A **Non-mandatory** Pre-Bid Meeting will be held at **10 am PST, September 3, 2025 at 4176 Warbler Road, Phelan, CA 92371.**

16. CALENDAR OF EVENTS – BID PERIOD**

Issue Notice Inviting Sealed Bids	August 21, 2025/August 28, 2025
Non-mandatory Pre-Bid Meeting	September 3, 2025, * 10:00 a.m.
Deadline for Written Inquires	October 1, 2015, * 3:00 p.m.
Bid Due Date/Bid Opening	October 9, 2025, * 3:00 p.m.***

*Time shown in Pacific Standard Time (PST) ** Dates subject to change

***Bids to be received at Phelan Pinon Hills CSD Office located at 4176 Warbler Road, Phelan, CA 92371.

Bidders are fully responsible for ensuring bids are delivered to the correct location and within the specified date and time specified.

17. ADDENDA OR BULLETINS

Addenda or bulletins issued before the time to submit bids expires, or forming a part of the contract documents furnished to the bidder for preparation of his bid, shall be covered in the bid and shall be made a part of the contract.

18. WITHDRAWAL OF BID

A bidder may withdraw the bid personally or by a signed written request *prior* to the scheduled time for opening of the bids (but not after).

19. AWARD OR REJECTIONS OF BIDS

The contract will be awarded to the lowest responsible bidder complying with these instructions and with the notice inviting sealed bids. The District may reject bids or waive informality in bids. If in the judgment of the District a bid is unbalanced, or if the bidder is not responsible, it shall be considered sufficient grounds for rejection of the entire bid.

20. BIDDERS INTERESTED IN MORE THAN ONE BID

No person, firm or corporation shall make or file, or be interested in more than one bid for the same work, unless alternative bids are solicited. A person, firm or corporation submitting a subbid to a bidder,

or who has quoted prices on material to a bidder, is not disqualified from submitting a subbid or quoting prices to other bidders.

BID TO
PHELAN PIÑON HILLS COMMUNITY SERVICES DISTRICT
FOR THE CONSTRUCTION OF
CIVIC CENTER DEVELOPMENT PHASE I PROJECT

Name of Bidder: _____
Business Address: _____

Telephone No: _____
Place of Residence: _____

The site of the work to be constructed and referred to herein is in the County of San Bernardino, California.

The work is to be in accordance with the Specifications and contract documents, and as shown on the Plans, therefore entitled “CIVIC CENTER DEVELOPMENT PROJECT PHASE I Project”, TO THE GOVERNING BOARD OF the Phelan Piñon Hills Community Services District.”

In compliance with your notice inviting sealed proposals (bids) and other documents, the undersigned bidder proposes to perform the work and in a workmanlike manner, in strict conformity with the Plans and Specifications and other contract documents, including Addenda Nos. _____, _____ and _____, on file in the office of the District for the contract unit prices herein.

BID SCHEDULE

Bidders shall fully complete the Bid Form and return it with their submittal. All bids shall include respective itemized costs associated with **all** labor, equipment, materials, transportation, overhead, travel, profit, insurance, sales and other taxes, licenses, incidentals and all related costs necessary to complete the scope of work.

1. _____ doing Business as _____
Business Name (Corporation, Partnership or Individual)

hereby proposes to furnish and complete work required by this request for bids for the construction of all items listed at the prices shown for each bid item on the Bid Schedule. Any total cost found inconsistent with the unit cost when the bids are examined will be deemed in error and corrected to agree with the unit cost which shall be considered correct.

2. The undersigned BIDDER does hereby declare and stipulate that this proposal is made in good faith, without collusion or connection with any other person or persons bidding for the same work, and that it is made in pursuance of and subject to all the terms and conditions of these Contract Documents, and the Plans pertaining to the work to be done, all of which have been examined by the undersigned.

BID SCHEDULE
PHELAN PIÑON HILLS COMMUNITY SERVICES DISTRICT
FOR THE CONSTRUCTION OF
CIVIC CENTER DEVELOPMENT PHASE I PROJECT

BID

Lump Sum Base Bid \$ _____

Total Bid Price in Words: _____

NOTE: Successful bidder shall be required to submit a detailed schedule of values for all items, within 14 calendar days following notice to proceed.

BID SHEET

3. All the various phases of work enumerated in these Contract Documents with their individual jobs and overhead, whether specifically mentioned, included by implication or appurtenant thereto, are to be performed by the BIDDER under one of the items listed in the Bid Schedule, irrespective of whether it is named in said list.

4. The bid will remain subject to acceptance for 60 Days after submittal, or for such longer time as the bidder may agree to in writing upon request by Owner.

5. It is understood that time is of the essence in this contract and the BIDDER agrees to commence within 10 days after the Notice to Proceed, and complete the Work within the Contract Time stated in Section 8, Instructions to Bidders.

Signature of Bidder: _____

Address

Authorized Officer of Bidder

Dated: _____

NOTE: If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If Bidder is a co-partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership. If the Bidder is an individual, the signature shall be placed above. If a joint venture of a special partnership, the names of the general partners and special partners shall be submitted.

BID SECURITY FORM

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____ as principal and _____ as surety, are held and firmly bound unto PHELAN PIÑON HILLS COMMUNITY SERVICES DISTRICT hereinafter referred to as "OWNER," for the sum of _____ dollars, (\$_____), the amount being 10 percent at least of the total amount of the bid, to be paid to the said OWNER, its successors, and assigns; for which payment, will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the certain proposal of the above bounden for the completion of the CIVIC CENTER DEVELOPMENT PHASE I Project as specifically set forth in documents entitled Contract Documents and Specifications for the CIVIC CENTER DEVELOPMENT PHASE I Project in accordance with the Specifications and Construction Drawings on file at the office of the Owner, 4176 Warbler Road, Phelan, CA 92371-8819, is not withdrawn within the period specified in Section 4 of the Instructions to Bidders, unless otherwise required by law, and notwithstanding the award of the contract to another bidder, and that if said proposal is accepted by the OWNER through action of its legally constituted contracting authorities and if the above bounden his/her heirs, executors, administrators, successors and assigns, shall duly enter into and execute a contract for such construction and shall execute and deliver the required Performance and Payment Bonds and proof of insurance coverage within 15 calendar days (not including holidays) after the date of notification by and from the said OWNER that the said Contract is ready for execution, then this obligation shall become null and void; otherwise it shall be and remain in full force and virtue.

IN WITNESS WHEREOF, we hereunto set our hands and seals this day of

_____ 20_____

Signature

Title

Note: The standard printed bond form of any bonding company acceptable to the OWNER may be used in lieu of the foregoing approved sample bond form provided the security stipulations protecting the OWNER are not in anyway reduced by use of the surety company's printed standard form.

LIST OF MATERIAL/EQUIPMENT SUPPLIERS

Name the manufacturer or manufacturers of the items listed below and every major product or major piece of equipment whose cost exceeds fifteen percent (15%) of the total bid amount.

In addition, the bidder is required to fill out the following blanks, listing manufacturers from whom it intends to purchase the indicated items and which selections will be considered as binding upon the Bidder, provided that all such selections shall comply with the provisions of the Contract Documents

No change shall be allowed by the Engineer of any material manufacturer or supplier listed after receipt of bids unless the manufacturer so listed cannot furnish materials meeting the specifications. Should such change be allowed, there will be no change in the amount of the bid originally submitted.

Item	Material	Manufacturer
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
9.	_____	_____
10.	_____	_____
11.	_____	_____
12.	_____	_____

Add additional sheet as required.

REFERENCES

(Offerer must complete the reference list as indicated for at least three (3) sites that are currently using a similar scope of work requested by the District. This reference list is mandatory.)

REFERENCE No. 1

City/Agency: _____

Contact Name: _____ Phone Number: _____

Address: _____

Contract Amount: \$ _____ Year: _____

Project Name & Description of work done: _____

REFERENCE No. 2

City/Agency: _____

Contact Name: _____ Phone Number: _____

Address: _____

Contract Amount: \$ _____ Year: _____

Project Name & Description of work done: _____

REFERENCE No. 3

City/Agency: _____

Contact Name: _____ Phone Number: _____

Address: _____

Contract Amount: \$ _____ Year: _____

Project Name & Description of work done: _____

COMPANY AND PARTNERSHIP IDENTIFICATION

Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of this work.

Legal name of Bidder _____

Street Address _____

Mailing Address _____

Business Telephone _____

Business Facsimile _____

Email Address _____

Type of Business:

☐ **Sole Proprietor** ☐ **Partnership** ☐ **Corporation** ☐ **Other:** _____

If corporation, indicate State where incorporated: _____

Contractor's License Numbers: _____
(General Building Contractor Class "B") (Other)

Contractor's DIR* Registration: _____
DIR Number Expiration Date

*DIR – California Department of Industrial Relations

AFFIDAVIT

I, the undersigned, certify and declare that I have read all the answers contained in this identification form and known their contents. The matters stated in the form answers are true of my own knowledge and belief, except as to those matters stated on information and belief, and as to those matters I believe them to be true. I declare under penalty of perjury under the laws of the State of California, that the foregoing is correct.

Dated: _____

(Signature)

(Printed Name and Title)

DESIGNATION OF SUBCONTRACTORS

In accordance with the provisions of Section 4100 and 4104 et. seq. of the Government Code of the State of California, the bidder shall, in its bid, list the name, License Number and Classification, and place of business of each subcontractor who will perform work or labor or render service to the prime contractor in an amount in excess of one-half of 1 percent of the prime contractor's total bid, including the percentage of Prime Contractor’s total base bid.

Description of Work	Subcontractor/License No.	% of Contract

ADDENDA ACKNOWLEDGEMENT

The undersigned acknowledges receipt of the following ADDENDA:

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Name of Bidder: _____

Address: _____

Telephone Number: _____

By: _____
Signature Title

WORKERS' COMPENSATION CERTIFICATE

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

Dated: _____

(Contractor (Type Full Name))

(Signature)

(Title)

(Street Address)

(City) (State) (Zip)

NOTE: If Contractor is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If the Contractor is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnerships. If the Contractor is an individual, the name of the firm shall be set forth together with the signature.

NON-COLLUSION DECLARATION

The undersigned declares under penalty of perjury as follows:

1. _____, being first duly sworn, deposes and says that he or she is (title) _____ of (company name) _____, the party making the foregoing bid.

2. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation.

3. The bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding.

4. The bidder had not in any manner, directly or indirectly, sought by agreement, communication or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract.

5. All statements contained in the bid are true.

6. The bidder has not, directly or indirectly, submitted the bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Dated: _____

(Contractor (Type Full Name))

(Signature)

(Title)

(Street Address)

(City)

(State)

(Zip)

(Attach Notarial Acknowledgement of Contractor)

**CERTIFICATE OF BIDDER REGARDING
AFFIRMATIVE ACTION PROGRAM**

The Bidder hereby certifies that he or she is in compliance with the Civil Rights Act of 1964, Executive Order No. 11246, the California Fair Employment Practices Act of 1964, Executive Order No. 11246, The California Fair Employment Practices Act, and all other applicable Federal and State laws and regulations relating to equal opportunity employment, including Federal Water Pollution Control Act Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, related to prohibition of discrimination on the basis of race, color, national origin, sex, disability or age.

Bidder's Name: _____

Address: _____

Name and Title of Signer: _____

Signature

Date

(The above certification of the Bidder regarding its affirmative action program shall be filled out completely, signed and submitted by each bidder and shall be part of the Contract Documents.)

ACKNOWLEDGMENT OF INSURANCE REQUIREMENTS

By signing below, Bidder acknowledges the insurance requirements as listed in Article 7 of the General Conditions. By this acknowledgment, the Bidder and its insurance provider(s) and surety(ies) certify that they have read and understand the insurance and bonding requirements in their entirety, including limits of coverage, additional insureds and endorsements, and bonding requirements, and that the Bidder can provide the insurance coverage and bonds as required in the Contract documents without exception.

Bidder understands that if the insurance coverage provided in these referenced Sections above cannot be provided, its bid is subject to rejection by the Owner as non-responsive.

BIDDER

Company Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

INSURANCE PROVIDER/SURETY REPRESENTATIVE

Insurer/Surety Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

**Bidder Must Provide This Acknowledgment for Each Insurer or Surety Providing Insurance Coverage
or a Bond under this Contract**

DEBARMENT AND SUSPENSION CERTIFICATION

- 1) The Contractor certifies, to the best of its knowledge and belief, that he/she and its subcontractors and subrecipients:
 - a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - b) Have not, within the three (3) year period preceding this certification, been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) transaction or contract under a public transaction, violation of Federal or state antitrust statutes, or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, state, or local) with commission of any of the offenses listed in subparagraph (1)(b) of this certification; and
 - d) Have not, within the three (3) year period preceding this certification, had one or more public transactions (Federal, state, and local) terminated for cause or default.
- 2) The Contractor also certifies that, if Contractor later becomes aware of any information contradicting the statements of paragraph (1) above, it will promptly provide that information to the State.
- 3) If the Applicant is unable to certify to all statements in paragraphs (1) and (2) of this certification, through those means available to Applicant, including the General Services Administration's Excluded Parties List System (EPLS), Applicant shall indicate so in its applications, or in the transmittal letter or message accompanying its annual certifications and assurances, and will provide a written explanation to the State.

DEBARMENT AND SUSPENSION CERTIFICATION

SIGNATURE PAGE

In signing this document, I declare under penalties of perjury that the foregoing certifications and assurances, and any other statements made by me on behalf of the Applicant are true and correct.

Signature Date Printed Name

As the undersigned Attorney for the above named Contractor, I hereby affirm to the District that it has the authority under state and local law to make and comply with the certifications and assurances as indicated on the foregoing pages. I further affirm that, in my opinion, these certifications and assurances have been legally made and constitute legal and binding obligations of the Contractor.

I further affirm to the Contractor that, to the best of my knowledge, there is no legislation or litigation pending or imminent that might adversely affect the validity of these certifications and assurances or of the performance of the described project.

AFFIRMATION OF CONTRACTOR'S ATTORNEY

For _____ (Name of Contractor)

Signature _____ Date _____

Printed Name of Applicant's Attorney _____

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS

The Contractor certifies that he/she, and his/her Subcontractors will provide a drug-free workplace by:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (b) Establishing a drug-free awareness program to inform employees about—
 - (1) The dangers of drug abuse in the workplace;
 - (2) The Contractor's/Subcontractor's policies of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation and employee assistance programs, and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
- (c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
- (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will—
 - (1) Abide by the terms of the statement; and
 - (2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after each conviction;
- (e) Notifying the District within ten days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction;
- (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted—
 - (1) Taking appropriate personnel action against such an employee, up to and including termination; or
 - (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

Typed Name and Title of Certification Official

Signature

Date

ACKNOWLEDGMENT OF BUILD AMERICA, BUY AMERICA ACT (BABAA)

By signing below, Bidder acknowledges the federal BABAA requirements that must be complied with for this Project. By this acknowledgment, the Bidder certifies that he/she has read and understands the BABAA requirements in their entirety, and that the Bidder will provide all documentation and proof of compliance when requested by Owner and/or Grantor.

BIDDER

Company Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

Bidder Must Provide This Acknowledgment Form with the Bid

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

* APPLICANT'S ORGANIZATION

* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE

Prefix: * First Name: Middle Name:
* Last Name: Suffix:
* Title:

* SIGNATURE: * DATE:

**QUALIFICATIONS OF SUCCESSFUL BIDDER FOR
PHELAN PIÑON HILLS COMMUNITY SERVICES DISTRICT
FOR THE CONSTRUCTION OF
CIVIC CENTER DEVELOPMENT PHASE I PROJECT**

Notice is hereby given that the Phelan Piñon Hills Community Services District (PPHCSD) has determined that the successful bidder on the CIVIC CENTER DEVELOPMENT PHASE I PROJECT, to be undertaken by the PPHCSD must be qualified for this project. It is mandatory that all Contractors who perform work for the District fully complete the qualification questionnaire provide all materials requested herein, and be approved by PPHCSD prior to the award of any contract. If two or more business entities submit a bid as part of a Joint Venture, or expect to submit a bid as part of a Joint Venture, each entity within the Joint Venture must be separately qualified to bid. The fully completed questionnaire is to be submitted prior to issuance of the Notice of Intent to Award letter.

Answers to questions contained in the attached questionnaire, information about current bonding capacity, notarized statement from surety, and the most recent reviewed or audited financial statements, with accompanying notes and supplemental information, are required. PPHCSD will use these documents as the basis of rating Contractors in respect to this bid. PPHCSD reserves the right to check other sources available.

While it is the intent of the qualification questionnaire and documents required therewith to assist PPHCSD in determining bidder responsibility and to aid PPHCSD in selecting the lowest responsible bidder, neither the fact of qualification, nor any qualification rating, will preclude PPHCSD from a post-bid consideration and determination of whether a bidder has the quality, fitness, capacity and experience to satisfactorily perform the proposed work, and has demonstrated the requisite trustworthiness.

The completed qualification package shall be submitted under seal and marked “CONFIDENTIAL”, addressed to George Cardenas, Engineering Manager.

The qualification packages (questionnaire answers and financial statements) submitted by Contractors are not public records and are not open to public inspection. All information provided will be kept confidential to the extent permitted by law. However, the contents may be disclosed to third parties for purpose of verification, or investigation of substantial allegations. State law requires that the names of contractors applying for qualification status shall be public records subject to disclosure, and the first page of the questionnaire will be used for that purpose.

Each questionnaire must be signed under penalty of perjury in the manner designated at the end of the form, by an individual who has the legal authority to bind the Contractor on whose behalf that person is signing. If any information provided by a Contractor becomes inaccurate, the Contractor must immediately notify PPHCSD and provide updated accurate information in writing, under penalty of perjury.

PPHCSD will refuse to grant qualification where the requested information and materials are not provided. PPHCSD reserves the right to waive minor irregularities and omissions in the information contained in the qualification application submitted, to make all final determinations, and to determine that the Contractor is qualified for this project.

Contractors may submit qualification packages during regular working hours on any day that the PPHCSD office is open.

CONTACT INFORMATION

Firm Name: _____ Check One: ☐ Corporation
(as it appears on license) ☐ Partnership
☐ Sole Prop.

Contact Person: _____

Address: _____

Phone: _____ Fax: _____

If firm is a sole proprietor or partnership:

Owner(s) of Company _____

Contractor's License Number(s):

PART I. ESSENTIAL REQUIREMENTS FOR QUALIFICATION

Contractor will be immediately disqualified if the answer to any of questions 1 through 5 is “no.”¹

Contractor will be immediately disqualified if the answer to any of questions 6, 7, 8 or 9 is “yes.”² If the answer to question 8 is “yes,” and if debarment would be the sole reason for denial of qualification, any qualification issued will exclude the debarment period.

1. Contractor possesses a valid and current California Contractor’s license for the project or projects for which it intends to submit a bid.
☐ Yes ☐ No
2. Contractor has a liability insurance policy with a policy limit of at least \$1,000,000 per occurrence and \$2,000,000 aggregate.
☐ Yes ☐ No
3. Contractor has current workers’ compensation insurance policy as required by the Labor Code or is legally self-insured pursuant to Labor Code section 3700 et. seq.
☐ Yes ☐ No ☐ Contractor is exempt from this requirement, because it has no employees
4. Have you attached your latest copy of a reviewed or audited financial statement with accompanying notes and supplemental information.³
☐ Yes ☐ No

NOTE: A financial statement that is not either reviewed or audited is not acceptable. A letter verifying availability of a line of credit may also be attached; however, it will be considered as supplemental information only, and is not a substitute for the required financial statement.

5. Have you attached a notarized statement from an admitted surety insurer (approved by the California Department of Insurance) and authorized to issue bonds in the State of California, which states: (a) that your current bonding capacity is sufficient for the project for which you seek qualification if you are seeking qualification for a single project; or (if you are seeking qualification valid for a year) (b) your current available bonding capacity?
☐ Yes ☐ No

NOTE: Notarized statement must be from the surety company, not an agent or broker.

¹ A “no” answer to Question 4 will not be disqualifying if the contractor is exempt from complying with Question 4, for reasons explained in footnote 3.

² A contractor disqualified solely because of a “Yes” answer given to question 6, 7, or 9 may appeal the disqualification and provide an explanation of the relevant circumstances during the appeal procedure.

³ Public Contract Code section 20101(e) exempts from this requirement a contractor who has qualified as a small business pursuant to Government Code section 14837(d)(1), if the bid is “no more than 25 per cent of the qualifying amount provided in section 14837(d)(1).” As of January 1, 2001, the qualifying amount is \$10 million, and 25 per cent of that amount, therefore, is \$2.5 million.

6. Has your contractor's license been revoked at any time in the last five years?
☐ Yes ☐ No
7. Has a surety firm completed a contract on your behalf, or paid for completion because your firm was default terminated by the project owner within the last five (5) years?
☐ Yes ☐ No
8. At the time of submitting this qualification form, is your firm ineligible to bid on or be awarded a public works contract, or perform as a subcontractor on a public works contract, pursuant to either Labor Code section 1777.1 or Labor Code section 1777.7?
☐ Yes ☐ No
If the answer is "Yes," state the beginning and ending dates of the period of debarment:

9. At any time during the last five years, has your firm, or any of its owners or officers been convicted of a crime involving the awarding of a contract of a government construction project, or the bidding or performance of a government contract?
☐ Yes ☐ No

**PART II. ORGANIZATION, HISTORY, ORGANIZATIONAL PERFORMANCE,
COMPLIANCE WITH CIVIL AND CRIMINAL LAWS**

A. Current Organization and Structure of the Business

For Firms That Are Corporations:

- 1a. Date incorporated : _____
- 1b. Under the laws of what state: _____
- 1c. Provide all the following information for each person who is either (a) an officer of the corporation (president, vice president, secretary, treasurer), or (b) the owner of at least ten per cent of the corporation's stock.

Name	Position	Years with Co.	% Ownership	Social Security #

- 1d. Identify every construction firm that any person listed above has been associated with (as owner, general partner, limited partner or officer) at any time during the last five years.

NOTE: For this question, "owner" and "partner" refer to ownership of ten per cent or more of the business, or 10 per cent or more of its stock, if the business is a corporation.

Person's Name	Construction Firm	Dates of Person's Participation with Firm

For Firms That Are Partnerships:

- 1a. Date of formation: _____
- 1b. Under the laws of what state: _____
- 1c. Provide all the following information for each partner who owns 10 per cent or more of the firm.

Name	Position	Years with Co.	% Ownership	Social Security #

- 1d. Identify every construction company that any partner has been associated with (as owner, general partner, limited partner or officer) at any time during the last five years.

NOTE: For this question, “owner” and “partner” refer to ownership of ten per cent or more of the business, or ten per cent or more of its stock, if the business is a corporation.

Person’s Name	Construction Company	Dates of Person’s Participation with Company

For Firms That Are Sole Proprietorships:

- 1a. Date of commencement of business. _____
- 1b. Social security number of company owner. _____
- 1c. Identify every construction firm that the business owner has been associated with (as owner, general partner, limited partner or officer) at any time during the last five years.

NOTE: For this question, “owner” and “partner” refer to ownership of ten per cent or more of the business, or ten per cent or more of its stock, if the business is a corporation.

Person’s Name	Construction Company	Dates of Person’s Participation with Company

For Firms That Intend to Make a Bid as Part of a Joint Venture:

- 1a. Date of commencement of joint venture. _____
- 1b. Provide all of the following information for each firm that is a member of the joint venture that expects to bid on one or more projects:

Name of firm	% Ownership of Joint Venture

B. History of the Business and Organizational Performance

2. Has there been any change in ownership of the firm at any time during the last three years?
- NOTE: A corporation whose shares are publicly traded is not required to answer this question.**

☐ Yes ☐ No

If “yes,” explain on a separate signed page.

3. Is the firm a subsidiary, parent, holding company or affiliate of another construction firm?
NOTE: Include information about other firms if one firm owns 50 per cent or more of another, or if an owner, partner, or officer of your firm holds a similar position in another firm.

☐ Yes ☐ No

If “yes,” explain on a separate signed page.

4. Are any corporate officers, partners or owners connected to any other construction firms.
NOTE: Include information about other firms if an owner, partner, or officer of your firm holds a similar position in another firm.

☐ Yes ☐ No

If “yes,” explain on a separate signed page.

5. State your firm’s gross revenues for each of the last three years:

6. How many years has your organization been in business in California as a contractor under your present business name and license number? _____ years

7. Is your firm currently the debtor in a bankruptcy case?

☐ Yes ☐ No

If “yes,” please attach a copy of the bankruptcy petition, showing the case number, and the date on which the petition was filed.

8. Was your firm in bankruptcy at any time during the last five years? (This question refers only to a bankruptcy action that was not described in answer to question 7, above)

☐ Yes ☐ No

If “yes,” please attach a copy of the bankruptcy petition, showing the case number and the date on which the petition was filed, and a copy of the Bankruptcy Court’s discharge order, or of any other document that ended the case, if no discharge order was issued.

Licenses

9. List all California construction license numbers, classifications and expiration dates of the California contractor licenses held by your firm:

10. If any of your firm’s license(s) are held in the name of a corporation or partnership, list below the names of the qualifying individual(s) listed on the CSLB records who meet(s) the experience and examination requirements for each license.

11. Has your firm changed names or license number in the past five years?
☐ Yes ☐ No
If “yes,” explain on a separate signed page, including the reason for the change.
12. Has any owner, partner or (for corporations:) officer of your firm operated a construction firm under any other name in the last five years?
☐ Yes ☐ No
If “yes,” explain on a separate signed page, including the reason for the change.
13. Has any CSLB license held by your firm or its Responsible Managing Employee (RME) or Responsible Managing Officer (RMO) been suspended within the last five years?
☐ Yes ☐ No
If “yes,” please explain on a separate signed sheet.

Disputes

14. At any time in the last five years has your firm been assessed and paid liquidated damages after completion of a project under a construction contract with either a public or private owner?
☐ Yes ☐ No
If yes, explain on a separate signed page, identifying all such projects by owner, owner’s address, the date of completion of the project, amount of liquidated damages assessed and all other information necessary to fully explain the assessment of liquidated damages.
15. In the last five years has your firm, or any firm with which any of your company’s owners, officers or partners was associated, been debarred, disqualified, removed or otherwise prevented from bidding on, or completing, any government agency or public works project for any reason?
NOTE: “Associated with” refers to another construction firm in which an owner, partner or officer of your firm held a similar position, and which is listed in response to question 1c or 1d on this form.
☐ Yes ☐ No
If “yes,” explain on a separate signed page. State whether the firm involved was the firm applying for qualification here or another firm. Identify by name of the company, the name of the person within your firm who was associated with that company, the year of the event, the owner of the project, the project and the basis for the action.
16. In the last five years has your firm been denied an award of a public works contract based on a finding by a public agency that your company was not a responsible bidder?
☐ Yes ☐ No
If “yes,” explain on a separate signed page. Identify the year of the event, the owner, the project and the basis for the finding by the public agency.

* * * * *

NOTE: The following two questions refer only to disputes between your firm and the owner of a project. You need not include information about disputes between your firm and a supplier, another contractor, or subcontractor. You need not include information about “pass-through” disputes in which the actual dispute is between a sub-contractor and a project owner. Also, you may omit reference to all disputes about amounts of less than \$50,000.

17. In the past five years has any claim **against** your firm concerning your firm’s work on a construction project been **filed in court or arbitration**?

☐ Yes ☐ No

If “yes,” on separate signed sheets of paper identify the claim(s) by providing the project name, date of the claim, name of the claimant, a brief description of the nature of the claim, the court in which the case was filed and a brief description of the status of the claim (pending or, if resolved, a brief description of the resolution).

18. In the past five years has your firm made any claim against a project owner concerning work on a project or payment for a contract and **filed that claim in court or arbitration**?

☐ Yes ☐ No

If “yes,” on separate signed sheets of paper identify the claim by providing the project name, date of the claim, name of the entity (or entities) against whom the claim was filed, a brief description of the nature of the claim, the court in which the case was filed and a brief description of the status of the claim (pending, or if resolved, a brief description of the resolution).

* * * * *

19. At any time during the past five years, has any surety company made any payments on your firm’s behalf as a result of a default, to satisfy any claims made against a performance or payment bond issued on your firm’s behalf, in connection with a construction project, either public or private?

☐ Yes ☐ No

If “yes,” explain on a separate signed page the amount of each such claim, the name and telephone number of the claimant, the date of the claim, the grounds for the claim, the present status of the claim, the date of resolution of such claim if resolved, the method by which such was resolved if resolved, the nature of the resolution and the amount, if any, at which the claim was resolved.

20. In the last five years has any insurance carrier, for any form of insurance, refused to renew the insurance policy for your firm?

☐ Yes ☐ No

If “yes,” explain on a separate signed page. Name the insurance carrier, the form of insurance and the year of the refusal.

Criminal Matters and Related Civil Suits

21. Has your firm or any of its owners, officers or partners ever been found liable in a civil suit or found guilty in a criminal action for making any false claim or material misrepresentation to any public agency or entity?
☐ Yes ☐ No
If “yes,” explain on a separate signed page, including identifying who was involved, the name of the public agency, the date of the investigation and the grounds for the finding.
22. Has your firm or any of its owners, officers or partners ever been convicted of a crime involving any federal, state, or local law related to construction?
☐ Yes ☐ No
If “yes,” explain on a separate signed page, including identifying who was involved, the name of the public agency, the date of the conviction and the grounds for the conviction.
23. Has your firm or any of its owners, officers or partners ever been convicted of a federal or state crime of fraud, theft, or any other act of dishonesty?
☐ Yes ☐ No
If “yes,” identify on a separate signed page the person or persons convicted, the court (the county if a state court, the district or location of the federal court), the year and the criminal conduct.

Bonding

24. Bonding capacity: Provide documentation from your surety identifying the following:

Name of bonding company/surety: _____

Name of surety agent, address and telephone number:

25. If your firm was required to pay a premium of more than one per cent for a performance and payment bond on any project(s) on which your firm worked at any time during the last three years, state the percentage that your firm was required to pay. You may provide an explanation for a percentage rate higher than one per cent, if you wish to do so.

26. List all other sureties (name and full address) that have written bonds for your firm during the last five years, including the dates during which each wrote the bonds:

27. During the last five years, has your firm ever been denied bond coverage by a surety company, or has there ever been a period of time when your firm had no surety bond in place during a public construction project when one was required?

☐ Yes ☐ No

If yes, provide details on a separate signed sheet indicating the date when your firm was denied coverage and the name of the company or companies which denied coverage; and the period during which you had no surety bond in place.

C. Compliance with Occupational Safety and Health Laws and with Other Labor Legislation Safety

28. Has CAL OSHA cited and assessed penalties against your firm for any “serious,” “willful” or “repeat” violations of its safety or health regulations in the past five years?

NOTE: If you have filed an appeal of a citation, and the Occupational Safety and Health Appeals Board has not yet ruled on your appeal, you need not include information about it.

☐ Yes ☐ No

If “yes,” attached a separate signed page describing the citations, including information about the dates of the citations, the nature of the violation, the project on which the citation(s) was or were issued, the amount of penalty paid, if any. If the citation was appealed to the Occupational Safety and Health Appeals Board and a decision has been issued, state the case number and the date of the decision.

29. Has the federal Occupational Safety and Health Administration cited and assessed penalties against your firm in the past five years?

NOTE: If you have filed an appeal of a citation and the Appeals Board has not yet ruled on your appeal, or if there is a court appeal pending, you need not include information about the citation.

☐ Yes ☐ No

If “yes,” attach a separate signed page describing each citation.

30. Has the EPA or any Air Quality Management District or any Regional Water Quality Control Board cited and assessed penalties against either your firm or the owner of a project on which your firm was the contractor, in the past five years?

NOTE: If you have filed an appeal of a citation and the Appeals Board has not yet ruled on your appeal, or if there is a court appeal pending, you need not include information about the citation.

☐ Yes ☐ No

If "yes," attach a separate signed page describing each citation.

31. How often do you require documented safety meetings to be held for construction employees and field supervisors during the course of a project?

32. List your firm's Experience Modification Rate (EMR) (California workers' compensation insurance) for each of the past three premium years:

NOTE: An Experience Modification Rate is issued to your firm annually by your workers' compensation insurance carrier.

Current year: _____

Previous year: _____

Year prior to previous year: _____

If your EMR for any of these three years is or was 1.00 or higher you may, if you wish, attach a letter of explanation.

33. Within the last five years has there ever been a period when your firm had employees but was without workers' compensation insurance or state-approved self-insurance?

☐ Yes ☐ No

If "yes," please explain the reason for the absence of workers' compensation insurance on a separate signed page. If "No," please provide a statement by your current workers' compensation insurance carrier that verifies periods of workers' compensation insurance coverage for the last five years. (If your firm has been in the construction business for less than five years, provide a statement by your workers' compensation insurance carrier verifying continuous workers' compensation insurance coverage for the period that your firm has been in the construction business.)

Prevailing Wage and Apprenticeship Compliance Record

34. Has there been more than one occasion during the last five years in which your firm was required to pay either back wages or penalties for your own firm's failure to comply with the state's prevailing wage laws?

NOTE: This question refers only to your own firm's violation of prevailing wage laws, not to violations of the prevailing wage laws by a subcontractor.

☐ Yes ☐ No

If "yes," attach a separate signed page or pages, describing the nature of each violation, identifying the name of the project, the date of its completion, the public agency for which it was constructed; the number of employees who were initially underpaid and the amount of back wages and penalties that you were required to pay.

35. During the last five years, has there been more than one occasion in which your own firm has been penalized or required to pay back wages for failure to comply with the **federal** Davis-Bacon prevailing wage requirements?

☐ Yes ☐ No

If "yes," attach a separate signed page or pages describing the nature of the violation, identifying the name of the project, the date of its completion, the public agency for which it was constructed; the number of employees who were initially underpaid, the amount of back wages you were required to pay along with the amount of any penalty paid.

36. Provide the **name, address and telephone number** of the apprenticeship program (approved by the California Apprenticeship Council) from whom you intend to request the dispatch of apprentices to your company for use on any public work project for which you are awarded a contract by *PPHCSD*.

37. If your firm operates its own State-approved apprenticeship program:

- (a) Identify the craft or crafts in which your firm provided apprenticeship training in the past year.
- (b) State the year in which each such apprenticeship program was approved, and attach evidence of the most recent California Apprenticeship Council approval(s) of your apprenticeship program(s).
- (c) State the number of individuals who were employed by your firm as apprentices at any time during the past three years in each apprenticeship and the number of persons who, during the past three years, completed apprenticeships in each craft while employed by your firm.

38. At any time during the last five years, has your firm been found to have violated any provision of California apprenticeship laws or regulations, or the laws pertaining to use of apprentices on public works?

NOTE: You may omit reference to any incident that occurred prior to January 1, 1998, if the violation was by a subcontractor and your firm, as general contractor on a project, had no knowledge of the subcontractor's violation at the time they occurred.

☐ Yes ☐ No

If "yes," provide the date(s) of such findings, and attach copies of the Department's final decision(s).

PART III. RECENT CONSTRUCTION PROJECTS COMPLETED

39. Contractor shall provide information about its six most recently completed public works projects and its three largest completed private projects within the last three years.⁴ Names and references must be current and verifiable. Use separate sheets of paper that contain all of the following information:

Project Name: _____

Location: _____

Owner: _____

Owner Contact (name and current phone number):

Architect or Engineer: _____

Architect or Engineer Contact (name and current phone number):

Construction Manager (name and current phone number):

⁴ If you wish, you may, using the same format, also provide information about other projects that you have completed that are similar to the project(s) for which you expect to bid.

Description of Project, Scope of Work Performed:

Total Value of Construction (including change orders): _____

Original Scheduled Completion Date: _____

Time Extensions Granted (number of days): _____

Actual Date of Completion: _____

* * * * *

I, the undersigned, certify and declare that I have read all the foregoing answers to this prequalification questionnaire and know their contents. The matters stated in the questionnaire answers are true of my own knowledge and belief, except as to those matters stated on information and belief, and as to those matters I believe them to be true. I declare under penalty of perjury under the laws of the State of California, that the foregoing is correct.

Dated:

(Name)

AGREEMENT FOR THE CONSTRUCTION OF CIVIC CENTER DEVELOPMENT PHASE I PROJECT

As of, _____, _____, Phelan Piñon Hills Community Services District, herein “District” and _____, herein “Contractor”, agree as follows:

GENERAL

SECTION 1 SCOPE OF WORK

Contractor will furnish labor, equipment and materials and will perform work for the construction of the facilities described in the plans and specifications.

SECTION 2 CONSIDERATION

District shall pay Contractor the sum set forth in Contractor’s bid for the performance of the work.

SECTION 3 PAYMENTS

- (a) Monthly progress payments shall be as follows:
- (1) On or about the 20th day of each month, Contractor shall submit to District an invoice including an estimate of the cumulative amount and value of the work performed by Contractor prior to that date and subsequent to prior estimates. The estimate may include 50% of the value of acceptable materials and equipment delivered to the work site. The estimate shall be based on certified copies of paid invoices by the Contractor.
 - (2) The District shall review the request as soon as practicable to determine whether the payment request is proper. A payment request found not to be a proper payment shall be returned within seven days after receipt accompanied by a written description of the reasons why the request is not proper.
 - (3) District shall pay Contractor, within 30 days of receipt of the invoice, ninety percent of the invoice amount reduced by: amounts due to District for equipment, services or materials furnished by District; amounts of claims or liens by the District or others, and amounts required to be deducted by federal, state or local governmental authorities.
 - (4) If the District fails to make progress payment within thirty days after receipt of an undisputed and properly submitted invoice, the District shall pay to the Contractor interest at the legal rate set forth in Code of Civil Procedure Section 685.101(a) from seven days after receipt of the invoice by the District until paid.

- (5) Progress payments do not signify acceptance of the work, or any portion of the work. Payments do not preclude District from demanding and recovering damages for failure to fully perform.

(b) On satisfactory completion of the work, District shall pay Contractor 95% of the value of the actual work less prior monthly progress payments.

(c) Within thirty days after recordation of a notice of completion, the undisputed amounts withheld by the District shall be released. "Completion" occurs on the acceptance by the governing body of the District; or the filing of a notice of cessation of labor.

(d) Notwithstanding the foregoing, Contractor may receive payment in full, other than retention for claims by the District or third parties, if the Contractor deposits approved securities or enters into an agreement with an escrow agent to hold earned retentions. The substitution of securities or the use of an escrow account shall be in the form and manner permitted by law.

SECTION 4 CONTRACT DOCUMENTS

The complete contract includes the contract documents set forth herein, to wit: the Notice Inviting Sealed Proposals (Bids), Instructions to Bidders, Proposal or Bid Form, Noncollusion Declaration, this Agreement, Certificate(s) of Insurance, Workers' Compensation Certificate, Bonds, Plans and Specifications, General Conditions, and Special Provisions, Attachments hereto, and Addenda issued by the District.

SECTION 5 COMPLIANCE WITH PROVISIONS OF LAW

(a) This District is subject to laws relating to public agencies which are part of this contract as though fully set forth herein.

(b) Contractor shall comply with laws relating to the work.

SECTION 6 ATTORNEYS' FEES

The Court shall award reasonable costs and expenses, including attorneys' fees, to the prevailing party in an action or proceeding to enforce this Agreement.

SECTION 7 NOTICES

Notices required or permitted shall be given by personal delivery, by first class mail, postage prepaid, or facsimile transmission:

To Contractor:

To District:

Phelan Piñon Hills Community Services District
4176 Warbler Road, Phelan, CA 92371
(P.O. Box 294049, Phelan, CA 92329-4049)

SECTION 8 CONFLICT WITH PLANS AND SPECIFICATIONS

Conflict between the plans and specifications and this contract shall be brought to the attention of the District, which shall resolve such conflict per subsection 2-5.2 of the General Provisions.

SECTION 9 ASSIGNMENT

(a) Contractor shall not assign this contract or payments under this contract.

(b) Contractor and each subcontractor hereby assign to the District rights, title, and interest in and to causes of action under Section 4 of the *Clayton Act (15 U.S.C.A. Sec. 15)* or under the *Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code)*, arising from purchases of goods, services or materials for this contract or the subcontract. This assignment shall be made and become effective without further acknowledgment by the parties at the time the District tenders final payment to the Contractor.

SECTION 10 SECTION HEADINGS

Section headings are for the convenience of the parties and shall not affect the interpretation of this contract.

SECTION 11 AUTHORITY OF THE ENGINEER

District's representative shall decide questions about the quality or acceptability of materials furnished and work performed, manner of performance and rate of progress of the work, the interpretation of the plans and specifications and the fulfillment of the contract by Contractor.

WAGES, HOURS, AND WORKING CONDITIONS

SECTION 12 PREVAILING WAGES

(a) A determination of the general prevailing rates of per diem wages and holiday and overtime work where the work is to be performed is on file at the District's office. Contractor and subcontractors will not pay less than the prevailing rates of wages. Contractor will post one copy of the prevailing rates of wages at the job site.

(b) Contractor shall forfeit as penalty to the District the amount of the penalty set forth in Labor Code Section 1775.

SECTION 13 TRAVEL AND SUBSISTENCE PAYMENTS

Travel and subsistence payments shall be paid to each worker as defined in the applicable collective bargaining agreements filed with the Department of Industrial Relations for the particular craft, classification or type of work.

SECTION 14 HOURS OF WORK

(a) Eight hours labor constitutes a legal day's work. Workers shall be paid at a rate of one and one-half times the basic rate of pay for work in excess of eight hours during a calendar day or forty hours during a calendar week of the foregoing hours.

(b) Contractor shall keep and make available an accurate record showing the name each of each worker and hours worked each day and each week by each worker.

(c) As a penalty to the District, Contractor shall forfeit twenty-five dollars for each worker, including subcontractor's work, for each day the worker works more than eight hour or each week the worker works more than forty hours.

SECTION 15 APPRENTICES

Contractor shall comply with the Labor Code concerning the employment of apprentices.

SECTION 16 SUBCONTRACTORS

(a) Contractor shall comply with the *Subletting and Subcontracting Fair Practices Act* of the Public Contracts Code.

(b) Contractor shall submit to District the following information:

- (i) The name and location of the place of business of each subcontractor performing work, labor or rendering construction services, and each subcontractor licensed by the State of California specially fabricating and installing improvements according to detailed drawings or the plans and specifications, in an amount in excess of one-half of one percent of the Contractor's total bid.

- (ii) The portion of the work to be done by each subcontractor.
- (c) The Contractor shall list only one subcontractor for each portion of the work identified in the bid.

SECTION 17 DISCRIMINATION

The Contractor shall not refuse to employ or promote any person, and shall not discriminate against any person with respect to compensation or terms and conditions of employment, and shall not discipline or discharge any person employed because of the person's race, religion, creed, color, national origin, ancestry or sex. The Contractor shall not refuse to accept otherwise qualified employees as indentured apprentices solely on the grounds of race, religion, creed, color, national origin, ancestry or sex.

SECTION 18 SAFETY

Contractor and subcontractors shall comply with the provisions of the Safety and Health Regulations for Construction, promulgated by the Secretary of Labor under the *Contract Work Hours and Safety Standards Act*, as set forth in Title 29, C.F.R. and by the California Division of Industrial Safety.

SECTION 19 CHARACTER OF WORKERS

Only competent workers shall be employed on the work. Workers who are incompetent, intemperate, troublesome, disorderly or otherwise objectionable, or who fail to perform work properly and acceptably, shall be immediately removed from the work by the Contractor and not re-employed.

INSURANCE, INDEMNIFICATION AND BONDS

SECTION 20 INSURANCE

(a) Before beginning the performance of the work, Contractor shall purchase and maintain insurance to protect the Contractor and the District from claims: (i) arising from Contractor's operations under the contract by the Contractor, a subcontractor, or anyone employed by them, or anyone for whose acts any of them may be liable; (ii) under workers' compensation, disability benefits and other similar benefits acts; (iii) for damages because of bodily injury, occupational sickness, or disease, or death of the Contractor's employees, or persons other than the Contractor's employees; (iv) for damages insured by usual personal injury liability coverage sustained by a person as a result of an offense related to employment of such person by the Contractor, or other persons; (v) for damages, other than the work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; (vi) for damages because of bodily injury, death of a person or property damages arising from ownership, maintenance or use of a motor vehicle; (vii) involving contractual liability insurance applicable to the Contractor's obligations; and (viii) for damage to work in progress.

(b) The insurance required shall be written for not less than limits of liability specified in the contract documents or required by law, whichever is greater. The insurance shall be purchased from companies authorized to do business in the jurisdiction where the project is located. Coverages shall be written on an occurrence basis without interruption from the date of commencement of the work until

date of final payment or until termination of coverage required to be maintained after final payment. District, its officers, agents, volunteers, and employees shall be named as additional insured.

(c) Certificates of insurance executed by the carrier(s) and acceptable to the District and copies of the policy shall be filed with the District prior to the commencement of the work. The Certificates and the insurance policies shall provide the policies will not be canceled or allowed to expire until at least thirty days prior written notice has been given to the District. If the insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for payment. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

(d) Contractor shall require each subcontractor to maintain policies of insurance covering the hazards, and under the conditions mentioned above, and having the District, its officers, agents, volunteers and employees as additional insureds. Copies of the subcontractor's certificates of insurance and policies shall be filed with the District.

SECTION 21 INDEMNIFICATION

(a) Contractor shall indemnify and save the District, its officers, agents, volunteers and employees, free and harmless from costs, damages or liability, including attorneys' fees, arising out of any act or omission to act, including any negligent act or omission to act by Contractor, its officers, agents, subcontractors and employees with respect to the performance of the work or the Contractor's obligations under this contract.

(b) In addition to the foregoing, Contractor shall pay District costs, including attorneys' fees, incurred by the District in handling, responding to, or litigating stop notice claims or other demands against money due to the Contractor or against the Contractor's payment bond by Contractor's officers, agents, employees or subcontractors.

SECTION 22 PAYMENT BOND

(a) Before beginning the performance of the work, Contractor shall file a payment bond with the District for its approval and acceptance. The payment bond shall be in the sum of one hundred percent (100%) of the contract price.

(b) The payment bond shall be in substantially the form of the bond attached hereto. The bond shall be executed by a representative of the surety having no financial interest in the contractor. The payment bond shall be separate and distinct from any other bond required by this contract. In addition to all other requirements imposed by law or by the Contract Documents listed in Section 4 of this Agreement, all surety companies executing bonds for the work to be performed hereunder shall possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance as defined in Section 105 of the California Insurance Code, and said sureties must also appear on the Treasury Department's most current list (Circular 570 as amended).

SECTION 23 PERFORMANCE BOND

(a) Before beginning the performance of the work, Contractor shall file a performance bond with the District for its approval and acceptance. The performance bond shall be in the sum of one hundred percent (100%) of the contract price. The bond shall be payable by surety or sureties to District if Contractor fails to fully perform his obligations hereunder.

(b) The performance bond shall be in substantially the form of the bond attached hereto. The bond shall be executed by a representative of the surety having no financial interest in the Contractor. The performance bond shall be separate and distinct from any other bond required by this contract. In addition to all other requirements imposed by law or by the Contract Documents listed in Section 4 of this Agreement, all surety companies executing bonds for the work to be performed hereunder shall possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance as defined in Section 105 of the California Insurance Code, and said sureties must also appear on the Treasury Department's most current list (Circular 570 as amended).

SECTION 24 MAINTENANCE AND GUARANTEE BOND

(a) Upon acceptance of the work, Contractor shall file a maintenance and guarantee bond with the District for its approval and acceptance. The maintenance and guarantee bond shall be in the sum of one hundred percent (100%) of the contract price. The bond shall be payable by surety or sureties to District if Contractor fails to fully perform his obligations hereunder.

(b) The maintenance and guarantee bond shall be in substantially the form of the bond attached hereto. The bond shall be executed by a representative of the surety having no financial interest in the Contractor. The performance bond shall be separate and distinct from any other bond required by this contract. In addition to all other requirements imposed by law or by the Contract Documents listed in Section 4 of this Agreement, all surety companies executing bonds for the work to be performed hereunder shall possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance as defined in Section 105 of the California Insurance Code, and said sureties must also appear on the Treasury Department's most current list (Circular 570 as amended).

PERFORMANCE

SECTION 25 TIME FOR COMPLETION

(a) The work shall be completed within **five hundred forty five (545) calendar days** following issuance of Notice to Proceed.

(b) If the work is not completed before this date, the District will suffer damage. It is impractical and infeasible to determine the amount of damage. The Contractor shall pay to the District, as fixed and liquidated damages and not as a penalty, the sum of one thousand dollars (\$1,000.00) each calendar day of delay. The Contractor and Contractor's surety shall be liable for the amount. The Contractor shall not be charged liquidated damages because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

(c) If the work is not completed before this date, the District will incur substantial damages which cannot be ascertained at this time. Contractor shall pay to District damages caused by Contractor's delay in completing the work.

(d) Within ten (10) days from the beginning of such delay, the Contractor shall notify the District in writing of the cause of the delay. District shall ascertain the facts and extent of the delay and extend the time for completing the work if in the District's judgment the finding justifies an extension. The findings of fact shall be final and conclusive.

(e) The District may extend the time for completion if District determines such extension to be in the best interest of the District. If the District extends the time limit for the completion of the work at the request of the Contractor, for other than acts of God and situations beyond the control of both parties, such extension will increase the District's financial obligations incurred for engineering, inspection, supervision, incidental and overhead expenses directly chargeable to the contract and accruing during the period of extension. The Contractor shall reimburse District for such reasonable charges before the final payment.

(f) The District may deduct the liquidated damages from progress payments or from the final payment. The payment of progress payments shall not constitute a waiver of liquidated damages.

SECTION 26 ACTS OF GOD

Contractor is not responsible for the cost of repairing or restoring damage to the work exceeding five percent of the contract price and determined to have been proximately caused by earthquakes in excess of the magnitude of 3.5 on the Richter Scale and tidal waves, if damaged work is build in accordance with accepted and applicable building standards and the plans and specifications.

SECTION 27 UTILITY RELOCATION

(a) As between the parties, District is responsible for the timely removal, relocation or protection of existing main or truck line underground utility facilities located on the job site, if such utilities are not identified by the District in the plans and specifications. As to such unidentified utilities, Contractor shall be compensated for: the costs of relocation; repairing damage not due to the failure of Contractor to exercise reasonable care; removing or relocating such utilities not included in the plans and specifications with reasonable accuracy, and equipment on the project necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay in completion of the project, when the delay is caused by the failure of the District or the owner of the utility to remove or relocate the facilities.

(b) The District is not required to indicate the presence of existing service laterals or appurtenances when the presence of such utilities on the work site can be inferred from other visible facilities, such as buildings, metering junction boxes, on or adjacent to the work site.

(c) Contractor shall immediately notify the District and utility in writing, if the Contractor discovers utility facilities not identified by the District in the contract plans and specifications.

SECTION 28 PUBLIC CONVENIENCE

(a) Contractor's operation shall cause no unnecessary public inconvenience. The access rights of the public shall be considered at all times. Unless otherwise authorized, traffic shall be permitted to pass through the work or an approved detour shall be provided. Safe, adequate, continuous and unobstructed pedestrian and vehicular access shall be maintained to fire hydrants, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals, unless other arrangements are made satisfactory to the owners.

(b) Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.

(c) Grading operations, roadway excavation and embankment construction shall provide a reasonably satisfactory surface for traffic. When rough grading is completed, the roadbed surface shall be brought to a smooth even condition satisfactory for traffic.

(d) The Contractor shall comply with applicable state and local requirements for closure of streets. Contractor shall provide barriers, guards, lights, signs, temporary bridges, flagmen and watchmen advising the public of detours and construction hazards. Contractor shall comply with additional public safety requirements arising during construction. Contractor shall furnish and install, and upon completion of the work promptly remove, signs and warning devices.

(e) At least forty-eight hours in advance of closing or partial closing or of reopening any street, alley or other public thoroughfare, Contractor shall notify the San Bernardino County Sheriff's department, Post Office, Snowline Unified School District, fire, traffic and engineering departments of jurisdictional agencies involved and comply with their requirements.

SECTION 29 EXCAVATIONS

(a) Contractor shall submit for District approval, a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of trenches five feet or more in depth. The plan shall be at least as effective as that required by the Construction Safety Orders of the California Division of Industrial Safety. If the plan varies from the shoring systems standards established by the Safety Orders, the plan shall be prepared by a registered civil or structural engineer.

(b) At the close of each working day, Contractor shall completely backfill open excavation and, where applicable, cover the same with temporary asphalt mix in accordance with normal practice in the industry and the rules, regulations, laws and ordinance of the State of California and the San Bernardino County Public Works Department.

(c) If the work involves digging trenches or excavations extending deeper than four feet below the surface, the Contractor shall promptly, and before the conditions are disturbed, notify the District, in writing, of any: (1) material the Contractor believes to be hazardous waste, as defined in Section 25117 of the Health and Safety Code, and required to be removed to a Class I, Class II, or Class III disposal site; (2) subsurface or latent physical conditions at the work site differing from those indicated; (3) unknown physical conditions at the work site of unusual nature, or different material from those ordinarily encountered and generally recognized as inherent in the work of the character provided

in the contract. The District shall promptly investigate the conditions. If the District finds the conditions are as alleged by the Contractor and conditions cause a change in the Contractor's cost, or the time required for performance, the District shall issue a change order. If a dispute arising whether the District's findings are correct, the Contractor shall proceed with the work. The Contractor shall retain rights by contract or law pertaining to resolution of disputes and protests between the parties.

SECTION 30 EXTRA WORK

(a) The District may require changes in, additions to, or deductions from the work to be performed or to the materials to be furnished under this contract. No extra work shall be performed or change made except in pursuance of a written order from the District stating the extra work or change is authorized, and setting forth the basis upon which payment is to be made. No claim for additional compensation shall be valid unless pursuant to such change order. Nothing in this section shall excuse the Contractor from proceeding with the prosecution of the changed work. When required by the District, the Contractor shall furnish an itemized breakdown of the quantities and prices used in computing the value of any ordered change.

(b) Adjustments in the amounts to be paid to the Contractor by reason of any such change, addition or deduction shall be determined by one or more of the following methods:

- (i) By an acceptable lump sum proposed from the Contractor.
- (ii) By unit prices contained in the Contractor's original bid and incorporated in the contract documents or fixed by subsequent agreement between the District and the Contractor.
- (iii) By ordering the Contractor to proceed with the work and to furnish daily reports of extra work. The reports shall itemize all costs for labor, material, and equipment rental. The reports for workmen shall include hours worked, rates of pay, names and classifications; and for equipment shall include size, type, identification number and hours of operation. Records and reports shall be made immediately available to the engineer upon his request.

(c) When the District orders extra work and there is an agreement between the District and the Contractor to perform the work, the District may approve the method used by the Contractor to accomplish the work. At the request of the District, the method to be used shall be memorialized in a writing prior to work being performed.

(d) If the Contractor contends a proposed change is a substantial revision in the character of the work, the question shall be immediately submitted to an arbitrator for decision. The arbitrator's decision will be final and conclusive unless it is fraudulent, capricious, arbitrary or so grossly erroneous as to imply bad faith. Each party shall advise the other in advance of the arbitration of the material on which the party intends to rely and give the other a reasonable opportunity to refute or supplement such factual material.

SECTION 31 CLEAN-UP

On completion of the work, Contractor shall remove debris and surplus materials from the work site prior to submitting for final payment.

SECTION 32 MATERIALS

(a) Unless otherwise specified, show, or permitted by the District, materials and equipment incorporated in the work shall be new and current manufacture. The District may request the Contractor to furnish manufacturer's certificates to this effect.

(b) Materials furnished and work performed shall be subject to inspection and testing by District's authorized agents at District's expenses. If such inspection and testing reveals non-compliance with the requirements of this contract, the Contractor shall bear the cost of necessary corrective measures and the cost of subsequent inspecting and testing.

(c) The inspection of the work shall not relieve the Contractor of the obligations under the contract. Even though equipment, materials, or work required under the contract have been inspected, accepted, and estimated for payment, the Contractor shall replace or repair such equipment, materials, or work found to be defective or otherwise not to comply with the requirements of the contract up to the end of the maintenance and guarantee period.

SECTION 33 PERMITS AND LICENSES

(a) Contractor shall apply for and procure permits and licenses necessary for the work that has not been acquired by the District. .

(b) Contractor shall give notices necessary and incidental to the due and lawful prosecution of the work and shall comply duly with the terms and conditions of permits and licenses.

(c) Contractor shall pay charges and fees in connection with permits and licenses that have not been acquired by the District.

SECTION 34 LAND AND RIGHTS OF WAY

(a) District shall provide land and rights-of-way where the work is constructed.

(b) Contractor shall procure additional rights-of-way desired by the Contractor to facilitate construction. Contractor shall enter into written agreements with property owners for such purposes and provide District with copies of the agreements.

(c) Except as provided above relating to utility relocation, when the work is to be performed in the vicinity of existing improvements, such improvements shall not be disturbed or damaged except for such removal or relocation in the land and rights-of-way provided by the District or unavoidable to accommodate the work.

SECTION 35 PLANS AND WORKING DRAWINGS SUBMITTED BY DISTRICT

(a) The approved plans shall be supplemented by working drawings necessary to control the work adequately. Such drawings shall be consistent with the contract documents. Such drawings delivered to the Contractor shall be deemed written instructions to the Contractor.

(b) The District will furnish to the Contractor 5 copies of drawings and specifications reasonably necessary for the execution of the work. The Contractor shall keep one set of drawings and specifications in good order available to the District's representative at the site of the work.

(c) The plans for the work show conditions supposed or believed by the engineer to exist. It is not intended or inferred the plans constitute a representation such conditions actually exist. The District, its officers, agents and employees shall not be liable for loss sustained by the Contractor as a result of variance of the conditions as shown on the plans and the actual conditions revealed during the progress of the work.

SECTION 36 SHOP DRAWINGS SUBMITTED BY CONTRACTOR

(a) Shop drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and illustrating some portion of the work.

(b) The Contractor shall review, stamp with approval, and submit for review by the District's representative, shop drawings for material and equipment to be incorporated into the work. Drawings shall be submitted in quadruplicate to the District's representative and be accompanied by a letter of transmittal listing the drawings submitted. Drawings shall show the name of the project, the name of the Contractor, the names of suppliers, manufacturers and subcontractors. Shop drawings shall be submitted with promptness and in orderly sequence to cause no delay in the work.

(c) Shop drawings shall be complete. If the shop drawings show deviations from the requirements of the plans and specifications because of standard shop practices or other reasons, the deviations and the reasons therefor shall be set forth in the letter of transmittal.

(d) By approving and submitting shop drawings, the Contractor represents material, equipment and other work shown thereon conforms to the plans and specifications except for the deviations set forth in the letter of transmittal.

(e) Within five calendar days after receipt of the drawings, the District will return two prints of the drawings to the Contractor with comments. If noted by the District, the Contractor shall correct the drawings and resubmit in the same manner as the original submittal. The Contractor shall direct attention in the letter of transmittal accompanying resubmitted shop drawings to revisions other than the corrections requested by the District's representatives on previous submittals.

(f) The review by the District's representative is for general conformance with the design concept of the project and general compliance with the plans and specifications and shall not be construed as relieving the Contractor of the full responsibility for: providing materials, equipment and work required by the contract; the proper fitting and reconstruction of the work; the accuracy and

completeness of the shop drawings; selection fabrication processes and techniques of construction; and performing the work in a safe manner.

(g) No portion of the work requiring a shop drawing submittal shall be commenced until the submittal has been reviewed by the District's representative and returned to the Contractor with a notation indicating re-submittal is not required.

SECTION 37 SUPERVISION BY THE CONTRACTOR

Before starting the work, the Contractor shall designate, in writing, a representative having authority to act for the Contractor as specified in subsection 7-6 of the Standard Specifications.

SECTION 38 INSPECTION

(a) The Engineer shall have access to the work during construction and shall be furnished with reasonable facility for gaining knowledge of the progress, workmanship and character of materials used and employed in the work.

(b) When the Contractor varies the period during which work is carried on each day, Contractor shall give notice to the Engineer so proper inspection may be provided. Work done in the absence of the Engineer is subject to rejection.

(c) No materials shall be installed until approved by the District's representative. Installations to be backfilled shall be inspected and approved by the Engineer prior to backfilling. The Contractor shall give notice in advance of backfilling to the Engineer so proper inspection may be provided.

(d) The inspection of the work shall not relieve the Contractor of obligations to fulfill the contract. Defective work shall be made good, and unsuitable materials may be rejected notwithstanding the fact such defective work and unsuitable materials have been previously overlooked by the Engineer and accepted.

SECTION 39 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK

(a) Rejected work shall be removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed for such removal or replacement. Work done beyond the lines and grades shown on the plans or established by the District's representative, or work done without written authority will be considered as unauthorized and not be paid for. Such work may be ordered removed at the Contractor's expense.

(b) Upon failure on the part of the Contractor to comply promptly with an order of the Engineer under this section, the Engineer shall have authority to cause defective work to be removed and replaced, and unauthorized work to be removed, and to deduct the costs from monies due the Contractor.

SECTION 40 ERRORS OR DISCREPANCIES NOTED BY CONTRACTOR

(a) If the Contractor finds discrepancies between the specifications and the drawings, and the physical conditions at the site of the work, or finds errors or omissions in the drawings or in any survey, Contractor shall promptly notify the District in writing of any such discrepancy, error or omission. If the Contractor observes drawings or specifications at variance with applicable law, ordinance, regulation, order or decree, Contractor shall promptly notify the District in writing of such conflict.

(b) On receipt of any such notice, the District shall promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, work done by the Contractor, after Contractor's discovery of such error, discrepancy or conflict, will be at Contractor's own risk and Contractor shall bear costs arising therefrom.

SECTION 41 EQUIPMENT

The Contractor must furnish adequate equipment and facilities to perform properly the work in a workmanlike manner in accordance with these specifications. Such equipment and facilities must be in a good state of repair and maintained in such state during the progress of the work and shall meet requirements of applicable ordinances and laws. No worn or obsolete equipment shall be used, and in no case shall the maker's rating of capacity for equipment be exceeded.

SECTION 42 STORAGE OF MATERIALS

Materials for use in the work shall be stored by the Contractor to prevent damage from exposure to the elements, admixture of foreign materials or from any other cause. Contractor is responsible for damage to or loss of materials by weather or other causes.

MISCELLANEOUS

SECTION 43 WARRANTY

Contractor guarantees work from defect in workmanship for the period of one year from the date of acceptance by the District and shall repair and replace such work, together with other displaced work, without expense to the District, ordinary wear and tear, usual abuse or neglect excepted. District may have the defects repaired and made good at the expense of the Contractor, if Contractor fails to comply with the above-mentioned conditions within a week after being notified in writing.

SECTION 44 RISK OF LOSS PRIOR TO FINAL ACCEPTANCE

Except as set forth above relating to acts of God, risk of loss from total or partial destruction of the work, prior to final acceptance, shall be borne by Contractor regardless of the cause. Contractor shall repair or replace such damages or destroyed work, to its prior undamaged condition before being entitled to additional progress payments or final payment. Total or partial destruction or damage shall not excuse Contractor from completion of the work.

SECTION 45 TERMINATION: CONTRACTOR AT FAULT

(a) The District may declare the Contractor in default, should the Contractor fail to meet the requirements of the contract, or be placed in bankruptcy, or should a receiver be appointed for Contractor's properties, or should Contractor make an assignment for the benefit of creditors. In such event, the District will notify the Contractor in writing. On receipt of such written notice, the Contractor shall preserve site construction materials, equipment and plant, and undertake immediate steps to remedy such default.

If the Contractor fails to remedy such default within five calendar days after receipt of such written notice, the District may terminate the Contractor's right to proceed with the work as to which default has occurred. Upon receipt of such written notice, the Contractor shall for that work affected by any such termination:

- (1) Assist the District in making an inventory of materials and equipment in storage at the site, en route to the site, in storage or manufacture away from the site, and on order from suppliers;
- (2) Assign to the District, subcontractors, supply contracts and equipment rental agreements all as designated by the District; and
- (3) Remove from the site, all construction materials, equipment and plant listed in said inventory other than such construction materials, equipment and plant which are designated in writing by the District to be used by the District in completing such work.

(b) The District may complete the work to which notice applies by contract or otherwise, and may take possession of the materials, plant, tools, equipment, supplies and property furnished by the Contractor which is designated by the District in writing for such purpose.

(c) The expense of completing such work, together with a reasonable charge for administering a contract for such completion, shall be charged to the Contractor. Such expense shall be deducted by the District out of such monies as may become due to the Contractor. If this expense exceeds the sum otherwise payable under the contract, the Contractor and Contractor's sureties shall be liable. Upon written notice from the District, the Contractor shall promptly pay to the District, the amount of such excess. The District shall not be required to obtain the lowest bids for completing such work, but may make such expenditures as in the District's sole judgment will best accomplish such completion.

SECTION 46 TERMINATION: CONTRACTOR NOT AT FAULT

District may terminate the contract upon ten days written notice to the Contractor, if District finds reasons beyond the control of the parties which make it impossible or against the District's interests to complete the work. In such a case, the Contractor shall have no claims against the District, except for the value of work performed to the date of termination, and the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date of termination if such materials and equipment would be needed in the work. The value of work performed and the cost of materials and shipment delivered to the site shall be determined by the District in accordance with the procedure prescribed for the making of a final estimate and payment.

SECTION 47 RESOLUTION OF CERTAIN CLAIMS

(a) Notwithstanding the foregoing, a demand of \$375,000 or less, by the Contractor for a time extension; payment of money or damages arising from the work done by or on behalf of the Contractor pursuant to this contract; or payment of an amount which is disputed by the District shall be processed in accordance with Public Contracts Code Sections 20104 *et seq.* relating to informal conferences, non-binding judicially supervised mediation and judicial arbitration.

(b) A single written claim shall be filed under this section prior to the date of final payment for all demands, including demands not subject to Public Contracts Code Sections 20104 *et seq.*, arising out of the contract.

(c) Within thirty (30) days of the receipt of the claim, the District may request additional documentation supporting the claim or relating to defenses or claims the District may have against the Contractor. If the amount of the claim is less than \$50,000, the Contractor shall respond to the request for additional information within fifteen (15) days after receipt of the request. The Contractor shall respond to the request within thirty (30) days of receipt if the amount of the claim exceeds \$50,000 but is less than \$375,000.

(d) Unless further documentation is requested, the District shall respond to the claim within forty-five (45) days if the amount of the claim is less than \$50,000, or within sixty (60) days if the amount of the claim is more than \$50,000 but less than \$375,000. If further documentation is requested, the District shall respond within the same amount of time taken by the Contractor to respond or fifteen (15) days, whichever is greater, after receipt of further information if the claim is less than \$50,000. If the claim is more than \$50,000 but less than \$375,000 and further documentation is required by the District, the District shall respond within the same amount of time taken by the Contractor to respond or thirty (30) days, whichever is greater.

(e) If the Contractor disputes the District's response, or the District fails to respond, the Contractor may demand an informal conference to meet and confer for settlement of the issues in dispute. The demand shall be served on the District within fifteen (15) days after the deadline of the District to respond or within fifteen (15) days of the District's response, whichever occurs first. The District shall schedule the meet and confer conference within thirty (30) days of the request.

(f) If the meet and confer conference does not produce a satisfactory result, the Contractor may pursue remedies authorized by law.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, or caused it to be executed as of the day, month and year first above written.

DISTRICT

CONTRACTOR

(Signature) Don Bartz, General Manager

Contractor (Type Full Name)

(Signature)

(Title)

(Title)

(Title)

(Attach Notarial Acknowledgement of Contractor)

**ADDENDUM TO AGREEMENT
OF
PHELAN PINON HILLS COMMUNITY SERVICES DISTRICT
AND**

**FOR THE CONSTRUCTION OF THE
CIVIC CENTER DEVELOPMENT PHASE I PROJECT**

THIS AGREEMENT, made and entered into this ____ day of _____, 2025, by and between Phelan Pinon Hills Community Services District, a public agency organized and existing under California Government Code Section 61000 et seq., hereinafter referred to as "Owner," and _____, hereinafter referred to as "Contractor."

The parties hereto mutually covenant and agree as follows:

This Addendum to Agreement, as well as Exhibit A attached hereto, are hereby into the Contract Documents, as that term is defined in Section 4 of the underlying construction Agreement, and made a part thereof as though fully set forth herein. Additionally, funding for the Work will be provided in full or in part from the Emergency Operations Center Grant Program administered by the United States Department of Homeland Security ("DHS") and the State of California Office of Emergency Services ("CalOES"). Consequently, Contractor shall also comply with any additional requirements that may be imposed upon the Work by DHS and/or CalOES.

IN WITNESS WHEREOF: The parties hereto have caused this Agreement to be executed as of the day and year first above written.

"OWNER"

"CONTRACTOR"

By: _____

License No(s). _____

Its _____
[TITLE]

Expiration Date(s) _____

By: _____

By: _____

Its _____
[TITLE]

Its _____
[TITLE]

NOTE: Contractor shall furnish, to the satisfaction of Owner's Attorney, verification that the persons signing this Agreement as Contractor or on behalf of the Contractor have authority and legal authorization to bind the Contractor.

EXHIBIT A

1. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the contractor agrees as follows:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action 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 in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the [contractor's](#) legal duty to furnish information.
- (4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders,

this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

- (8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

2. DAVIS-BACON ACT

Compliance with the Davis-Bacon Act.

- a. All transactions regarding this contract shall be done in compliance with the Davis-Bacon Act (40 U.S.C. 3141- 3144, and 3146-3148) and the requirements of 29 C.F.R. pt. 5 as may be applicable. The contractor shall comply with 40 U.S.C. 3141-3144, and 3146-3148 and the requirements of 29 C.F.R. pt. 5 as applicable.
- b. Contractors are required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor.
- c. Additionally, contractors are required to pay wages not less than once a week.

3. COPELAND ANTI-KICKBACK ACT

Compliance with the Copeland "Anti-Kickback" Act.

- a. Contractor. The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.
- b. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as DHS may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

- c. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

4. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Compliance with the Contract Work Hours and Safety Standards Act.

- (1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- (2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (1) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.
- (3) *Withholding for unpaid wages and liquidated damages.* The Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.
- (4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

5. CLEAN AIR ACT AND THE FEDERAL WATER POLLUTION CONTROL ACT

Clean Air Act

1. The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.
2. The contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.
3. The contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by DHS.

Federal Water Pollution Control Act

1. The contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.
2. The contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.
3. The contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by DHS.

6. DEBARMENT AND SUSPENSION

Suspension and Debarment

1. This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).
2. The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.
3. This certification is a material representation of fact relied upon by Owner. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to the Owner, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

4. The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

7. BYRD ANTI-LOBBYING AMENDMENT

Byrd Anti-Lobbying Amendment, 31 U.S.C. § 1352 (as amended)

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

If applicable, contractors must sign and submit to the non-federal entity the following certification:

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap.

38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Signature of Contractor's Authorized Official _____

Name and Title of Contractor's Authorized Official _____

Date _____

8. PROCUREMENT OF RECOVERED MATERIALS

- i. In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired—
 1. Competitively within a timeframe providing for compliance with the contract performance schedule;
 2. Meeting contract performance requirements; or
 3. At a reasonable price.
- ii. Information about this requirement, along with the list of EPA-designated items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.
- iii. The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

9. ACCESS TO RECORDS

Access to Records. The following access to records requirements apply to this contract:

- (1) The Contractor agrees to provide the Owner, the DHS Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
- (2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

- (3) The Contractor agrees to provide the DHS Administrator, or his or her authorized representatives, access to construction or other work sites pertaining to the work being completed under the contract.
- (4) In compliance with the Disaster Recovery Act of 2018, the Owner and the Contractor acknowledge and agree that no language in this contract is intended to prohibit audits or internal reviews by the DHS Administrator or the Comptroller General of the United States.

10. DHS SEAL, LOGO, AND FLAGS

The Contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific DHS pre-approval.

11. COMPLIANCE WITH FEDERAL LAW, REGULATIONS, AND EXECUTIVE ORDERS

This is an acknowledgement that DHS financial assistance will be used to fund all or a portion of the contract. The contractor will comply with all applicable Federal law, regulations, executive orders, DHS policies, procedures, and directives.

12. NO OBLIGATION BY FEDERAL GOVERNMENT

The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

13. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

Contractor/SubContractor OSHA Competent Person Designation

Based on the review of OSHA 29 CFR 1926.32(f), the following individual(s) representing _____ (Company Name) are designated as the OSHA *Competent Person* for the project listed below. He/she shall be responsible and accountable for jobsite safety.

(Signature/Title)

(Date)

Project Name: _____

1. Competent Person _____
(Name)

(Optional):

Designated Competent Person in Line 1's absence:

2. _____
(Name)

OSHA defines competent person in 29 CFR 1926.32(f) as “*one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.*”

Attach valid identification and certification documents for the above listed person(s).

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the governing board of the Phelan Piñon Hills Community Services District (herein “District”), on _____, _____, awarded to _____, (herein “Principal”), a contract for CIVIC CENTER DEVELOPMENT PHASE I PROJECT.

WHEREAS, Principal is required under the terms of the contract to furnish a bond for the faithful performance of the contract;

NOW THEREFORE, the Principal and _____, (herein “Surety”), are held firmly bound unto the District in the penal sum of _____ dollars (\$_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bond ourselves, our heirs, executors, administrators and successors, jointly and severally and firmly by these promises.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above-bounden Principal, or its heirs, executors, administrators, successors or assigns shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in the contract, including but not limited to the payment of liquidated damages, and any alteration thereof made as therein provided, on its part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the District, its officers and agents, as therein stipulated, this obligation shall become null and void; otherwise it shall be and remain in full force and virtue.

Surety stipulates and agrees no change, extension of time, alteration, or addition to the terms of the contract, or to the work to be performed thereunder, or the specifications accompanying the same, shall affect its obligation on this bond. Surety waives notice of such change, extension of time, alteration or addition to the terms of the contract, or to the work or to the or to the specifications.

Surety agrees in case suit is brought on this bond, Surety will pay District’s reasonable attorneys’ fees to be fixed by the court.

IN WITNESS WHEREOF, the Principle and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year set forth above.

Principle (Type Full Name)

Surety (Type Full Name)

(Signature)

(Signature)

(Title)

(Title)

(Street Address)

(Street Address)

(City) (State) (Zip)

(City) (State) (Zip)

(Attach Notarial Acknowledgement of Contractor and Surety)

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (circular 570 as amended) and be authorized to transact business, and admitted, in the State of California.

END OF SECTION

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the Governing Board of the Phelan Piñon Hills Community Services District (herein “District”), on _____, _____, awarded to _____ (herein “Principal”), a contract for CIVIC CENTER DEVELOPMENT PHASE I PROJECT.

WHEREAS, Principal is required to furnish a bond in connection with contract so if Principal or its subcontractors fail to pay for materials or supplies, for the performance of the work, or for labor done thereon, or for amounts due under the Unemployment Insurance Act, the Surety on the bond will pay the same.

NOW THEREFORE, the Principal and _____, (herein “Surety”), are held and firmly bound unto the District in the penal sum of _____ dollars (\$ _____), lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these promises.

THE CONDITION OF THIS OBLIGATION IS SUCH if Principal, its subcontractors, heirs, executors, administrators, successors, or assigns, shall fail to pay for materials, provisions, provender or other supplies or teams used in, upon, for or about the performance of the work contracted to be done, or for work or labor thereon of any kind, or fail to pay the persons named in California Civil Code Section 3181, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, and other laws of the State of California and rules and regulations of its agencies, then Surety will pay the same in or to an amount not exceeding the amount hereinabove set forth, and also will pay, in case suit is brought upon this bond, such reasonable attorneys’ fees as shall be fixed by the court, pursuant to Section 3181 of the California Civil Code.

This bond shall inure to the benefit of the persons named in Section 3181 of the California Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond, such reasonable attorneys’ fees as shall be fixed by the court, pursuant to Section 3181 of the California Civil Code.

No change, extension of time, alteration, or addition to the terms of the contract, or the work to be performed thereunder, or the specifications accompanying the same, shall affect Surety’s obligation on this bond. Surety waives notices of such change, extension of time, alteration, or addition to the terms of the contract, or to the work or to the specifications.

IN WITNESS WHEREOF, the Principle and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year set forth above.

Principle (Type Full Name)

Surety (Type Full Name)

(Signature)

(Signature)

(Title)

(Title)

(Street Address)

(Street Address)

(City) (State) (Zip)

(City) (State) (Zip)

(Attach Notarial Acknowledgement of Contractor and Surety)

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (circular 570 as amended) and be authorized to transact business, and admitted, in the State of California.

END OF SECTION

MAINTENANCE AND GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the governing board of the Phelan Piñon Hills Community Services District (sometimes referred to hereinafter as “Obligee”) has permitted _____ (sometimes referred to hereinafter as “Principal”) to construct a Civic Center Development Phase I Project, San Bernardino County, California, commonly known as and _____ located _____ at/on _____;

WHEREAS, the said project is more particularly set forth in that certain design plan and specification dated _____, _____, and identified as, CIVIC CENTER DEVELOPMENT PHASE I PROJECT which are incorporated herein by this reference; and

WHEREAS, the Principal is required by the Obligee to warrant the completed project against defective labor or workmanship and materials for a period of one year after the “Notice of Substantial Completion” and to provide a bond or letter of credit for guarantee of cost of repairs due to defective labor, workmanship, or materials.

NOW, THEREFORE, we _____, the undersigned as Principal, and _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the Obligee in the sum of \$_____, said sum being not less than one hundred percent (100%) of the total cost for construction (including labor and materials) of the above project, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the above bounded Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements to make all repairs to said project necessitated by defective labor, workmanship or materials and shall faithfully fulfill this one year Guarantee of all materials, labor and workmanship and indemnify and save harmless the Obligee, its officers and agents, as stipulated herein, then this obligation shall become null and void one year from the date of Obligee’s formal acceptance of the project; otherwise the bond shall remain in full force and effect and shall bind solely to perform the obligations of Principal.

In case suit is brought upon this bond, the said Surety will pay to the Obligee a reasonable attorney’s fee to be fixed by the Court.

The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the agreement between the Obligee and the Principal, or the work to be performed by the Principal or the specifications of the project, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement or to the work or to specifications.

IN WITNESS WHEREOF, the Principle and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year set forth above.

Principle (Type Full Name)

Surety (Type Full Name)

(Signature)

(Signature)

(Title)

(Title)

(Street Address)

(Street Address)

(City) (State) (Zip)

(City) (State) (Zip)

(Attach Notarial Acknowledgement of Contractor and Surety)

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (circular 570 as amended) and be authorized to transact business, and admitted, in the State of California.

END OF SECTION

GENERAL CONDITIONS

The Standard Specifications for the Phelan Piñon Hills Community Services District (PPHCSD) shall be the **STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 2024 EDITION** (hereinafter referred to as the *Green Book*), written and promulgated by the Southern California Chapter, American Public Works Association, and Southern California Districts Associated General Contractors of California Joint Cooperative Committee, including all published amendments thereto except for the following additions, deletions and modifications.

Any conflict arising between these modifications and the Standard Specifications for Public Works Construction shall be resolved by the Engineer, whose decision shall be final.

MODIFICATIONS TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS

1-2 DEFINITIONS

Modify by adding the following new Definitions:

District: The Phelan Piñon Hills Community Services District, County of San Bernardino, State of California.

District Board: The duly elected Board of Directors of the Phelan Piñon Hills Community Services District.

Drawings: See Plans

Engineering Manager: The Engineering Manager of the Phelan Piñon Hills Community Services District.

General Conditions: Phelan Piñon Hills Community Services District (PPHCSD) additions, deletions, and amendments to the Standard Specifications.

Modify the following Definitions:

Agency: See District

Engineer: An authorized deputy, agent, representative, or inspector of the Phelan Piñon Hills Community Services District.

Standard Specifications: *Add the following to the end of the definition:*

and current supplements as amended, and as modified by the Phelan Piñon Hills Community Services District (PPHCSD) General Conditions.

1-3.2 ABBREVIATIONS

Modify by adding the following new Abbreviations:

NIC	Not in Contract
NTS	Not to Scale
OAE	Or Approved Equal
OSHA	Occupational Safety and Health Administration
SSPWC	Standard Specifications for Public Works Construction
UBC	Uniform Building Code
UPC	Uniform Plumbing Code

1-3.3 INSTITUTIONS

Modify by adding the following new Institutions:

ACI	American Concrete Institute
AGA	American Gas Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISI	American Iron and Steel Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
CRSI	Concrete Reinforcement Steel Institute
PCA	Portland Cement Association
PPHCSD	Phelan Piñon Hills Community Services District
SBC	San Bernardino County
SSPC	Steel Structures Painting Council

SECTION – GENERAL

1-7.2 Contract Bonds

Modify by adding the following paragraph after the fifth paragraph:

If so specified in the Instructions to Bidders, the bidder shall provide and include in the bid packet a good and sufficient Bid Bond in the amount of 10% of the base bid, pledging that the bidder shall furnish and execute the required contract documents and other requirements as set forth in the Bid Bond Form.

Modify by replacing the first sentence of the third paragraph with the following:

The successful bidder shall provide 3 good and sufficient surety bonds.

Modify by adding the following paragraph after the fifth paragraph:

Contractor shall provide a Maintenance and Guarantee Bond for 100% of the Contract Price as specified in Subsection 6-8.3 of the General Conditions.

SECTION 2 – SCOPE OF THE WORK

2-2 PERMITS

Modify by replacing the first sentence in the first paragraph with the following:

Unless otherwise provided in the Instructions to Bidders, the Contractor shall obtain at the Contractor's own expense all permits and licenses and make all necessary deposits required for prosecution of the Work and shall pay all fees and taxes properly assessed against equipment or property used in connection with the Work. Those permits and licenses of regulatory agencies which are necessary to be maintained after the completion of the guaranty period of the Contract will be secured and paid for by the District.

Modify by adding the following:

The Contractor shall pay all sales and use taxes assessed by the federal, state or local authorities on materials furnished by the Contract in the performance of the Work.

2-3 RIGHT-OF-WAY

Modify by adding the following:

Nothing contained in the Specifications or Drawings shall be interpreted as giving the Contractor exclusive occupancy of the lands or rights-of-way provided. Any additional lands or rights-of-way required for construction operations shall be provided by the Contractor at the Contractor's own expense.

Except as may otherwise be provided, the Contractor shall secure from the agencies having jurisdiction the necessary permits to create obstructions, to make excavations if required under the Contract and to otherwise encroach upon rights-of-way and shall present evidence to the Engineer that such permission has been granted before work is commenced. Regulations and requirements of all agencies concerned shall be strictly adhered to in the performance of this Contract, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements under this Contract shall not be made the basis for claims for additional compensation.

2-5 THE CONTRACTOR'S EQUIPMENT AND FACILITIES

2-5.1 General

Modify by adding the following to the end of the second sentence of the second paragraph:

“to comply with the requirements of state and local health departments.”

Modify by adding the following:

The Work shall be under the Contractor's responsible care and charge. The Contractor shall bear all loss and damage whatsoever and from whatever cause, except that caused solely and exclusively by the fault or negligence of the District which may occur on or to the Work during the fulfillment of the Contract. If any loss or damage occurs, the Contractor shall immediately make good any such loss or damage and in the event of the Contractor refusing or neglecting so to do, the District may itself or by the employment

of some other person made good any such loss or damage and the cost and expense of so doing shall be charged to the Contractor.

The Contractor alone shall at all times be responsible for the safety of employees and any Subcontractor's employees and for plant and equipment and any Subcontractor's plant and equipment and the method of prosecuting the Work.

2-5.2 Temporary Utility Services

Modify by adding the following at the end of this subsection:

Free access shall be provided to all fire hydrants at all times. The Contractor shall not draw any water from a fire hydrant for use on the Work, other than for extinguishing fire, without first obtaining permission from District for such water.

The Contractor shall obtain a fire hydrant meter to record water usage. A deposit as established by the District shall be paid by Contractor and refunded upon return of said hydrant meter. The water usage fees shall be paid for by the District, with the understanding that the Contractor shall manage use of such water so as not to be wasteful. Should District determine that Contractor is not managing construction water appropriately, the District may at its discretion, charge the Contractor for excessive use of water by deducting such charges from progress payments due Contractor. .

2-7 CHANGES INITIATED BY THE AGENCY

2-7.1 General

Modify by adding the following:

The signing of the Contract by the Contractor will be deemed to be an agreement on the part of the Contractor to perform extra work, as and when ordered by the District. If, required extra work results in delay to the Work or additional time, the Contractor will be given a reasonable extension of time.

The completed change order, when signed by the Contractor and the District shall become a contractual extension of the Contract and all sureties, bonds and insurance in effect under the Contract shall be extended intact to include the work described in the change order.

2-8 EXTRA WORK

2-8.1 Procedure

Modify by adding the following new subsection:

Upon decision of the District to have extra work performed, or to delete or modify work, the District will so inform the Contractor, acquainting the Contractor with the essential details. The Contractor shall thereupon prepare an estimate of cost and submit said price and estimate to the District who will secure the District's approval in writing before work is started. The District reserves the right to reject any claims as a result of extending the Work under the bid prices, which has not been approved by the District

in the same manner herein provided.

Adjustment in the compensation due the Contractor shall be determined by mutually agreeable lump-sum or unit prices, based upon current prevailing fair prices for materials, labor, overhead, and profit. If requested by the District's representative, the Contractor shall furnish an itemized breakdown of the quantities and prices used in computing proposed lump-sum and unit prices.

If mutual agreement cannot be reached, a force account whereby the Contractor is compensated for furnishing labor, materials, tools, and equipment shall be as specified in 7-4.2.

2-11 ALTERNATIVE METHODS OF CONSTRUCTION

Modify by adding the following new subsection:

Whenever the Drawings and Specifications provide that more than one specified method of construction or more than one specified type of construction equipment may be used to perform portions of the Work and leave the selection of the method of construction or the type of equipment to be used up to the Contractor, it is understood that the District does not guarantee that every such method of construction or type of equipment can be successfully used throughout all or any part of any project. It shall be the Contractor's responsibility to select and use the alternative(s) which will satisfactorily perform the Work under the conditions encountered. In the event some of the alternatives are not feasible or it is necessary to use more than one of the alternatives on the project, full compensation for any additional cost involved shall be considered as included in the Contract price paid for the item of work involved and no additional compensation will be allowed therefore.

2-12 EXAMINATION OF WORK

Modify by adding the following new subsection:

Contractor must examine the location, physical conditions and surroundings of the proposed work and judge for themselves the nature of the excavation to be made and the Work to be done.

The Drawings for the Work show conditions as they are supposed or believed to exist by the Engineer, but it is not intended or to be inferred that the conditions as shown thereon constitute a representative or warranty, express or implied, by the District or its officers, that such conditions are actually existent, nor shall the Contractor be relieved of the liability under this Contract, nor the District or any of its officers be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the Drawings and the actual conditions revealed during the progress of the Work or otherwise.

Execution of the Contract shall be conclusive evidence that the Contractor has satisfied himself through his own investigation as to the conditions to be encountered; the character, quality and quantity of work to be performed; materials and equipment to be furnished; and all requirements of the Drawings and Specifications.

2-13 PROTESTS

Modify by adding the following new subsection:

If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or if he considers any order or ruling of the Engineer, or of any inspector to be unfair, he shall, immediately upon such work being demanded or such order or ruling being made, ask for written instructions or decision, whereupon he shall proceed without delay to perform the Work or to conform to the order or ruling; but unless the Contractor finds such instructions or decisions satisfactory, he shall, within five (5) days after receipt of same, file a written protest with the Engineer, stating clearly and in detail any objections and the reasons therefor. The Engineer shall, as soon as practicable after receipt of such written protest from the Contractor, forward said protest through appropriate channels to the District including any written comments on the issue or issues involved. The decision of the District on all such matters shall be considered final and binding upon all parties concerned. Except for such grounds for protests or objections as are made of record in the manner specified and within the time stated herein, the Contractor hereby waives all grounds for protests or objections to the orders, rulings, instructions or decisions of the Engineer and hereby agrees that, as to all matters not included in such protest, the orders, instructions and decisions of the engineer shall be final and conclusive.

SECTION 3 – CONTROL OF THE WORK

3-1 ASSIGNMENT

Modify by adding the following:

If the Contractor violates the provisions of this section, the Contract may be terminated at the option of the District and the District shall be relieved of all liability and obligations to the Contractor, and to his assignee or transferee, growing out of such termination.

3-2 SELF-PERFORMANCE

Modify by adding the following:

No discrimination shall be made in the employment of persons on the Work by the Contractor or by any Subcontractor because of race, color or religion of such persons.

3-3 SUBCONTRACTORS

Modify by adding the following to the end of the second paragraph:

The Contractor shall at all times be responsible for the adequacy, efficiency and sufficiency of persons employed by the Contractor and any Subcontractor or persons employed by the Subcontractor. All workmen must have sufficient knowledge, skill and experience to perform properly the work assigned to them.

3-4 AUTHORITY OF THE BOARD AND THE ENGINEER

Modify by replacing with the following:

The Work and the manner of performing the same shall be done to the satisfaction and approval of the District.

The Contract Documents do not purport to control the method of performing the Work but only the requirements as to the nature of the completed work. The Contractor shall assume the entire responsibility for methods of performing the Work.

The Engineer is the agent of the District and is employed to act as advisor and consultant to the District in engineering matters relating to the Contract. The District has delegated its authority under this Contract to the Engineer to determine the amount, quality, acceptability and fitness of the several kinds of work, material and equipment which are to be paid for under the Contract; to decide for the District all questions relative to the construction, meaning and intent of the Contract documents; to decide all questions relative to the classifications, measurements of quantities, materials and the fulfillment of this Contract, and to reject or condemn all work or material which does not conform to the terms of this Contract to recommend, for consideration and action of the District, progress payments and change orders. The Engineer's decision in all matters is the decision of the District and can only be changed by the District.

All work shall be done in a thorough and workmanlike manner under the direction and to the satisfaction of the District Engineer, and the materials used shall comply with these Specifications. Work shall be started and continued at such time and at such points as may be designated by the District Engineer and shall be carried on diligently and without unnecessary delay.

If the Contractor files any suit arising under the Contract and names the Engineer as a party and if no recovery is had against the Engineer, then the Engineer shall recover damages from the Contractor for reasonable attorney's fees for time spent by the attorney for the Engineer in the defense of the suit and the Engineer shall recover from the Contractor and be paid by the Contractor at the rate of \$1,000.00 per day for the time of the Engineer required in connection with the preparation and defense of the suit.

3-5 INSPECTION

Modify by replacing with the following:

The Contractor shall give written notice to the District Engineer at least twenty-four (24) hours before beginning any work and shall furnish said District Engineer all reasonable facilities for obtaining full information respecting the progress and manner of work.

All materials furnished and all work performed under the Contract shall be subject to inspection by the Engineer. Such inspection may include mill, plant, shop or field inspection as required. The Engineer shall be permitted access to all parts of the Work, including plants where material or equipment are manufactured or fabricated, and the Engineer shall be furnished with such materials, information and assistance by the Contractor and Subcontractors and suppliers as is required to make a complete and detailed inspection.

Work done in the absence of prescribed inspection may be required to be removed and replaced under proper inspection, and the entire cost of removal and replacement, including the cost of all materials which may be furnished by the District and used in the Work thus removed, shall be borne by the Contractor, regardless of whether the work removed is found to be defective or not. Work shall not be covered up without the authority of the Engineer. If so covered, without authority, the work, upon order of the engineer, shall be uncovered to the extent required, and the Contractor similarly shall bear the entire cost of performing all the Work and furnishing all the material necessary for the removal of the covering and its subsequent replacement, as directed and approved by the Engineer.

All inspection fees and costs imposed by agencies other than the District shall be paid by the Contractor.

The District will provide inspection for an 8-hour day and 40-hour week, Monday through Friday excluding legal holidays. The Contractor shall reimburse the District at rates established by the District for inspection in excess of the foregoing.

3-7 CONTRACT DOCUMENTS

3-7.1 General

Modify by replacing the first paragraph with the following:

The District will furnish to the Contractor five (5) sets of Specifications together with Drawings.

Additional quantities of Specifications and Drawings will be furnished at reproduction cost.

The Contractor shall maintain, on the job site, a set of full-size plans to which the Engineer shall have access at all times. On these the Contractor shall mark all as-built conditions, locations, configurations, and other details which may vary from the details represented on the original drawings. This master record of as-built conditions, including all revisions made necessary by addenda, change orders and field conditions shall be maintained up-to-date during the progress of the Work.

In the case of those drawings which depict the detailed requirement for equipment to be assembled and wired in the factory, such as motor control centers and instrumentation, the as-built drawings shall be updated by indicating those portions which are superseded by final Shop Drawings, and by including a reference note describing the Shop Drawings by manufacturer, drawing and revision number and date.

Upon completion of the Work but prior to final acceptance, the as-built drawings maintained by the Contractor shall be delivered to the District.

3-7.2 Precedence of the Contract Documents

Modify by adding the following after g) Plans:

h) General Conditions. *(revise lettering callout in the subsequent terms due to this insertion)*

Modify by adding the following:

Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, omission, ambiguity, or discrepancy between the provisions of the Contract Documents and (1) the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents) or (2) the provisions of any laws or regulations applicable to the Project (unless such interpretation of the provisions of the Contract Documents would result in a violation of such law or regulation). Any provision or part of the Contract Documents determined to be void or unenforceable under any applicable law or regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding. The Contract Documents shall be reformed to replace such stricken provisions or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

Within the scope of the Project, the Engineer has the authority to enforce compliance with the Contract Documents. The Contractor shall promptly comply with the instructions from the Engineer or an authorized representative of the Owner. On all questions related to the quantities, the acceptability of material, equipment, or workmanship, the execution, progress, or sequence of Work, the interpretation of the Contract Documents and the specifications or drawings, and the acceptable completion of the Project, the decision of the Engineer shall govern and shall be precedent to any payment under the Contract Documents unless otherwise ordered by the Owner. The progress and completion of the Work shall not be impaired or delayed by virtue of any questions or dispute arising out of or related to the foregoing matters and the instructions of the Engineer relating thereto.

The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If during performance of the project, the Contractor finds a conflict, error, ambiguity, or discrepancy

in the Contract Documents, the Contractor shall report to the Engineer in writing at once and shall obtain a written interpretation or clarification from the Engineer before proceeding further as to that matter.

3-8.3 Shop Drawings

Modify by adding the following:

Wherever called for in these Specifications or on the Drawings, or where required by the Engineer, the Contractor shall furnish to the Engineer for review six (6) copies of each Shop Drawing. The Shop Drawings shall be approved by the Contractor prior to submittal to the Engineer. Unless otherwise required, said drawings shall be submitted at a time sufficiently early to allow review of same by the Engineer, and to accommodate the rate of construction progress required under the Contract.

The Contractor shall stamp all six copies of the Shop Drawings stating his approval of the submittal and that the Contractor has determined and verified all field measurements and quantities, field construction criteria, materials, catalog numbers and similar data, and that the Contractor has reviewed and coordinated the information in the Shop Drawings with the requirements of the Work and the Contract Documents. Any Shop Drawings submitted without complying with this Section will not be reviewed by the Engineer.

Except as may be otherwise provided in the Special Provisions, the Engineer will return two prints of each Shop Drawing to the Contractor, with comments noted thereon, within fifteen (15) calendar days following their receipt at the Engineer's office. The Contractor shall make a complete and acceptable submittal to the Engineer by the second submission of drawings. The District reserves the right to withhold monies due the Contractor to cover additional costs of the Engineer's review beyond the second submittal.

If the Shop Drawings are returned to the Contractor marked APPROVED AS SUBMITTED or NO EXCEPTIONS TAKEN, formal revision and resubmittal of said drawing will not be required.

If the Shop Drawings are returned to the Contractor marked APPROVED AS NOTED or MAKE CORRECTIONS NOTED, formal revision and resubmittal of said drawing will not be required, but the noted correction will be adhered to by the Contractor.

If the Shop Drawing is returned to the Contractor marked REVISE AND RESUBMIT or AMEND AND RESUBMIT the Contractor shall revise said drawing and shall resubmit six (6) copies of said revised drawing to the Engineer.

If the Shop Drawing is returned to the Contractor marked NOT APPROVED or REJECTED Contractor shall resubmit six (6) copies of a material or installation process specified in the Contract Documents and/or acceptable to the Engineer.

Fabrication of an item shall not commence before the Engineer has reviewed the pertinent Shop Drawings and returned copies to the Contractor marked either APPROVED AS SUBMITTED/NO EXCEPTIONS TAKEN or APPROVED AS NOTED/MAKE CORRECTIONS NOTED. Revisions indicated on shop Drawings shall be considered as changes necessary to meet the requirements of the Contract Drawings and Specifications and shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay resulting from the Contractor's having to

make the required revisions to Shop Drawings (unless review by the Engineer of said drawings is delayed beyond a reasonable period of time and unless the contractor can establish that the Engineer's delay in review actually resulted in a delay in the contractor's construction schedule). The review of said drawings by the Engineer will be limited to checking for general agreement with the Specifications and Drawings and shall in no way relieve the Contractor of responsibility for errors or omissions contained therein, nor shall such review operate to waive or modify any provision contained in the Specifications or Contract Drawings. Fabricating dimensions, quantities of material, applicable code requirements and other Contract requirements shall be the Contractor's responsibility.

3-12 WORK SITE MAINTENANCE

3-12.1 General

Modify by adding the following after the third paragraph:

The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused material, concrete forms, equipment and temporary structures used during construction. Additional clean-up work, if provided in the Special Provisions, shall be performed by the Contractor.

3-12.2 Air Pollution Control

Modify by adding the following:

The Contractor shall at all times conduct work so as to avoid unnecessary dust. The Contractor shall provide adequate equipment, water and implement procedures to comply with the Mojave Desert Air Quality Management District (MDAQMD) rules to prevent dust emissions.

3-12.4.3 Safeguarding of Equipment, Material and Work

Modify by adding the following new subsection:

The Contractor shall properly safeguard all equipment, material and work against loss, damage, malicious mischief or tampering by unauthorized persons until acceptance of the Work by the District. Locked and covered storage or continuous surveillance by a watchman shall be provided if required to accomplish this purpose.

3-13 COMPLETION, ACCEPTANCE, AND WARRANTY

3-13.3 Warranty

Modify by replacing the entire Subsection with the following:

In addition to the guarantees required elsewhere in this Contract Document, the Contractor shall and hereby does guarantee all work for a period of one (1) year after the date of acceptance of the Work by the District and shall repair and replace any and all such work, together with any other work which may be displaced, that may prove defective in workmanship and/or materials within the one (1) year period from the date of acceptance, without expense whatsoever to the District, ordinary wear and tear and usual abuse or neglect excepted. In the event of failure to comply with the above mentioned conditions within

seven (7) days after being notified in writing, or in the event of an emergency, the District is hereby authorized to proceed to have the defects repaired and make good at the expense of the Contractor, who hereby agrees to pay the cost and charges therefore immediately on demand.

The Contractor hereby guarantees that the entire work constructed under this Contract will meet fully all requirements thereof as to quality of workmanship and of materials furnished by the Contractor. The Contractor hereby agrees to make any repairs or replacements made necessary by defects in materials or workmanship supplied by the Contractor that becomes evident within the guarantee period, and to restore to full compliance with the requirements of these Specifications, including the test requirements set forth herein for any part of the Work constructed hereunder, which during said period is found to be deficient with respect to any provision of the Specifications. The Contractor also agrees to hold the District harmless from claims of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written orders for same from the Engineer. If the Contractor fails to make the repairs and replacements promptly, the District may do the Work and the Contractor and the Contractor's surety shall be liable to the District for the cost of such work.

Upon acceptance of the Work by the District, any and all manufacturers' guarantees held by the Contractor shall be delivered to the District.

The guarantees and agreements set forth herein shall be secured by a Maintenance and Guarantee surety bond which shall be delivered by the Contractor to the District before the notice of completion shall be filed by the Engineer. Said bond shall be in an approved form and executed by a surety company or companies satisfactory to the District, in the amount of one hundred percent (100%) of the contract price. Said bond shall remain in force for the period specified herein. Instead of providing a surety bond, the Contractor may, at his option, provide for the Performance Bond furnished under the Contract to remain in force for said amount until the expiration of the required period.

3-13.4 Fulfillment of Contract

Modify by adding the following new subsection:

The Contractor shall protect and care for all work until the Contract has been fulfilled to the satisfaction of the Engineer, and subsequent acceptance of the Work by the District Board of Directors.

The Contractor shall remove all rubbish, excess earth and rock, leaving the site in a neat, orderly and presentable condition before the Engineer makes final inspection of the Work to determine the fulfillment of the Contract.

3-13.5 Notice of Completion

Modify by adding the following new subsection:

As required by the California Code of Civil Procedure, and within ten calendar days after date of acceptance of the Work by the District Board of Directors, the District will file, in the county recorder's office, a notice of completion of the Work.

3-13.6 Final Payment Terminates Liability of District

Modify by adding the following new subsection:

The acceptance by the Contractor of the final payment shall be a release of the District and its agents from all claims of and liability to the Contractor for anything done or furnished for, or relating to, the Work or for any act or neglect of the District or of any person relating to or affecting the Work.

3-14 PROOF OF COMPLIANCE WITH CONTRACT

Modify by adding the following new subsection:

In order that the Engineer may determine whether the Contractor has complied with the requirements of the Contract Documents not readily determinable through inspection and tests of plant, equipment, work or materials, the Contractor shall, at any time when requested, submit to the Engineer properly authenticated documents or other satisfactory proof as to compliance with such requirements.

SECTION 4 – CONTROL OF MATERIALS

4-1 GENERAL

Modify by replacing the third paragraph with the following:

If the Contractor shall fail to repair or replace unsatisfactory equipment or material from the job site within ten (10) calendar days after being ordered to do so by the Engineer, the Engineer, acting on behalf of the District, may make the ordered repairs or remove the condemned equipment or material and the District will deduct the cost thereof from any moneys due or to become due to the Contractor.

Modify by adding the following:

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

4-4 TESTING

Modify by adding the following after the third paragraph:

All samples shall be submitted before shipment of the material to the site of the Work and in ample time to permit the making of proper tests, analyses, examinations, rejections and resubmissions before the time at which it is desired to incorporate the material into the Work. All tests of materials furnished by the Contractor will be made by the Engineer in accordance with recognized standard practice. No such materials shall be used in the Work unless or until they have been accepted in writing by the Engineer and samples of materials will be retained by the Engineer for reference and comparison purposes. All samples requested by the Engineer/District shall be provided by Contractor at no additional cost to the District.

The cost of material inspection and testing in the vicinity of the Work unless specified otherwise herein, will be borne by the District. If the inspection and testing of material in the vicinity of the Work is not practicable, the Contractor may request such inspection and testing take place at the point of manufacture.

In such an event, the additional cost to the District of remote inspection and testing shall be paid for by the Contractor. Such additional cost will consist of reimbursement for travel time and expense to and from the remote point. If testing fails or does not meet the Contract requirements to the satisfaction of the Engineer, costs for subsequent re-testing shall be borne by the Contractor at no additional cost to the District.

4-6 TRADE NAMES

Modify by adding the following to the beginning of the Section:

Where references to proprietary products appear in the Specifications or Drawings, whether or not followed by the words "or equal" or "or approved equal", it is for the purpose of establishing an acceptable standard of quality or design and it is understood that "or equals" will be reviewed and considered by the Engineer and District. If the Engineer deems the product to not be in conformance with

the Contract Documents, the Contractor may request approval of a substitute for any such proprietary product. Such approval normally will not be given by the Engineering Manager prior to award of a Contract.

Substitution Request. Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

4-9 QUALITY

Modify by adding the following new subsection:

Material and equipment shall be new and of the quality specified. All work shall be executed in conformity with the best accepted standard practice of the trade so as to contribute to maximum efficiency of operation, accessibility and appearance, and minimum cost of maintenance and construction of future alterations and additions.

Whenever the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed Specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market from firms of established good reputation or, if not ordinarily carried in stock, shall conform to the usual standards for first-class materials or articles of the kind required with due consideration of the use to which they are to be put. In general, the Work performed shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment of the Work as a whole or in part.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

5-1 LAWS AND REGULATIONS

Modify by adding the following:

The Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations pertaining to the conduct of the Work. The Contractor shall be liable for all violations of the law in connection with work furnished by the Contractor. If the Contractor observes that the Drawings or Specifications are at variance with any law, ordinance, rule or regulation, the Contractor shall promptly notify the Engineer in writing and any necessary changes shall be made by instruction or change order. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations and without giving such notice to the Engineer, the Contractor shall bear all cost arising therefrom.

5-1.1 Contractor Not Responsible For Damage Resulting From Certain Acts Of God

Modify by adding the following new subsection:

As provided in Section 7105 of the Public Contract Act, the Contractor shall not be responsible for the cost of repairing or restoring damaged portions of the Work determined to have been proximately caused by an act of God, in excess of five percent of the contracted amount, provided, that the Work damaged was constructed in accordance with accepted and applicable building standards and the Specifications and Drawings. The Contractor shall obtain insurance to indemnify the District for any damage to the Work caused by an act of God if the premium of said insurance coverage is called for as a separate bid item in the proposal for the Work. The term ‘Act of God’ shall include only the following occurrences or conditions and effects: (1) earthquakes in excess of a magnitude 3.5 on the Richter Scale and (2) Tsunami.

5-3 LABOR

5-3.1 General

Modify by replacing the second paragraph with the following:

Skilled workmen shall be employed on work requiring special qualifications. When required in writing by the Engineer, the Contractor or any Subcontractor shall discharge any person who is, in the opinion of the Engineer, incompetent, unfaithful, disorderly or otherwise unsatisfactory and shall not again employ such discharged person on the Work except with the consent of the Engineer. Such discharge shall not be the basis of any claim for compensation or damages against the District or any of its officers.

5-3.4 Hours of Labor

Modify by adding the following to this subsection:

Except as otherwise provided in this Section, the Contractor shall receive no additional compensation for overtime work by his employees even though such overtime work may be required under emergency conditions and may be ordered by the Engineer in writing. Additional compensation will be paid to the

Contractor for overtime work by his employees only in the event extra work is ordered by the Engineer and the change order specifically authorizes the use of overtime work, and then only to such extent as overtime wages are regularly being paid by the Contractor for overtime work of a similar nature in the same locality.

5-4 INSURANCE

Modify by replacing the entire Subsection with the following:

5-4.1 General

In all instances where a Contractor or its representatives will be conducting business and/or providing services, the District requires the following MINIMUM insurance requirements and limits.

Contractor shall procure and maintain insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by Contractor, its agents, representatives, employees or Subcontractors.

Insurance must be renewed for a period of at least 180 days after final payment has been made by the District to Contractor pursuant to this agreement.

Maintenance of proper insurance coverage is a material element of the contract. Failure to maintain or renew coverage or to provide evidence of renewal may be treated by the District as a material breach of contract.

Contractor agrees that in the event of loss due to any of the perils for which it has agreed to provide Commercial General and Auto Liability insurance, Contractor shall look solely to its insurance for recovery. Contractor hereby grants to the District, on behalf of any insurer providing Commercial General and Automobile Liability insurance to either Contractor or the District with respect to the services of Contractor herein, a waiver of any right to subrogation which any such insurer of said Contractor may acquire against the District by virtue of the payment of any loss under such insurance.

Original signed certificates and separate policy endorsements naming the District as an additional insured for general liability, and a waiver of subrogation for Workers' Compensation Insurance shall be received and approved by the District before any work may begin. However, failure to do so shall not operate as a waiver of these insurance requirements. The District reserves the right to modify or require additional coverages for specific risk exposures depending on scope of Contractor's work.

Minimum coverage is detailed below. The policy limits of coverage shall be made available to the full limits of the policy. The minimum limits stated herein shall not serve to reduce the policy limits of coverage of Contractor. Exceptions to these requirements may be allowed in special circumstances. Contact Risk Management to inquire.

Minimum Scope of Insurance – the following forms shall be provided and coverage shall be at least as broad as the following:

1. Insurance Services Office Commercial General Liability coverage (ISO Occurrence Form CG 01) including coverage for on-going operations, and products and completed operations.
2. Original and separate Additional Insured Endorsements for General Liability (ISO Form CG 20 10 11/85 or its equivalent) with primary and non-contributory language.
3. Insurance Services Office Automobile Liability coverage (ISO Form CA 0001, Code 1, Any Auto).
4. Workers' Compensation Insurance as required by the State of California including Employer's Liability coverage.
5. Original and separate Waiver of Subrogation for Workers' Compensation Insurance.
6. Builder's Risk/Course of Construction insurance covering all risks of loss less policy exclusions when the District has a financial interest in the property. *(Required for Construction Contracts involving property, if specified in other contract documents)*
7. Contractor's Pollution Liability. *(Applicable for Construction Contractors, if specified in other contract documents)*

5-4.2 General Liability (primary and excess limits combined)

Minimum coverage \$1,000,000 per occurrence/\$2,000,000 aggregate. Coverage requirements may be increased based on risk analysis and consultation with the District. Includes coverage for bodily injury, personal injury, property damage and products and completed operations. The policy shall not exclude coverage for XCU perils (explosion, collapse, or damage to underground property).

If the policy includes a general aggregate, either the general aggregate shall apply separately to this project, service or location or the **minimum required aggregate limit shall be twice the per occurrence limit.**

Policy shall be endorsed to name the District as an additional named insured per the conditions detailed below.

5-4.3 Automobile Liability

\$1,000,000 per occurrence for bodily injury and property damage.

5-4.4 Workers' Compensation and Employers' Liability

Statutory limits as required by the State of California including \$1million Employers' Liability per accident, per employee for bodily injury or disease. If Contractor is self-insured, provide a certificate of Permission to Self-Insure, signed by the California Department of Industrial Relations and Self-Insurance.

Pursuant to Sections 1860 and 3700 of the Labor Code, the Contractor shall secure, pay for, and maintain in full force for the duration of the Contract, workers' compensation insurance. The insurance company shall have a policy rating equal to or better than that of the California State Compensation Insurance Fund (SCIF). The District, its officers, employees, and agents, shall not be held responsible for any claims in law or equity occasioned by failure of the Contractor to comply with this requirement.

Pursuant to Sections 1860 and 1861 of the Labor Code, the Contractor shall submit the following certification to the Engineer prior to execution of the Contract by the Board:

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

The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the District, and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from work performed by the named insured for the District.

5-4.5 Builders' Risk/Course of Construction Insurance

Covers property under construction, repair or renovation as well as equipment and materials to be installed. Unless otherwise specified or stated in the Special Provisions, the Contractor shall provide such insurance. *(Required for Construction Projects involving property and equipment installation, if specified in other Contract documents. I suggest adding a section to the Special Provisions, with optional phrases to: require District to provide Builders' Risk Insurance, or 2) delete the requirement for Builder's Risk insurance all together if not warranted for a particular project).*

Coverage shall include all risks of direct physical loss, excluding earthquake, *for an amount equal to the full completed value of the covered structure or replacement value of alterations or additions, including soft costs and business interruption.* If the project does not involve new or major reconstruction, an Installation Floater may be acceptable.

For such projects, a property installation floater shall be obtained that provides for the improvement, remodel, modification, alteration, conversion or adjustment to existing buildings, structures, processes, machinery and equipment. The Property Installation Floater shall provide property damage coverage for any building, structure, machinery or equipment damaged, impaired, broken or destroyed during the performance of the Work, including during transit, installation and testing at the District's site.

The District shall be named as loss payee as its interest may appear. The insurer shall waive all rights against the District.

5-4.6 Contractor's Pollution Liability Insurance

Contractor's Pollution Liability *(Applicable for Construction Contractors, if specified in other Contract documents. I suggest adding a section to the Special Provisions, with optional phrases to include or exclude this requirement.)*

Contractors' Pollution Liability insurance shall be provided on a Contractors Pollution Liability policy form or other policy form acceptable to The District providing coverage for liability caused by pollution conditions arising out of the operations of Contractor.

The policy limit shall be no less than one million dollars (\$1,000,000) per claim and one million dollars (\$1,000,000) general aggregate.

Coverage shall apply to: bodily injury; property damage, including loss of use of damaged property or of property that has not been physically injured, cleanup costs, defense costs, including costs and expenses incurred in the investigation, defense, or settlement of claims. All activities contemplated in the Contract shall be specifically scheduled on the policy as "covered operations." The policy shall provide coverage for the hauling of waste from the Project site to the final disposal location, including non-owned disposal sites.

Coverage shall be included on behalf of the insured for covered claims arising out of the actions of independent Contractors. If the insured is using Subcontractors, the policy must include work performed "by or on behalf" of the insured.

Coverage shall apply on a primary non-contributing basis in relation to any other insurance or self-insurance, primary or excess, available to The District or any employee or agent of The District. If this coverage is written on a claims-made basis, the retroactive date shall precede the effective date of the Contract with the District, and continuous coverage will be maintained or an extended reporting period will be exercised for a period of at least three (3) years from termination or expiration of this Contract.

The policy of insurance required above shall be endorsed as follows:

Additional Insured: The District, its officers, officials, employees, agents and volunteers shall be added as additional insured with regard to liability and defense of suits or claims arising from the operations and activities performed by or on behalf of the Named Insured.

Additional Insured endorsements shall not: 1) be limited to "on-going operations", 2) exclude "Contractual Liability", 3) restrict coverage to the sole liability of the contractor, or 4) contain any other exclusion contrary to the Contract.

5-4.7 Applicable to General Liability

The District, its officers, officials, employees, agents and volunteers are to be named as additional insured's for all liability arising out of the operations by or on behalf of the named insured including but not limited to bodily injury, deaths and property damage or destruction arising in any respect directly or indirectly in the performance of this contract.

Primary and Noncontributory Contractor's insurance coverage must be primary and noncontributory coverage as it pertains to the District, its officers, officials, employees, agents and volunteers. Any insurance or self insurance maintained by the District is wholly separate from the insurance of Contractor and in no way relieves Contractor from its responsibility to provide the required limits of insurance.

5-4.8 Waiver of Subrogation Endorsement Form

Contractor's insurer will provide a Waiver of Subrogation endorsement in favor of the District for Workers Compensation coverage during the life of this contract.

5-4.9 Deductibles and Self-Insured Retentions

Any deductible or self-insured retention over \$50,000 must be declared to and approved by the District. At the option of the District either the insurer shall reduce or eliminate such deductibles or self-insured retention as respects the District or Contractor shall procure a financial guarantee in an amount equal to the deductible or self-insured retention guaranteeing payment of losses and related investigations, claims administration and defense expenses.

Contractor is responsible for satisfaction of the deductible and/or self-insured retention for each loss.

5-4.10 Loss Payable Endorsement

Applicable to Builder's Risk/Course of Construction naming the District as Loss Payee. **(Applicable for Builder's Risk and/or Course of Construction Insurance, if specified in other Contract documents.)**

5-4.11 Subcontractors

Contractor shall include all Subcontractors as insured under its policies or shall furnish to the District's designated project manager for review and approval, separate certificates and endorsements for each Subcontractors. All coverage for Subcontractors shall be subject to all of the requirements stated herein.

Contractor agrees to defend and indemnify the District for any damage resulting to it from failure of either Contractor or any Subcontractor to take out or maintain the required insurance policies. The fact that insurance is obtained by Contractor, and/or Contractor's Subcontractors, will not be deemed to release or diminish the liability of Contractor, including, without limitation, liability under the indemnity provisions of this contract. Damages recoverable by the District from Contractor or any third party will not be limited by the amount of the required insurance coverage.

5-4.12 Verification of Coverage

All original certificates and endorsements shall be received and approved by the District *before work may begin*. The District reserves the right to require complete, certified copies of all required insurance policies including endorsements affecting the coverage at any time.

Original insurance certificates and required policy endorsements shall be mailed, or delivered to the designated project manager for the District.

5-4.13 Liability of District and Engineer

To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the District, Engineer and their officers, agents and employees against and from all claims, suits or actions arising under or by reason of the Work agreed to be undertaken in the Contract or any performance of the Work from the sole negligence of the Contractor or employees or agents or negligence which could be

jointly attributed to District employees or the Contractor, but not from the sole negligence or willful misconduct of the District or the Engineer.

5-4.14 Liability of Contractor

The Contractor shall be liable for all damages and injury which shall be caused to District or property on or in the vicinity of the Work or which shall occur to any person or persons or property whatsoever arising out of the performance of this Contract, whether or not such damage or injury be caused by the negligence of the Contractor and whether or not such damage or injury be caused by the inherent nature of the Work as specified except the willful misconduct or sole negligent acts of the District, its officers or agents.

In case any suit or legal proceedings shall be brought against the District or the Engineer or any of their officers, agents or employees on account of loss or damage sustained by any person or property as a result of the performance of the Work covered by this Contract, whether or not such injuries or damage be due to the negligence of the Contractor and whether or not such injuries or damage be caused by the inherent nature of the Work as specified, the Contractor agrees to assume the defense thereof and to pay all expenses connected therewith including reasonable attorneys' fees and any judgment that may be obtained against the District or the Engineer or any of their officers, agents or employees in such suits, and in the event that any lien is placed upon the property of the District or the Engineer or any of their officers, agents or employees, as a result of such suits, the Contractor agrees to at once cause the same to be dissolved and discharges by giving bond or otherwise.

5-7 SAFETY

5-7.1.1 General

Modify by adding the following paragraphs to the subsection:

The Contractor shall at all times conduct work so as to assure the least possible obstruction to traffic and inconvenience to the general public and adequate protection of persons and property in the vicinity of the Work. No street shall be closed to the public without first obtaining permission of the Engineer and the San Bernardino County Public Works Department at (909)-387-7910. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise provided or shown. Toeboards shall be provided to retain excavated material. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the Contractor to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets and other drainage facilities.

The Contractor shall provide adequate barricades, signs, warning lights, watchmen and flagmen as required, as directed by the Engineer and agency having jurisdiction, to protect the Work and the safety of the public. Warning lights using inflammable liquids will not be permitted. Only electrically operated warning lights will be approved for use. Warning lights shall operate from sunset to sunrise. Barricades shall be painted to increase their visibility at night.

“NO PARKING” signs with specific time frames shall be supplied and posted by the Contractor 48 hours prior to start of work. The Contractor shall notify the local San Bernardino Sheriff's Department, at (760) 995-8781, of such restrictions and obtain approval for the posting.

The Contractor shall notify the San Bernardino County Sheriff's Department, Fire Department, Snowline Unified School District, and refuse collectors of any construction causing street closure(s) forty-eight (48) hours prior to start of construction or closure.

The contractor shall also be responsible for notifying, in writing, affected businesses forty-eight (48) hours prior to the start of construction or closures.

5-7.2 Safety Orders

Modify by adding the following after the second paragraph:

All work shall be performed in accordance with requirements of the California Division of Industrial Safety, the California Occupational Safety and Health Act and the William Steiger Occupational Safety and Health Act of 1970, and all applicable Federal health and safety laws. The Contractor shall submit, to the Engineer, a Mandatory Injury/Illness Program as mandated by S.B. 198. The Contractor shall post at an appropriate location notices pursuant to Proposition 65 or any hazardous chemicals listed by the State Health Department which are used as part of the construction of the project. The job safety conditions shall be the responsibility of the Contractor at all times.

5-7.2.2 Shoring Plan

Modify by adding the following:

In no case will the Contractor be permitted to use a shoring, sloping or other protection system less effective than that required by said Orders. Nothing contained herein shall be construed to impose a tort liability upon the District, Engineer or any of their officers, agents or employees.

5-7.2.4 Concrete Forms, Falsework and Shoring

Modify by adding the following new subsection:

The Contractor shall comply with the requirements of CAL OSHA, Construction Safety Orders, regarding the design of concrete forms, falsework and shoring and the inspection of same prior to placement of concrete. The Contractor shall employ a civil engineer registered in California to prepare design calculations and working drawings of the falsework or shoring system, to inspect such system prior to placement of concrete and to certify in writing to the Engineer 24 hours prior to placing concrete that the falsework or shoring system complies with the design and that the materials and workmanship are satisfactory for the purpose intended.

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK

6-1.1 Construction Schedule

Modify by adding the following after the first paragraph:

If in the Engineer’s opinion a schedule submitted is inadequate to secure the completion of the Work in the time agreed upon, or is otherwise not in accordance with the Specifications, the Engineer may require the Contractor to submit a new or revised schedule which will insure timely completion of the Work. It is mandatory that an up-to-date construction schedule be submitted with each request for progress payment. The initial construction schedule shall be submitted for review by the Engineer, within 15 days following Notice to Proceed, or at the pre-construction meeting, whichever occurs first.

6-3 TIME OF COMPLETION

6-3.1 General

Revise the last sentence:

Replace “Working Days” with “Calendar Days”.

6-3.2 Contract Time Accounting

Revise this subsection:

Replace the term “Working Day” and “Working Days” with “Calendar Day” and “Calendar Days”.

6-4 DELAYS AND EXTENSIONS OF TIME

6-4.2 Extensions of Time

Modify by adding the following:

To receive consideration, a request for extension of time must be made in writing to the Engineer stating the reason for said request, and such request must be received by the Engineer within ten calendar days following the end of the delay-causing condition.

6-6 SUSPENSION OF THE WORK

6-6.1 General

Modify by adding the following to the end of the paragraph:

Suspended work shall be resumed by the Contractor within a reasonable time, as designated by the Engineer, after receipt from the Engineer of written notice to proceed.

6-8 TERMINATION OF THE CONTRACT FOR CONVENIENCE

6-8.1 Termination of Contract By Contractor

Modify by adding the following new subsection:

The Contractor may terminate the Contract upon ten calendar days written notice to the District whenever: (1) the entire work has been suspended in accordance with Section 6-6.1, for sixty (60) consecutive calendar days through no fault or negligence of the Contractor and notice to resume work or to terminate the Contract has not been received from the District within this time period, or (2) the District shall fail to pay the Contractor any substantial sums due in accordance with the terms of the Contract and within the time limits prescribed. In the event of such termination, the Contractor shall have no claims against the District except for those claims specifically enumerated in Section 6-8 and determined in accordance with that Subsection.

SECTION 7 – MEASUREMENT AND PAYMENT

7-3 PAYMENT

7-3.1 General

Modify by adding the following after the eighth paragraph:

If any person shall bring against the District or any of its agents any action to enforce such claim or stop notice, the District will, until the action is settled, withhold from moneys due to the Contractor an amount sufficient to satisfy the decision of the court together with costs.

7-3.2 Partial and Final Payment

Modify by replacing with the following:

The Contractor shall submit progress payments on or about the 20th day of each calendar month. The Engineer will review such progress payments within 7 calendar days of receipt, and once progress payment is acceptable to the Engineer, Engineer will prepare and certify to the District an approved progress payment, which includes an agreed upon cumulative amount and value of work performed by the Contractor up to that date. All payments will be paid within 30 calendar days of the date of the approved progress payment. Except as may otherwise be provided in the Special Provisions, said amount will include 50 percent of the value of all acceptable materials and equipment delivered to the site of the Work. Said value will be based on certified copies of paid invoices delivered by the Contractor to the Engineer. To this figure will be added all amounts due or paid the Contractor for performance of extra work in accordance with change orders.

From the total computed above, a deduction of 5 percent (retention) will be made. Further deductions will be made for: (1) amounts due the District for equipment or materials furnished or services rendered; (2) amounts due the District under the terms of the Contract; (3) amounts of any claims of lien filed with the District in accordance with Section 7-3, and (4) amounts required to be deducted by federal, state or local governmental authority. From the balance thus determined will be deducted the amount of all previous payments and the remainder shall constitute the monthly payment due the Contractor.

Pursuant to the provisions of Public Contract Code Sections 10263 and 22300, the Contractor is permitted to substitute securities for any moneys withheld to ensure performance of this Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the State Treasurer or a state or federally chartered bank in California as the escrow agent, who shall then pay the moneys to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

Alternatively, the Contractor may request and the District shall make payment of retentions earned directly to the escrow agent. The Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for in this Section for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the District pursuant to the terms of this Section.

Securities eligible for investment under this Section shall include those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the District. Securities selected must also comply with the District's current investment policy and 1995 California State Senate Bills 564 and 866.

The Contractor shall be beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon. The escrow agreement used pursuant to this Section shall be null, void and unenforceable unless it is substantially similar to the form enclosed.

The Engineer's estimate of the monthly payment due the Contractor will not be required to be made by strict measurement and an approximation will suffice. The monthly payments may be withheld or reduced if, in the Engineer's opinion, the Contractor is not diligently or efficiently endeavoring to comply with the intent of the Contract or if the Contractor fails to pay labor and material bills as they become due.

The Contractor shall furnish the Engineer promptly, upon request, all information and records necessary to determine the cost of the Work for purposes of estimating monthly payments, including an itemized statement, in a form satisfactory to the Engineer, of the actual cost of all acceptable materials delivered by the Contractor to the site.

No monthly payment shall be construed as an acceptance of the Work or of any portion of the Work, nor shall the making of such payment preclude the District from demanding and recovering from the Contractor such damages as it may sustain by reason of the Contractor's failure to comply with the requirements of the Contract.

In the event the Contract is terminated, any funds due the Contractor and retained by the District shall become the property of the District to the extent necessary to repay to the District any excess in the Contract price above the cost of the work completed at the time of the termination. After issuance of notice to discontinue work, no further payment will be made to the Contractor for the work covered by the notice until completion of the Work and final settlement has been made.

7-3.3 Final Estimate of Payment

Modify by adding the following new subsection:

When the Engineer is of the opinion that the Contractor has completely performed all work required under the Contract, the Engineer shall certify to the District that the Work is complete and shall submit to the Contractor a draft of the final estimate. The Contractor shall submit a written approval of said final estimate within five (5) calendar days after receipt, or, in the event the Contractor disagrees with said final estimate, the Contractor shall, within said five day period, file a written statement of all claims to be presented. If the Contractor delays more than five calendar days in approving said final estimate or in presenting claims, the District may, at its sole option, treat the delay as a waiver of the Contractor's right to file a written statement of all claims to be presented or extend the time for final payment by the period of such delay.

Pursuant to Section 7107(c) of the Public Contracts Code, within 60 days after the date of completion of the Work, the retention withheld by the District shall be released. In the event of a dispute between the

District and the Contractor, the District may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. For purposes of this section, “completion” means any of the following:

The occupation, beneficial use, and enjoyment of the Work, excluding any operation only for testing, startup, or commissioning, by the District, or its agent, accompanied by cessation of labor on the Work.

The acceptance of the Work by the District.

After the commencement of the Work, a cessation of labor on the Work for a continuous period of 100 days or more, due to factors beyond the control of the contractor.

After the commencement of the Work, a cessation of labor on the Work for a continuous period of 30 days or more, if the District files for record a notice of cessation or a notice of completion.

If the Contractor disagrees with the Engineer’s final estimate and files a timely written statement of his claims, the Engineer will issue, as a semi-final estimate, the proposed estimate submitted to the Contractor, and the District will make payment to the Contractor based thereon in accordance with the provision of Subsection 9-3.2. The Engineer then will investigate the Contractor’s claims, make any revisions to said semi-final estimate as the Engineer deems appropriate and certify in writing to the District the amount and value of the work performed by the Contractor. The District then will make final payment to the Contractor based thereon in accordance with the provisions of Subsection 7-3.2.

7-4.3.1 Work by the Contractor

Modify by replacing the first sentence of the paragraph with following:

The following percentages shall be added to the Contractor’s costs and shall constitute the markup for all overhead and profit:

(1) Labor	15%
(2) Materials	15%
(3) Equipment and Rental	15%
(4) Other Items and Expenditures	15%

To the sum of the costs and markups provided for in this subsection, 1 percent shall be added as compensation for bonding and insurance.

7-4.3.2 Work by a Subcontractor

Modify by replacing the paragraph with the following:

When all or any part of the extra work is performed by a Subcontractor, of any tier, the markup established in 7-4.3.1 shall be applied to \$5,000 of the subcontractor portion of the extra work, and a markup of 5 percent on work added in excess of \$5,000 of the subcontracted portion of the extra work may be added by the Contractor.

The markups specified in this subsection and in 7-5.3.1 shall be considered as including, but not limited to, the Contractor’s labor costs for personnel not working directly on the “extra work,” including the cost

of any tools, equipment, and supervisors/superintendence that they may use. Such cost shall not be reported as labor or equipment costs elsewhere except when they are actually used to physically construct the “extra work”. The Contractor shall then report labor costs for the labor classification corresponding to the type and nature of “extra work” done.

SECTION 8 – FACILITIES FOR AGENCY PERSONNEL

No changes.

SECTION 400 – PROTECTION AND RESTORATION

400-1 LOCATION

Modify by adding the following after the first paragraph:

Performance under this Contract by the Contractor shall not be excused by any unforeseen obstruction or difficulties which may be encountered, including damage to or destruction of the project under construction by action of the elements or otherwise.

SECTION 402 - UTILITIES

402-1 GENERAL

Modify by adding the following before the first paragraph:

As used in this section, the word “Utility” shall be understood to include tracks, overhead or underground wires, cables, pipelines, conduits, ducts, sewers or storm drains. The term “service connection” shall be understood to mean all or any portion of a pipeline (including sewer house laterals), conduit, wire, cable or duct, including meter, between a utility distribution line and an individual customer or customers when served by a single service connection. The term “construction interference” shall be understood to include any utility or service connection within the limits of excavation or over excavation required for the Work under the Contract as shown, or ordered by the Engineer, or any utility, or service connection located in the space which will be required by any of the Work under the Contract.

In the event any utility or service connection is required to be disturbed or removed to permit construction of a pipeline or other structure under the Contract, such disturbance or removal shall be done only with the approval of the Engineer and following notification to the owner of the interfering utility or service connection. Any such utility or service connection removed or otherwise disturbed shall be reconstructed as promptly as possible in its original or other authorized location in a condition at least as good as prior to such removal or disturbance, subject to the inspection of the owner of same. The Contractor’s responsibility under this section to remove or replace shall apply even in the event such damage or destruction occurs after backfilling or is not discovered until after completion of backfilling. The owner of the utility or service connection shall be notified immediately after damage or destruction occurs or is discovered.

During the performance of the Work under this Contract, the owner of any utility affected by the Work shall have the right to enter when necessary upon any portion of the Work for the purpose of maintaining service and to make repairs to said utility.

The drawings show the approximate positions of known utilities in the immediate vicinity of the Work done but the District does not guarantee that all existing utilities are shown. Service connections normally are not shown on the Drawings. The Contractor, before commencing any excavation, shall ascertain from records or otherwise, the existence, horizontal and vertical position and ownership of all existing utilities and service connections. The District will not be liable for any consequences arising as a result of a service connection being incorrectly located in the field by the agency having jurisdiction over said service connection.

All costs involved in removing, relocating, protecting, supporting, repairing, maintaining or replacing a main or trunk line utility which actually constitutes a construction interference when said utility is not shown with reasonable accuracy as an interference or is omitted from the Drawings, will be paid for by the District as extra work. In such case, the District also will compensate the Contractor for equipment on the project necessarily idled during and by reason of such work. The District's obligation to repair damage to such a facility and to compensate the Contractor for idled equipment shall not extend to damage resulting from the failure of the Contractor to use reasonable care.

The Contractor shall not be assessed liquidated damages for failure to complete the Work on time to the extent that such delay was caused by failure of the District or of the agency having jurisdiction over the utility or service connection to authorize or otherwise provide for its removal, relocation, protection, support, repair, maintenance or replacement.

The District reserves the right, upon determination of the actual position of existing utilities and service connections, to order changes in alignment or grade of the District's pipelines when by so doing, the necessity for relocation of existing utilities or service connections will be avoided. Such changes will be ordered in writing by the Engineer. Where applicable, adjustment in the contract price will be on the basis of the unit prices stated in the proposal. Where unit prices in the proposal are not applicable, adjustment in Contract price will be in accordance with Section 7-4.

402-2 PROTECTION

Modify by adding the following to the end of the second paragraph:

The Contractor shall not do any work that would affect any oil, gas, sewer, storm drain, or water pipeline, any telephone, telegraph, or electric transmission line, fence, or any other structure, nor enter upon the rights-of-way involved until notified by the Engineer that the District has secured authority therefore from the proper party. After authority has been obtained, the Contractor shall give said party due notice of any intention to begin work and shall give said party convenient access to every facility for removing, shoring, supporting, or otherwise protecting such pipeline, transmission line, ditch, fence or structure and for replacing same. The Contractor shall not be entitled to any extension of time or extra compensation on account of any postponement, interference, or delay caused by any such pipeline, transmission line, fence or structure being on the line of the Work except as provided herein.

SPECIAL PROVISIONS

CIVIC CENTER DEVELOPMENT PHASE I PROJECT

SECTION I:

GENERAL

1. **Summary of Work**

The work to be performed under this contract shall consist of all plant, labor, equipment, materials, tools, transportation, and services required for the fulfillment of the contract in strict accordance with the Plans and Contract Documents. The work shall be complete, and all work, materials, and services not expressly shown or called for in the Plans and Contract Documents which may be necessary for the complete and proper construction of the work in good faith shall be performed, furnished, and installed by the Contractor as though originally so specified or shown, at no increasing cost to the District.

The work will primarily consist of construction of a new 14,034 SF Civic Center building, which will include a 3,592 SF Community Emergency Response Center (EOC). This facility (located within the new Civic Center and will be located at the intersection of Warbler Road and Sheep Creek Road, Phelan, California.

2. **Order of Work**

The Contractor shall have the option of completing the work in any order. The order of work shall be consistent with the duration of contract to insure that the work is completed within the time period allocated.

3. **Completion of Work**

All work shall be completed within the specified Contract Time, in Section 25(a) of the Agreement, from the Contract Time start date stipulated in the Notice to Proceed.

4. **Insurance**

Contractor shall provide Builder's Risk/Course of Construction Insurance per the General Conditions, Article 5-4.5. Secure such insurance and provide certificate of such insurance in accordance with the Agreement, Section 20 INSURANCE, Paragraph (c) prior to the commencement of the Work."

5. **Special Requirements**

A. Laws and Regulations

- (1) In performing the work within the jurisdiction of other public and private agencies, the Contractor shall comply with all applicable rules, regulations, ordinances, and all other lawful requirements of said entities. Except as otherwise provided, the Contractor shall obtain such paving, excavation, and related permits as may be required by said rules, regulations, ordinances, and requirements.

- (2) Wherever necessary or required for the convenience of the public or individual residents at street or highway crossings, private driveways, or elsewhere, the Contractor shall provide suitable temporary bridges over unfilled excavations, except in such cases as the Contractor shall secure the written consent of the individual or authorities concerned about owning such temporary bridges, or where bridges are impractical due to the limited width of the street, as determined by the Engineer. All such bridges shall be maintained in service until access is provided across the backfilled trench. Temporary bridges for street and highway crossings shall conform to the requirements of the authority having jurisdiction in each case, and the Contractor shall adopt designs furnished by the authority for such bridges, or shall submit designs to the authority for approval, as may be required.
- (3) Neither the terms hereof nor anything shown on the drawings in connection with rights-of-way provided by the District shall be construed to entitle the Contractor to conduct operations in the rights-of-way in violation of any city or county ordinance or regulation restricting interference with watercourses and drainage channels. The Contractor shall take adequate precautions against obstructing storm water flow in any affected watercourse or channel and shall not deposit excavated materials on any area where they might interfere with or be subject to erosion from such flow.
- (4) Except as may specifically be provided to the contrary, nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street or way during performance of the contract work, and he shall so conduct his operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets and ways.
- (5) In addition to the requirements specified in the General Conditions, the Contractor shall, in particular and without limitation, comply with the Construction Safety Orders issued by the Division of Industrial Safety of the State of California and the Safety and Health regulations for Construction promulgated by the Bureau of Labor Standards of the United States Department of Labor, whichever is the more restrictive, and such other rules or regulations as now or in the future may be applicable to the work to be performed under the contract.

B. Improvements

- (1) The Project construction is in close proximity to improvements such as buildings and other structures, fences, paved areas, driveways, sewers, water mains, utilities, and other substructures, including trees and other vegetation. All said improvements shall be maintained in place and shall not be disturbed or damaged, except for such removal of improvements within the right-of-way as is unavoidable in order to accommodate required excavation.
- (2) Where necessary for purposes of construction, the Contractor shall move interfering structures, improvements, or portions thereof temporarily to provide

space for his operations. Any such building, fence, block wall, sewer, storm drain, utility, traffic signal control pad, or other structure or improvement so moved, damaged, or disturbed by the Contractor shall be completely replaced and restored by him except as may otherwise be provided under this section, to a condition at least as good as its condition immediately prior to its disturbance by his operations, and the replacement and restoration of said improvements or structures shall be exactly in the respective positions which they occupied at the time of beginning of the work under the contract.

- C. Bench Marks and Monuments. The Contractor, prior to commencing any construction whereby he might move or disturb survey monuments or bench marks of others, shall give the Engineer 15 days prior notice, in writing, in order that these monuments may be referenced for replacement. Should the Contractor accidentally disturb or destroy any such monuments or bench marks, he shall immediately notify the agency having jurisdiction. Any monuments disturbed or destroyed during the work without being referenced shall be replaced to the satisfaction of the Engineer thereof or public agency having jurisdiction therefore, at the cost and expense of the Contractor.

D. Traffic

- (1) For the protection of traffic in public streets and ways, the Contractor shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the State of California Department of Transportation.
- (2) Prior to the start of construction, the Contractor shall notify the Post Office, Snowline Joint Unified School District, San Bernardino County Public Works Department, San Bernardino County Sheriff's Department, refuse collectors, and fire, traffic, and engineering departments of all jurisdictional agencies involved, giving the approximate starting date, approximate completion date expected, and the name and telephone number of a responsible person who may be contacted in the event of a condition requiring immediate attention. The Contractor shall likewise notify the agencies at least 48 hours in advance of completely or partially closing any public thoroughfare or of opening any public thoroughfare which has been completely or partially closed.
- (3) Any shifting of traffic from one lane to another, which is necessary in order to maintain the required number of lanes, shall be directed in such manner that traffic may move smoothly across the work without any sudden changes. The minimum radii allowed for transitioning traffic from one lane to another shall be 250 feet.
- (4) The Contractor may post "No Parking" signs within the construction areas, provided he has obtained permission therefore from the San Bernardino County Sheriff's Department.
- (5) Traffic lanes mentioned herein and not otherwise specified shall have a minimum width of 12 feet. Furthermore, all traffic lanes shall have 2 feet clearance from

curbs and other obstructions, and 5 feet clearance from any excavation.

- (6) Ingress to and egress from private driveways shall be maintained and, unless otherwise specified herein, intersecting highways and streets shall be kept open at all times.
- (7) The Contractor shall protect and maintain in operation all street lighting systems and traffic signal control pads, and, should these or other similar facilities be damaged in any way during construction, the Contractor shall repair or replace these facilities to the satisfaction of the agency having jurisdiction.
- (8) Temporary striping of pavement shall be removed by the Contractor by wet sandblasting at his expense.

E. Fire Prevention and Control

- (1) General. The Contractor, his employees, subcontractors and their employees, shall obey all Federal, State and local fire laws and ordinances. The Contractor shall abide by any requirements to clear away weeds, shrubs or other growth or debris, as may be made by the County and/or State fire prevention authorities, resulting from the District's construction project. The Contractor shall furnish to the Engineer a current directory of available personnel and a list of project construction equipment suitable for firefighting purposes.
- (2) Spark Arrestors. The exhaust pipes of all internal combustion engines used in the work shall be equipped with approved spark arrestors.
- (3) Fire Suppression. If fire occurs in the construction area along the line of the work, the entire project crew shall immediately be alerted and the Contractor shall dispatch sufficient men and equipment, up to the total manpower and equipment available for fire fighting on the project, to suppress said fire and prevent it from spreading.
- (4) Hydrants and Valves. Free access shall be maintained at all times to fire hydrants and water and gas valves.

F. Utility Companies and Agencies

- (1) Southern California Edison and Southern California Gas; The Contractor's attention is directed to overhead power and underground gas distribution lines within the project area. The Contractor shall notify proper representatives from each of these agencies not less than 72 hours prior to starting any work in the vicinity of said facilities.
- (2) Verizon and Verizon Fiber Optic; The Contractor's attention is directed to the facilities owned by Verizon and Verizon Fiber Optic and located in the vicinity of the proposed work. The Contractor shall notify Verizon and Verizon Fiber Optic not less than 72 hours prior to excavation in the vicinity of said facilities.

- (3) Frontier. The Contractor's attention is directed to the facilities owned by Frontier, and associated Work required of Contractor, located in the vicinity of the proposed work and the EV Station. Provide utility Work as shown on the drawings, and comply with Communication Requirements for Commercial Service, Developer/Owner Responsibilities, Conduit Requirements, included at the end of these Special Provisions. The Contractor shall notify Frontier not less than 72 hours prior to excavation in the vicinity of said facilities.

G. Federal Funding Agency Requirements

The Project Grantor requires Owner and Owner's consultants, contractors and its subcontractors to comply with applicable federal requirements, included in the attachment at the end of this Section, and requirements listed in the Addendum to the Agreement between Owner and Contractor. All requirements of the Grant Funding Agreement are hereby incorporated into the Contract Documents, as that term is defined in Section 4 of the underlying construction Agreement, and made a part thereof as though fully set forth herein. Additionally, Contractor shall also comply with any and all other requirements that may be imposed upon the Work by the federal, state, and local governmental agencies administering the Grant Funding Agreement. Where indicated, Bidders shall submit the required document(s) with the Bid. Otherwise, proof of compliance with these provisions will be required of the successful Bidder, within 14 calendar days of issuance of the Notice of Award.

Regarding compliance with these federal funding requirements, when referring to "Contractor" or "Recipient", this shall mean the Contractor and Contractor's subcontractors.

1. Unless otherwise specified, all equipment and materials used on this Project shall be subject to open and full competition (no sole sourcing), thus all "or equals" will be considered by the Architect/Engineer and District.
2. Conflict of Interest. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.

Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

Gratuities. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or District in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

3. **Audit and Access to Records.** For all negotiated contracts and negotiated modifications (except those of \$10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.
4. **Small, Minority and Women's Businesses (MBE/WBE).** If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms. The successful low responsive responsible bidder will be required to submit good faith effort documentation within 14 calendar days of issuance of the Notice of Award. Documentation forms are included at the end of this Section.
5. **Anti-Kickback.** Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.
6. **Clean Air and Pollution Control Acts.** If this Contract exceeds \$100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 et seq.) and the Federal Water Pollution Control Act as amended (33 USC 1251 et seq.). Contractor will report violations to the Agency and the Regional Office of the EPA.
7. **State Energy Policy.** Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

8. **Equal Opportunity Requirements.** If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.", and including Federal Water Pollution Control Act Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, related to prohibition of discrimination on the basis of race, color, national origin, sex, disability or age. Contractor and his/her Subcontractors shall also comply with Title VI of the Civil Rights Act of 1964 (Limited English Proficiency), and Section 504 of the Rehabilitation Act of 1973 (Rehabilitation Act of 1973).

Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

9. **Restrictions on Lobbying.** Contractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the District. Refer to the Proposal Forms for the Restrictions on Lobbying certification that must be submitted with the Bid.
10. **Build America, Buy America Act.** Contractor shall comply with the Build America, Buy America Act (BABAA), which was enacted as part of the Infrastructure Investment and Jobs Act

§§ 70901-70927, Pub. L. No. 117-58 (2021); and Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers. BABAA requires all federal agencies, including FEMA, to ensure that no federal financial assistance for "infrastructure" projects is provided unless all of the iron, steel, manufactured products, and construction materials used in the project are produced in the United States. Contractor shall provide submittals demonstrating compliance with BABAA for all applicable iron, steel, manufactured products and construction materials used for this Project. Construction material submittals will not be approved by the Architect/Engineer and District without proof of compliance with the BABAA.

11. Debarment and Suspension. The Contractor and its subcontractors must certify, to the best of its knowledge and belief, that he/she and its subcontractors and subrecipients are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency. Refer to the Proposal Forms for the debarment and suspension certification that must be submitted with the Bid.
12. Drug-Free Workplace. Contractor shall comply with drug-free workplace requirements in Subpart B (or Subpart C, if the recipient is an individual) of 2 C.F.R. Part 3001, which adopts the Government-wide implementation (2 C.F.R. Part 182) of Sec. 5152-5158 of the Drug-Free Workplace Act of 1988 (41 U.S.C. §§ 8101-8106). Refer to Proposal Forms for the certification form that must be submitted with the Bid.
13. False Claims Act and Program Fraud Civil Remedies. Contractor shall comply with the requirements of the False Claims Act, 31 U.S.C. §§3729-3733, which prohibits the submission of false or fraudulent claims for payment to the Federal Government. (See 31 U.S.C. §§ 3801-3812, which details the administrative remedies for false claims and statements made.).
14. Procurement of Recovered Materials. Contractor shall comply with Section 6002 of the Solid Waste Disposal Act, Pub. L. 89-272 (1965), (codified as amended by the Resource Conservation and Recovery Act, 42 U.S.C. § 6962.). The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 C.F.R. Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. Contractor shall provide each material and equipment submittal with information demonstrating compliance with this Act to the extent feasible, and/or stating exemption thereof.
15. Terrorist Financing. Contractor shall comply with E.O. 13224 and U.S. laws that prohibit transactions with, and the provisions of resources and support to, individuals and organizations associated with terrorism. Recipients are legally responsible to ensure compliance with the Order and laws.
16. Trafficking Victims Protection Act. Contractor shall comply with the requirements of the government-wide financial assistance award term which implements Section 106 (g) of the Trafficking Victims Protection Act of 2000 (TVPA), codified as amended at 22 U.S.C. § 7104. The award term is located at 2 C.F.R. § 175.15, the full text of which is incorporated here by reference.

6. **Preconstruction Verification of Underground Utilities**

The Engineer has, by a search of known records, endeavored to locate and indicate on the Drawings all utilities which exist within the limits of the work. However, the accuracy or completeness of the utilities indicated on the Drawings is not guaranteed. Service connections to adjacent properties may or may not be shown on the drawings. It shall be the responsibility of the Contractor to determine the location of all utilities and their service connections which may interfere with construction. Within ten (10) calendar days of award of Contract, the Contractor shall submit to the Engineer a plan showing the Contractor's proposed method and location of field verification (potholing) of utilities as deemed necessary by the Contractor. Contractor shall perform and complete field verification of utilities within 5 calendar days of approval, of the Contractor's proposed plan, by the Engineer, and at no additional cost to the District.

Upon completion of utility verifications, Contractor shall submit all utility verification findings to the Engineer. Upon review of findings by the Engineer, revisions to the design plans may be required as directed by the Engineer. District will have ten (10) working days to revise the design as may be required. Contractor shall allow sufficient time in the Contractor's schedule for performance of the above work.

7. **Resolution of Construction Claims**

A. In accordance with section 20104 et. Seq. of the California Public Contractor Code, this section applies to all claims of \$375,000 or less which arise between the Contractor and the District under this Contract for:

- (1) A time extension;
- (2) Payment of money or damages arising from work done by or on behalf of the Contractor pursuant to this Contract and payment of which is not otherwise expressly provided for as the Contractor is not otherwise entitled; or
- (3) An amount the payment of which is disputed by the District.

B. For any claim set out in Paragraph "A", above, the following requirements apply:

- (1) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing herein is intended to extend the time limit or supersede notice requirements otherwise provide by Contractor for the filing of claims.
- (2) For claims of less than fifty thousand dollars (\$50,000), the District shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim any additional documentation supporting the claim or relating to defenses or claims the District may have against the Contractor.

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

The District's written response to the claim, as further documented, shall be submitted to the Contractor within 15 days after receipt of further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

- (3) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the District shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim' or relating to defenses or claims the District may have against the Contractor.

If additional information is therefore required, it shall be requested and provided pursuant to this subsection, upon mutual agreement of the District and the Contractor.

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

- (4) If the Contractor disputes the District's written response, or the District fails to respond within the time prescribed, the Contractor may notify the District, in writing, either within 15 days of receipt of the District response or within 15 days of the District's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute.
- (5) If following the meet and confer conference, the claim or any portion remains in dispute, the Contractor may file a claim pursuant to Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. 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 Contractor submits its written claim pursuant to the subsection (A) until the time the claim is denied, including any period of time utilized by the meet and confer conference.

C. The following procedures are established for all civil actions filed to resolve claims subject to this article:

- (1) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be

concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court.

- (2) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subsection consistent with the rules pertaining to judicial arbitration.

In addition to Chapter 2.5 (commencing with section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure (A) arbitrators shall, when possible, be experienced in construction law, and (B) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that Chapter, also pay the attorneys' fees on appeal of the other party.

- D. The District shall not fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in this Contract.
- E. In any suit filed under section 20104.4 of the California Public Contract Code the District shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

8. **Retention Proceeds: Withholding; Disbursement**

In accordance with section 7107 of the Public Contracts Code, the following shall apply to this Contract:

- A. The retention proceeds withheld from any payment by the District from the original Contractor or by the original Contractor from any subcontractor shall be subject to this subsection.
- B. Within 60 days after the date of completion of the Work, the retention withheld by the District shall be released. In the event of a dispute between the District and the original Contractor, the District may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. For the purposes of this paragraph, "completion" means any of the following:
 - (1) The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup or commissioning, by the District, accompanied by cessation of labor on the work of improvement.
 - (2) The acceptance by the District of the work of improvement.
 - (3) After the commencement of a work of improvement, a cessation of labor on the

work of improvement for a continuous period of 100 days or more, due to factors beyond the control of the Contractor.

- (4) After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 days or more, if the District files for record of notice of cessation or a notice of completion.
- C. Subject to subparagraph B(4), within 10 days from the time that all or any portion of the retention proceeds are received by the original Contractor, the original Contractor shall pay each of its subcontractors from whom retention has been withheld, each Subcontractor's share of the retention received. However, if a retention payment received by the original Contractor is specifically designated for a particular subcontract, payment of the retention shall be made to the designated Subcontractor, if the payment is consistent with the terms of the subcontract.
- D. The original Contractor may withhold from a Subcontractor its portion of the retention proceeds if a bonafide dispute exists between the Subcontractor and the original Contractor. The amount withheld from the retention payment shall not exceed 150 percent of the estimated value of the disputed amount.
- E. In the event that retention payments are not made within the time periods required by this section, the District or original Contractor shall be subject to a charge of two percent per month on the improperly withheld amount, in lieu of any interest otherwise due. Additionally, in any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to attorneys' fees and costs.
- F. Any attempted waiver of the provisions of this section shall be void as against the public policy of this state.

9. **Timely Progress Payments. Interest: Payment Requests**

- A. In accordance with the provisions of the Public Contract Code section 20104.50, if the District fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from the Contractor, the District shall pay interest to the Contractor equivalent to the legal rate set forth in subsection (a) of section 685.010 of the Code of Civil Procedure.
- B. Upon receipt of a payment request, the District shall act in accordance with both of the following:
 - (1) Each payment request shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.
 - (2) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the

payment request is not proper.

- C. The number of days available to the District to make a payment without incurring interest pursuant to this paragraph shall be reduced by the number of days by which the District exceeds the seven day requirement set forth above.
- D. For purposes of this paragraph:
 - (1) A “progress payment” includes all payments due the Contractor, except that portion of the final payment designated by the Contract as retention earnings.
 - (2) A payment request shall be considered properly executed if funds are available for payment of the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the District.

10. **Public Works Contracts; Assignment to Awarding Body**

In accordance with section 7103.5 of the California Public Contract Code, the Contractor and Subcontractors shall conform to the following requirements. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the District tenders final payment to the Contractor, without further acknowledgment by the parties.

- B. Prior to commencement of the work, if requested by the Engineer, the Contractor shall submit a detailed price breakdown of any or all of his bid items for this work. Such price breakdown shall include quantities, unit prices, and other information requested in sufficient detail to enable the Engineer to make accurate monthly progress estimates.
- C. The Contractor shall receive no additional compensation for overtime work even though such overtime work may be required under emergency conditions and may be ordered by the Engineer in writing. Extra payment for overtime work may be paid if it falls under the extra work section and is specifically called for as overtime work, and then payment shall be to the extent as overtime work of a similar nature in the same locality.
- D. At, or prior to the pre-construction meeting, the Contractor shall submit a progress schedule showing the order in which he proposes to carry on the work and the dates when the various parts are to be begun and completed. The progress schedules shall be subject to the approval of the Engineer.
- E. Final Acceptance and Payment.

When the Engineer is of the opinion that the Contractor has completely performed all work required under the Contract, he will submit to the Contractor a draft of the final estimate. The Contractor will be expected to submit his written approval of said final estimate within five calendar days, or in the event of a disagreement, he shall file a written statement for all claims which he intends to present, also within said period. Upon receipt of the Contractor's written approval of the final estimate, the Engineer will certify physical completion of the Contractor work to the District and will recommend acceptance of the work. After acceptance of the work by the District and 35 calendar days after filing Notice of Completion, the District will pay to the Contractor the amount remaining after all deductions are made.

As required by the California Code of Civil Procedure and within 10 calendar days after date of acceptance of the work by the District, the District will file, in the County Recorder's Office, a Notice of Completion of the work.

- F. Final Payment Terminates Liability of District. The acceptance by the Contractor of the final payment made under the terms of the Contract shall operate as, and shall be, a release to the District and its agents from all Claims of and/or liability to the Contractor for anything done or furnished for, or in relation to, the Work or for any act or neglect of the District or any person related to or affecting the Work, except for claims previously made in writing and identified as disputed by the Contractor at the time of the Contractor's request for final payment.

2. **Liquidated Damages**

- A. The Contractor acknowledges that District desires the project to be completed on or before the time specified. Contractor also acknowledges that if the work is not completed on or before said date that the District will incur substantial damages which cannot be ascertained at this time. Accordingly, Contractor shall pay to District any and all damages caused by Contractor's delay in completing the work as herein provided. If the work is not completed in accordance with the foregoing, it is mutually agreed, that the District will suffer damage, and it being mutually agreed, that it is impractical and infeasible to determine the amount of actual damage at this time, it is agreed the Contractor shall pay to District as fixed and liquidated damages and not as a penalty, the sum of one thousand dollars (\$1,000.00) each and every calendar day of delay, and the Contractor and his surety shall be liable for the amount thereof provided that the Contractor shall not be charged liquidated damages because of any delays in the completion of the work due to unforeseeable causes beyond Contractor's control. Including but not restricted to acts of God, or of public enemy, acts of the Government, acts of the District or acts of another Contractor in the performance of a Contract with the District, fires, floods, quarantine restrictions, strikes, freight embargoes, and unusually severe weather, or delays of subcontractors due to such causes. The Engineer may deduct the liquidated damages set forth herein from progress payments or from the final payment. In no event shall the payment of progress payments, before or after the scheduled completion date with or without the amount set for liquidated damages, constitute a waiver of liquidated damages.
- B. The Contractor shall within ten (10) calendar days from the beginning of any such delay (unless the District shall grant a further period of time to the date of final settlement of the Contract) notify the District in writing of the cause of delay, whereupon the District shall ascertain the facts and extent of the delay and extend the time for completing the work if in its judgment the findings of fact justify such an extension, and its findings of fact thereon shall be final and conclusive on the parties hereto.
- C. The District shall have the right to extend the time for completing the work if it determines such extension to be in the best interest of the District; however, if the District extends the time limit for the completion of the work, by way of a change order, at the request of the Contractor, for other than acts of God and situations beyond the control of both parties, it is understood and agreed that such time extension will increase the District financial obligations incurred for engineering, inspection, supervision, incidental and overhead expenses that are directly chargeable to the contract and that accrue during the period of extension. Therefore the Contractor does hereby acknowledge that reasonable charges for the herein above District expense shall be reimbursed to the District by the Contractor before the final payment of the 5 percent retention.

ATTACHMENT: Frontier, Communication Requirements for Commercial Service,
Developer/Owner Responsibilities

**COMMUNICATION REQUIREMENTS FOR COMMERCIAL SERVICE
DEVELOPER/OWNER RESPONSIBILITIES**

CONDUIT REQUIREMENTS

1. MINIMUM ONE 4 INCH CONDUIT (OR SPECIFIED SIZE) PVC SCHEDULE 40.
2. CONDUIT WILL BE PLACED FROM UTILITY BOX OR FROM UTILITY POLE. UTILITY POLE ATTACHMENT LOCATION TO BE MARKED BY A FRONTIER COMMUNICATIONS REPRESENTATIVE.
3. CONDUIT TO BE CONTINUOUS WITH NO MORE THAN TWO 90 DEGREE SWEEPS. WHERE THE RUN EXCEEDS 300 FEET, PULLBOXES SHALL BE INSTALLED. CONDUIT BENDS IN A TRENCH LINE NOT HAVE LESS THAN 12' 6" RADIUS (UNLESS OTHERWISE SPECIFIED). CONDUIT WHICH ENTERS A BUILDING WILL NOT HAVE A RADIUS OF LESS THAN 36".
4. CONDUIT TERMINATION AT POLE MUST HAVE 36 INCH SCHEDULE 40 RISER BEND ENDING 12 INCHES ABOVE FINISHED GRADE.
5. CONDUIT WILL BE BURIED A MINIMUM OF 30 INCHES MEASURED FROM FINAL GRADE. BEFORE DIGGING, PLEASE SCHEDULE FOR UTILITY LOCATES.
6. A MINIMUM OF 12 INCHES OF WELL PACKED EARTH OR THREE INCHES OF CONCRETE IS REQUIRED BETWEEN PRIMARY POWER CIRCUITS AND TELEPHONE CONDUIT.
7. ALL CONDUITS TO HAVE A MINIMUM 3/8 INCH NYLON PULL ROPE. ALL CONDUITS SHALL BE LEFT CLEAN, DRY AND FREE OF DEBRIS OR OTHER OBSTRUCTIONS. ALL VACANT OR STUBBED OUT DUCTS MUST BE SEALED WITH PLASTIC CAPS OR PLASTIC PLUGS.
8. WALL TO WALL MEASUREMENTS WILL BE FURNISHED TO FRONTIER COMMUNICATIONS PRIOR TO ORDERING CABLE.
9. CONDUIT TERMINATING IN A MANHOLE MUST BE ENCASED IN 2B CONCRETE FOR AT LEAST 15" OUTSIDE OF THE MANHOLE WALL TO MINIMIZE SHEARING ACTION FROM BACKFILL SETTLEMENT.

TELEPHONE SERVICE BOX REQUIREMENTS

1. PROVIDE A WEATHER RESISTANT FLUSH MOUNTED TELEPHONE SERVICE BOX WITH A HINGED DOOR AND 3/4 INCH PLYWOOD BACKBOARD (FOR OUTDOOR APPLICATIONS).
2. A MINIMUM 24" W X 36" L X 24" D PULL BOX IS REQUIRED FOR ALL CABLE PLACEMENT.
3. PULL BOXES MUST HAVE 5/8" X 8' DRIVEN GROUND ROD LOCATED IN 1 CORNER 3" ABOVE THE GRAVEL BASE.
4. BOX SHALL BE PLACED ON A 3" BASE OF GRAVEL FOR DRAINAGE PURPOSES.
5. THE DEVELOPER/OWNER WILL FURNISH AND INSTALL A 4' X 8' X 3/4" PLYWOOD BACKBOARD. THE BACKBOARD MUST BE CLEAR OF ALL OBSTRUCTIONS, WITH A CLEAR PATH TO THE TELEPHONE CONDUITS. ANY UTILITY ROOM/CLOSET MUST HAVE 24/7 ACCESS.
6. ALL INTERIOR WIRING WILL TERMINATE INSIDE THE TELEPHONE SERVICE BOX OR BACKBOARD.
7. INSTALLATION OF PROTECTION/NID SHALL BE NO CLOSER THAN 12" FROM ELECTRICAL EQUIPMENT.

GROUND REQUIREMENTS

#6 AWG SOLID COPPER GROUND WIRE. THE GROUND WIRE IS TO BE PLACED FROM A TELEPHONE SERVICE BOX TO THE ELECTRICAL GROUND SOURCE OR UFER GROUND, PROVIDING A COMMON BOND WITH A SEPARATE CLAMP. GROUND CONDUCTOR LENGTH NOT TO EXCEED 20' FROM AC POWER SVC.

CHARGES

1. ANY RELOCATION OF EXISTING TELEPHONE FACILITIES WITHIN A PROJECT WILL BE AT THE EXPENSE OF THE DEVELOPER.
2. SERVICE TO CONSTRUCTION TRAILERS OR MAKESHIFT OFFICES WILL BE CONSIDERED TEMPORARY ACCORDING TO CALIFORNIA PUC TARIFF RULE #34. ALL TEMPORARY SERVICES WILL BE PLACED AND REMOVED AT THE EXPENSE OF THE CUSTOMER.
3. WHERE MORE THAN ONE DEMARCATION POINT IS REQUESTED BY A CUSTOMER, SECONDARY MPOE CHARGES MAY APPLY.

**The Department of Homeland Security (DHS)
Notice of Funding Opportunity (NOFO)
Fiscal Year 2023 Emergency Operations Center
Grant Program**

All entities wishing to do business with the federal government must have a unique entity identifier (UEI). The UEI number is issued by the SAM system. Requesting a UEI using SAM.gov can be found at <https://sam.gov/content/entity-registration>.

Grants.gov registration information can be found at <https://www.grants.gov/web/grants/register.html>.

Planned UEI Updates in Grant Application Forms:

On April 4, 2022, the Data Universal Numbering System (DUNS) Number was replaced by a new, non-proprietary identifier requested in, and assigned by, the System for Award Management (SAM.gov). This new identifier is the Unique Entity Identifier (UEI).

Additional Information can be found on Grants.gov:

<https://www.grants.gov/web/grants/forms/planned-uei-updates.html>

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A. Program Description**1. Issued By**

U.S. Department of Homeland Security (DHS)/Federal Emergency Management Agency (FEMA)/Grant Programs Directorate

2. Assistance Listings Number

97.052

3. Assistance Listings Title

Emergency Operations Center (EOC) Grant Program

4. Funding Opportunity Title

Fiscal Year 2023 Emergency Operations Center (EOC) Grant Program

5. Funding Opportunity Number

FY 2023 EOC Grant Program	NOFO Number
Region 1	DHS-23-GPD-052-001-01
Region 2	DHS-23-GPD-052-002-01
Region 3	DHS-23-GPD-052-003-01
Region 4	DHS-23-GPD-052-004-01
Region 5	DHS-23-GPD-052-005-01
Region 6	DHS-23-GPD-052-006-01
Region 7	DHS-23-GPD-052-007-01
Region 8	DHS-23-GPD-052-008-01
Region 9	DHS-23-GPD-052-009-01
Region 10	DHS-23-GPD-052-010-01

6. Authorizing Authority for Program

Section 614 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5196c) as amended by section 202 of the Implementing Recommendations of the 9/11 Commission Act of 2007

7. Appropriation Authority for Program

Consolidated Appropriations Act, 2023 (Pub. L. No. 117-328)

8. Announcement Type

Initial

9. Program Category

Preparedness: Community Security

10. Program Overview, Objectives, and Priorities

a. *Overview*

The fiscal year (FY) 2023 Emergency Operations Center (EOC) Grant Program is intended to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located, and fully interoperable EOCs with a focus on addressing identified deficiencies and needs. Fully capable emergency operations facilities at the state and local levels are an essential element of a comprehensive national emergency management system and are necessary to ensure coordination and unity of effort among multiple emergency management organizations and across multiple jurisdictions during major disasters or emergencies caused by any hazard. Among the five basic homeland security missions noted in the [DHS Strategic Plan for Fiscal Years 2020-2024](#), the EOC Grant Program supports the goal to Strengthen National Preparedness and Resilience.

The [2022-2026 FEMA Strategic Plan](#) outlines three bold, ambitious goals in order to position FEMA to address the increasing range and complexity of disasters, support the diversity of communities we serve, and complement the nation's growing expectations of the emergency management community. The EOC Grant Program supports Goal 3: Promote and Sustain a Ready FEMA and a Prepared Nation.

The FY 2023 EOC Grant Program will provide \$89,140,285 for equipping, upgrading, or constructing the EOC projects included in Appendix A of this NOFO. Per the National Fire Protection Association, an EOC is defined as a “facility or capability from which direction and control is exercised in an emergency. This type of center or capability is designated to ensure that the capacity exists for leadership to direct and control operations from a centralized facility or capability in the event of an emergency.” “Construction,” as defined in this program, refers to building a new facility or any changes to the footprint of an existing facility, while “upgrading” refers only to internal improvements to an existing facility.

State Administrative Agencies (SAAs) are the only entities eligible to apply for FY 2023 EOC Grant Program funding. Such applications will be submitted on behalf of the state and local governments (subrecipients) identified to receive funding as outlined in Appendix A of this NOFO. See [Section C](#) of this notice for additional program eligibility information and [Section D](#) for detailed application instructions.

b. *Objectives*

The objective of the FY 2023 EOC Grant Program is to improve EOC operations through funding the EOC projects included in Appendix A of this NOFO. These projects fund equipping, upgrading, and/or construction of EOCs to provide fully capable facilities to support command, control, and coordination of multi-agency responses to major disasters or emergencies.

c. *Priorities*

The priorities of the FY 2023 EOC Grant Program are to fund equipping, upgrading, and/or construction of the emergency operations center projects identified in **Appendix A** of this NOFO.

11. Performance Measures

Performance metrics for this program are as follows:

- Percentage of funded projects that result in fully operational emergency operations centers
- Percentage of funded projects that provide an enhanced level of EOC services and capabilities

FEMA will calculate and analyze the above metrics through a review of recipient Performance Progress Reports and award monitoring to ensure that the funds are expended for their intended purpose and achieve the stated outcomes in the grant application.

B. Federal Award Information

1. Available Funding for the NOFO: **\$89,140,285**
2. Period of Performance: **36 Months**

Extensions to the period of performance are allowed. Additional information on period of performance extensions, please refer to Section H of this NOFO.

FEMA awards under most programs, including this program, only include one budget period, so it will be same as the period of performance. *See* 2 C.F.R. § 200.1 for definitions of “budget period” and “period of performance.”

3. Projected Period of Performance Start Date(s): **No later than 06/01/2023**
4. Projected Period of Performance End Date(s): **No later than 05/31/2026**
5. Funding Instrument Type: **Grant**

C. Eligibility Information

1. **Eligible Applicants**

Only State Administrative Agencies (SAAs) (on behalf of state and local units of government) with identified projects in **Appendix A** of this NOFO are eligible to apply.

2. **Applicant Eligibility Criteria**

Eligible EOC projects were identified in the Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2023. Those EOC projects are identified in **Appendix A** of this NOFO.

3. **Other Eligibility Criteria/Restrictions**

a. ***National Incident Management System (NIMS) Implementation***

Prior to allocation of any federal preparedness awards, recipients must ensure and maintain adoption and implementation of NIMS. The list of objectives used for progress and achievement reporting is on FEMA’s website at [NIMS Implementation and Training | FEMA.gov](https://www.fema.gov/nims-implementation-and-training).

Emergency management and incident response activities require carefully managed resources (personnel, teams, facilities, equipment, and/or supplies) to meet incident needs. Utilization of the standardized resource management concepts such as typing, credentialing, and inventorying, promote a strong national mutual aid capability needed to support delivery of core capabilities. Additional information on resource management, NIMS resource typing definitions, job titles, and position qualifications is on FEMA’s website at [NIMS Components - Guidance and Tools | FEMA.gov](#).

FEMA developed the [National Incident Management System Guideline for the National Qualification System](#) to describe national credentialing standards and to provide written guidance regarding the use of those standards. This guideline describes credentialing and typing processes and identifies tools that Federal Emergency Response Officials and emergency managers at all levels of government may use both routinely and to facilitate multijurisdictional coordinated responses.

Although state (including territorial), local, tribal, and private sector partners (including nongovernmental organizations) are not required to credential their personnel in accordance with these guidelines, FEMA strongly encourages them to do so to leverage the federal investment in the Federal Information Processing Standards 201 infrastructure and to facilitate interoperability for personnel deployed outside their home jurisdiction.

Additional information about NIMS in general is available on FEMA’s website at [National Incident Management System | FEMA.gov](#).

4. **Cost Share or Match**

The FY 2023 EOC Grant Program has a cost share requirement. All award recipients must provide a non-federal entity contribution supporting 25% of the total project costs (federal amount plus cost share amount). The non-federal entity contribution can be cash (hard match) or third-party in-kind (soft match), with the exception of construction activities, which must be a cash (hard) match. In-kind contributions are defined as third-party contributions per 2 C.F.R. § 200.306. The required cost share amount, by project, is included in the project funding table in Appendix A.

All applicants are required to commit to the cost share requirement **for each activity under each project** at the time of application. The non-federal contribution should be specifically identified for each proposed activity. The non-federal contribution, whether cash or third-party in-kind match, must consist of eligible costs (i.e., same allowability as the federal share).

D. Application and Submission Information

1. Key Dates and Times

- | | |
|--|---------------------------------|
| a. <i>Application Start Date:</i> | 03/01/2023 |
| b. <i>Application Submission Deadline:</i> | 04/14/2023 at 5:00 PM ET |

All applications **must** be received by the established deadline. **Prior to application submission, SAAs must coordinate with applicable subrecipients identified in Appendix A to collect the information required for completion of the State’s application and may impose separate deadlines to ensure timely application submission.**

The Non-Disaster (ND) Grants System has a date stamp that indicates when an application is submitted. Applicants will receive an electronic message confirming receipt of their submission. For additional information on how an applicant will be notified of application receipt, see the subsection titled “Timely Receipt Requirements and Proof of Timely Submission” in Section D of this NOFO.

FEMA will not review applications that are received after the deadline or consider these late applications for funding. FEMA may, however, extend the application deadline on request for any applicant who can demonstrate that good cause exists to justify extending the deadline. Good cause for an extension may include technical problems outside of the applicant’s control that prevent submission of the application by the deadline, other exigent or emergency circumstances, or statutory requirements for FEMA to make an award.

Applicants experiencing technical problems outside of their control must notify FEMA as soon as possible and before the application deadline. Failure to timely notify FEMA of the issue that prevented the timely filing of the application may preclude consideration of the award. “Timely notification” of FEMA means: prior to the application deadline and within 48 hours after the applicant became aware of the issue.

A list of FEMA contacts can be found in Section G of this NOFO, “DHS Awarding Agency Contact Information.” For additional assistance using the ND Grants System, please contact the ND Grants Service Desk at (800) 865-4076 or NDGrants@fema.dhs.gov. The ND Grants Service Desk is available Monday through Friday, 9:00 AM – 6:00 PM Eastern Time (ET). For programmatic or grants management questions, please contact your FEMA Regional EOC Grant Program Manager. If applicants do not know who to contact or if there are programmatic questions or concerns, please contact the Centralized Scheduling and Information Desk (CSID) by phone at (800) 368-6498 or by e-mail at askcsid@fema.dhs.gov, Monday through Friday, 9:00 AM – 5:00 PM ET.

- c. *Anticipated Award Date:* **06/30/2023**
- d. *Other Key Dates*

The suggested deadlines outlined in the table below apply only to the SAA as the eligible applicant. As noted in Section D.1.b. above, SAAs may impose separate deadlines on the subrecipients identified in Appendix A to ensure timely collection of the information required for application submission.

Event	Suggested Deadline for Completion
Initial registration in SAM.gov includes UEI issuance	Four weeks before actual submission deadline
Obtaining a valid Employer Identification Number (EIN)	Four weeks before actual submission deadline
Creating an account with login.gov	Four weeks before actual submission deadline
Registering in SAM or updating SAM registration	Four weeks before actual submission deadline
Registering in Grants.gov	Four weeks before actual submission deadline
Registering in ND Grants	Four weeks before actual submission deadline
Starting application in Grants.gov	One week before actual submission deadline
Submitting application in Grants.gov	Three days before actual submission deadline
Submitting the final application in ND Grants	By the submission deadline

2. Agreeing to Terms and Conditions of the Award

By submitting an application, applicants agree to comply with the requirements of this NOFO and the terms and conditions of the award, should they receive an award.

3. Address to Request Application Package

Initial applications are processed through the [Grants.gov](https://www.grants.gov) portal. Final applications are completed and submitted through FEMA's Non-Disaster Grants (ND Grants) System. Application forms and instructions are available at Grants.gov. To access these materials, go to [Home | Grants.gov](#).

Hard copies of the NOFO can be downloaded at [Grants.gov](https://www.grants.gov) or obtained via email from the Awarding Office points of contact listed in Section G of this NOFO, "DHS Awarding Agency Contact Information" or by TTY (800) 462-7585.

4. Requirements: Obtain a Unique Entity Identifier (UEI) and Register in the System for Award Management (SAM)

Each applicant, unless they have a valid exception under 2 CFR 25.110, must:

- 1) Be registered in Sam.Gov before application submission;
- 2) Provide a valid Unique Entity Identifier (UEI) in its application; and
- 3) Continue to always maintain an active System for Award Management (SAM) registration with current information during the Federal Award process.

5. Steps Required to Obtain a Unique Entity Identifier, Register in the System for Award Management (SAM), and Submit an Application

Applying for an award under this program is a multi-step process and can take four weeks or more to complete. Applicants are encouraged to register early to ensure they meet the required submission deadlines.

Please review the table above for estimated deadlines to complete each of the steps listed. Failure of an applicant to comply with any of the required steps before the deadline for submitting an application may disqualify that application from funding.

To apply for an award under this program, all applicants must:

- a. Apply for, update, or verify their Unique Entity Identifier (UEI) number from SAM.gov and Employer Identification Number (EIN) from the Internal Revenue Service;
- b. In the application, provide an UEI number;
- c. Have an account with login.gov;
- d. Register for, update, or verify their SAM account and ensure the account is active before submitting the application;
- e. Create a Grants.gov account;
- f. Add a profile to a Grants.gov account;
- g. Establish an Authorized Organizational Representative (AOR) in Grants.gov;
- h. Register in ND Grants
- i. Submit an initial application in Grants.gov;
- j. Submit the final application in ND Grants, including electronically signing applicable forms; and**
- k. Continue to maintain an active SAM registration with current information at all times during which it has an active federal award or an application or plan under consideration by a federal awarding agency. As part of this, applicants must also provide information on an applicant's immediate and highest-level owner and subsidiaries, as well as on all predecessors that have been awarded federal contracts or federal financial assistance within the last three years, if applicable.

Specific instructions on how to apply for, update, or verify an UEI number or SAM registration or establish an AOR are included below in the steps for applying through Grants.gov.

Applicants are advised that FEMA may not make a federal award until the applicant has complied with all applicable SAM requirements. Therefore, an applicant's SAM registration must be active not only at the time of application, but also during the application review period and when FEMA is ready to make a federal award. Further, as noted above, an applicant's or recipient's SAM registration must remain active for the duration of an active federal award. If an applicant's SAM registration is expired at the time of application, expires during application review, or expires any other time before award, FEMA may determine that the applicant is not qualified to receive a federal award and use that determination as a basis for making a federal award to another applicant.

Per 2 C.F.R. § 25.110(c)(2)(iii), if an applicant is experiencing exigent circumstances that prevents it from obtaining an UEI number and completing SAM registration prior to receiving a federal award, the applicant must notify FEMA as soon as possible by contacting askcsid@fema.dhs.gov and providing the details of the circumstances that prevent completion of these requirements. If FEMA determines that there are exigent circumstances and FEMA has decided to make an award, the applicant will be required to obtain an UEI number, if applicable, and complete SAM registration within 30 days of the federal award date.

6. Electronic Delivery

DHS is participating in the Grants.gov initiative to provide the grant community with a single site to find and apply for grant funding opportunities. DHS encourages or requires applicants to submit their applications online through Grants.gov, depending on the funding opportunity.

For this funding opportunity, FEMA requires applicants to submit initial applications through Grants.gov and a final application through ND Grants.

7. How to Register to Apply through Grants.gov

a. *General Instructions:*

Registering and applying for an award under this program is a multi-step process and requires time to complete. Read the instructions below about registering to apply for FEMA funds. Applicants should read the registration instructions carefully and prepare the information requested before beginning the registration process. Reviewing and assembling the required information before beginning the registration process will alleviate last-minute searches for required information.

The registration process can take up to four weeks to complete. To ensure an application meets the deadline, applicants are advised to start the required steps well in advance of their submission.

Organizations must have an UEI number, an EIN, an active System for Award Management (SAM) registration and Grants.gov account to apply for grants.

Organizations must also have a Grants.gov account to apply for an award under this program. Creating a Grants.gov account can be completed online in minutes, but UEI and SAM registrations may take several weeks. Therefore, an organization's registration should be done in sufficient time to ensure it does not impact the entity's ability to meet required application submission deadlines. Complete organization instructions can be found on Grants.gov here: [Organization Registration | Grants.gov](#).

If individual applicants are eligible to apply for this grant funding opportunity, refer to [Applicant Registration | Grants.gov](#).

b. *Obtain an UEI Number:*

All entities applying for funding, including renewal funding, must have a UEI number. Applicants must enter the UEI number in the applicable data entry field on the SF-424 form.

For more detailed instructions for obtaining a UEI number, refer to [SAM.gov](#).

c. *Obtain Employer Identification Number*

All entities applying for funding must provide an Employer Identification Number (EIN). The EIN can be obtained from the IRS by visiting: [Apply for an Employer Identification Number \(EIN\) Online | Internal Revenue Service \(irs.gov\)](#).

d. *Create a login.gov account:*

Applicants must have a login.gov account in order to register with SAM or update their SAM registration. Applicants can create a login.gov account here: [Create your account - Login.gov](#).

Applicants only have to create a login.gov account once. For applicants that are existing SAM users, use the same email address for the login.gov account as with SAM.gov so that the two accounts can be linked.

For more information on the login.gov requirements for SAM registration, refer to [SAM.gov | Home](#).

e. *Register with SAM:*

All organizations applying online through Grants.gov must register with SAM. Failure to register with SAM will prevent your organization from applying through Grants.gov. SAM registration must be renewed annually. Organizations will be issued a UEI number with the completed SAM registration.

For more detailed instructions for registering with SAM, refer to [Step 2: Register with SAM | Grants.gov](#).

Note: As a new requirement per 2 C.F.R. § 25.200, applicants must also provide the applicant's immediate and highest-level owner, subsidiaries, and predecessors that have been awarded federal contracts or federal financial assistance within the last three years, if applicable.

I. ADDITIONAL SAM REMINDERS

Existing SAM.gov account holders should check their account to make sure it is "ACTIVE." SAM registration should be completed at the very beginning of the application period and should be renewed annually to avoid being "INACTIVE." **Please allow plenty of time before the grant application submission deadline to obtain an UEI number and then to register in SAM. It may be four weeks or more after an applicant submits the SAM registration before the registration is active in SAM, and then it may be an additional 24 hours before FEMA's system recognizes the information.**

It is imperative that the information applicants provide is correct and current. Please ensure that your organization's name, address, and EIN are up to date in SAM and that the UEI number used in SAM is the same one used to apply for all other FEMA awards. Payment under any FEMA award is contingent on the recipient's having a current SAM registration.

II. HELP WITH SAM

The SAM quick start guide for new recipient registration and SAM video tutorial for new applicants are tools created by the General Services Administration (GSA) to assist those registering with SAM. If applicants have questions or concerns about a SAM registration, please contact the Federal Support Desk at [GDIT TSS Service Portal - GDIT Technology Shared Services Portal \(fsd.gov\)](#) or call toll free (866) 606-8220.

f. *Create a Grants.gov Account:*

The next step in the registration process is to create an account with Grants.gov. If applicable, applicants must know their organization's UEI number to complete this process.

For more information, follow the on-screen instructions or refer to: [Applicant Registration | Grants.gov](#).

See also Section D.9 in this NOFO, "Submitting the Final Application in ND Grants," for instructions on how to register early in ND Grants.

g. *Add a Profile to a Grants.gov Account:*

A profile in Grants.gov corresponds to a single applicant organization the user represents (i.e., an applicant) or an individual applicant. If you work for or consult with multiple organizations and have a profile for each, you may log in to one Grants.gov account to access all of your grant applications. To add an organizational profile to your Grants.gov account, if applicable, enter the UEI number for the organization in the UEI field while adding a profile.

For more detailed instructions about creating a profile on Grants.gov, refer to: [Add Profile | Grants.gov](#).

h. *EBiz POC Authorized Profile Roles:*

After you register with Grants.gov and create an Organization Applicant Profile, the organization applicant's request for Grants.gov roles and access is sent to the EBiz POC. The EBiz POC will then log in to Grants.gov and authorize the appropriate roles, which may include the Authorized Organization Representative (AOR) role, thereby giving you permission to complete and submit applications on behalf of the organization. You will be able to submit your application online any time after you have been assigned the AOR role.

For more detailed instructions about creating a profile on Grants.gov, refer to [EBiz POC Authorizes Profile Roles | Grants.gov](#).

i. *Track Role Status:*

To track your role request, refer to [Track Profile Role Status | Grants.gov](#).

j. *Electronic Signature:*

When applications are submitted through Grants.gov, the name of the organization applicant with the AOR role that submitted the application is inserted into the signature line of the application, serving as the electronic signature. The EBiz POC **must** authorize individuals who are able to make legally binding commitments on behalf of the organization as an AOR; **this step is often missed, and it is crucial for valid and timely submissions.**

8. *How to Submit an Initial Application to FEMA via Grants.gov*

Standard Form 424 (SF-424) is the initial application for this NOFO.

Grants.gov applicants can apply online using a workspace. A workspace is a shared, online environment where members of a grant team may simultaneously access and edit different

web forms within an application. For each Notice of Funding Opportunity, you can create individual instances of a workspace. Applicants are encouraged to submit their initial applications in Grants.gov at least seven days before the application deadline.

In Grants.gov, applicants need to submit the following forms:

- SF-424, Application for Federal Assistance; and
- Grants.gov Lobbying Form, Certification Regarding Lobbying.

Below is an overview of applying on Grants.gov. For access to complete instructions on how to apply for opportunities using Workspace, refer to [Workspace Overview | Grants.gov](#).

a. *Create a Workspace:*

Creating a workspace allows you to complete it online and route it through your organization for review before submitting.

b. *Complete a Workspace:*

Add participants to the workspace to work on the application together, complete all the required forms online or by downloading PDF versions, and check for errors before submission.

c. *Adobe Reader:*

If you decide not to apply by filling out webforms you can download individual PDF forms in Workspace so that they will appear similar to other Standard or DHS forms. The individual PDF forms can be downloaded and saved to your local device storage, network drive(s), or external drives, then accessed through Adobe Reader.

NOTE: Visit the Adobe Software Compatibility page on Grants.gov to download the appropriate version of the software at [Adobe Software Compatibility | Grants.gov](#).

d. *Mandatory Fields in Forms:*

In the forms, you will note fields marked with an asterisk and a different background color. These fields are mandatory fields that must be completed to successfully submit your application.

e. *Complete SF-424 Fields First:*

The forms are designed to fill in common required fields across other forms, such as the applicant name, address, and UEI number. To trigger this feature, an applicant must complete the SF-424 information first. Once it is completed, the information will transfer to the other forms.

f. *Submit a Workspace:*

An application may be submitted through workspace by clicking the “Sign and Submit” button on the Manage Workspace page, under the Forms tab. Grants.gov recommends submitting your application package at least 24-48 hours prior to the close date to provide you with time to correct any potential technical issues that may disrupt the application submission.

g. *Track a Workspace:*

After successfully submitting a workspace package, a Grants.gov Tracking Number (GRANTXXXXXXXX) is automatically assigned to the application. The number will be listed on the confirmation page that is generated after submission. Using the tracking number, access the Track My Application page under the Applicants tab or the Details tab in the submitted workspace.

h. *Additional Training and Applicant Support:*

For additional training resources, including video tutorials, refer to: [Applicant Training | Grants.gov](#).

Grants.gov provides applicants 24/7 (except federal holidays) support via the toll-free number (800) 518-4726, email at support@grants.gov and the website at [Support | Grants.gov](#). For questions related to the specific grant opportunity, contact the number listed in the application package of the grant you are applying for.

If you are experiencing difficulties with your submission, it is best to call the Grants.gov Support Center and get a ticket number. The Support Center ticket number will assist FEMA with tracking your issue and understanding background information on the issue.

9. Submitting the Final Application in ND Grants

After submitting the initial application in Grants.gov, eligible applicants will be notified by FEMA and asked to proceed with submitting their complete application package in ND Grants. Applicants can register early with ND Grants and are encouraged to begin their ND Grants registration at the time of this announcement or, at the latest, seven days before the application deadline. Early registration will allow applicants to have adequate time to start and complete their applications.

Applicants needing assistance registering for the ND Grants system should contact ndgrants@fema.dhs.gov or (800) 865-4076, Monday through Friday, 9:00 AM – 6:00 PM ET. For step-by-step directions on using the ND Grants system and other guides, please see [Non-Disaster Grants Management System | FEMA.gov](#).

In ND Grants, applicants will be prompted to submit the standard application information and any program-specific information required as described in Section D.10 of this NOFO, “Content and Form of Application Submission.” The Standard Forms (SF) are auto generated in ND Grants, but applicants may access these forms in advance through the Forms tab under the [SF-424 family on Grants.gov](#). Applicants should review these forms before applying to ensure they have all the information required.

For additional application submission requirements, including program-specific requirements, please refer to the subsection titled “Content and Form of Application Submission” under Section D of this NOFO.

10. Timely Receipt Requirements and Proof of Timely Submission

As application submission is a two-step process, the applicant with the AOR role who submitted the application in Grants.gov will receive an acknowledgement of receipt and a tracking number (GRANTXXXXXXXX) from Grants.gov with the successful transmission of its initial application. **This notification does not serve as proof of timely submission, as the application is not complete until it is submitted in ND Grants.** Applicants can also view the ND Grants Agency Tracking Number by accessing the Details tab in the submitted workspace section in Grants.gov, under the Agency Tracking Number column. Should the Agency Tracking Number not appear, the application has not yet migrated from Grants.gov into the ND Grants System. Please allow 24 hours for your ND Grants application tracking number to migrate.

All applications must be received in ND Grants by **5:00 PM ET** on the application deadline. Proof of timely submission is automatically recorded by ND Grants. An electronic date/time stamp is generated within the system when the application is successfully received by ND Grants. Additionally, the applicant(s) listed as contacts on the application will receive a system-generated email to confirm receipt.

11. Content and Form of Application Submission

a. *Standard Required Application Forms and Information*

The following forms or information are required to be submitted in either Grants.gov or ND Grants. The Standard Forms (SF) are submitted either through Grants.gov, through forms generated in ND Grants, or as an attachment in ND Grants. Applicants may also access the SFs at [SF-424 Family | Grants.gov](#).

I. GRANTS.GOV

- **SF-424, Application for Federal Assistance**, initial application submitted through Grants.gov
- **Grants.gov Lobbying Form, Certification Regarding Lobbying**, submitted through Grants.gov

II. ND GRANTS

- **SF-424A, Budget Information (Non-Construction)**, submitted via the forms generated by ND Grants
 - **For construction under an award, submit SF-424C, Budget Information (Construction)**, submitted via the forms generated by ND Grants, in addition to or instead of SF-424A
- **SF-424B, Standard Assurances (Non-Construction)**, submitted via the forms generated by ND Grants
 - **For construction under an award, submit SF-424D, Standard Assurances (Construction)**, submitted via the forms generated by ND Grants, in addition to or instead of SF-424B
- **SF-LLL, Disclosure of Lobbying Activities**, submitted via the forms generated by ND Grants
- **Indirect Cost Agreement or Proposal**, submitted as an attachment in ND Grants if the budget includes indirect costs and the applicant is required to have an indirect cost rate agreement or proposal. If the applicant does not have or is not required to have an

indirect cost rate agreement or proposal, please see Section D.13 of this NOFO, “Funding Restrictions and Allowable Costs,” for further information regarding allowability of indirect costs and whether alternatives to an indirect cost rate agreement or proposal might be available or contact the relevant FEMA staff identified in Section G of this NOFO, “DHS Awarding Agency Contact Information” for further instructions.

Generally, applicants have to submit either the non-construction forms (i.e., SF-424A and SF-424B) or construction forms (i.e., SF-424C and SF-424D), meaning that applicants that only have construction work and do not have any non-construction work need only submit the construction forms (i.e., SF-424C and SF-424D) and not the non-construction forms (i.e., SF-424A and SF-424B), and vice versa. However, applicants who have both construction and non-construction work under this program need to submit both the construction and non-construction forms.

b. *Program-Specific Required Forms and Information*

The following program-specific forms or information are required to be submitted in ND Grants:

- As part of the FY 2023 EOC Grant Program application process, applicants must develop a formal Investment Justification (IJ) that addresses the construction, upgrading, or equipping activities and costs. FEMA has developed an Excel-based template that establishes the required IJ content and helps ensure that submissions are organized in a consistent manner while addressing key data requirements. Use of the template is not mandatory but recommended to ensure all appropriate information is submitted. If applicants choose to not use the template, they must ensure their application submission includes all fields and data elements that are included in the template. All applications must use the following file naming convention when submitting required documents as part of the FY 2023 EOC Grant Program: “FY 2023 EOC <State Abbreviation> - <EOC Name>.”

12. Intergovernmental Review

An intergovernmental review may be required. Applicants must contact their state’s Single Point of Contact (SPOC) to comply with the state’s process under Executive Order 12372 (See [Executive Orders | National Archives; Intergovernmental Review \(SPOC List\)](#) (whitehouse.gov))

13. Funding Restrictions and Allowable Costs

All costs charged to awards covered by this NOFO must comply with the Uniform Administrative Requirements, Cost Principles, and Audit Requirements at 2 C.F.R. Part 200, unless otherwise indicated in this NOFO, or the terms and conditions of the award. This includes, among other requirements, that costs must be incurred, and products and services must be delivered, within the period of performance of the award, with the exception of approved pre-award costs (see Section 13.b [Pre-award Costs](#)). Also see 2 C.F.R. § 200.403(h) (referring to budget periods, which for FEMA awards is the same as the period of performance). For the EOC Grant Program, the budget period is the same as the period of performance.

In general, the Cost Principles establish standards for the allowability of costs, provide detailed guidance on the cost accounting treatment of costs as direct or administrative costs, and set forth allowability principles for selected items of cost. More specifically, except as otherwise stated in this NOFO, the terms and condition of an award, or other program materials, costs charged to awards covered by this NOFO must be consistent with the Cost Principles for Federal Awards located at 2 C.F.R. Part 200, Subpart E. In order to be allowable, all costs charged to a FEMA award or applied to the cost share must be reasonable in nature and amount and allocable to the particular FEMA award.

Additionally, all costs charged to awards must comply with the grant program's applicable statutes, policies, requirements in this NOFO as well as with the terms and conditions of the award. If FEMA staff identify costs that are inconsistent with any of these requirements, these costs may be disallowed, and FEMA may recover funds as appropriate, consistent with applicable laws, regulations, and policies.

As part of those requirements, grant recipients and subrecipients may only use federal funds or funds applied to a cost share for the purposes set forth in this NOFO and the terms and conditions of the award, and those costs must be consistent with the statutory authority for the award.

Grant funds may not be used for matching funds for other federal grants/cooperative agreements, lobbying, or intervention in federal regulatory or adjudicatory proceedings. In addition, federal funds may not be used to sue the federal government or any other government entity.

a. *Prohibitions on Expending FEMA Award Funds for Covered Telecommunications Equipment or Services*

Recipients and subrecipients of FEMA federal financial assistance are subject to the prohibitions described in section 889 of the [John S. McCain National Defense Authorization Act for Fiscal Year 2019 \(FY 2019 NDAA\)](#), Pub. L. No. 115-232 (2018) and 2 C.F.R. §§ 200.216, 200.327, 200.471, and Appendix II to 2 C.F.R. Part 200. Beginning August 13, 2020, the statute – as it applies to FEMA recipients, subrecipients, and their contractors and subcontractors – prohibits obligating or expending federal award funds on certain telecommunications and video surveillance products and contracting with certain entities for national security reasons.

Guidance is available at [Prohibitions on Expending FEMA Award Funds for Covered Telecommunications Equipment or Services, FEMA Policy #405-143-1](#), or superseding document.

Additional guidance is available at [Contract Provisions Guide: Navigating Appendix II to Part 200 - Contract Provisions for Non-Federal Entity Contracts Under Federal Awards \(fema.gov\)](#).

Effective August 13, 2020, FEMA recipients and subrecipients **may not** use any FEMA funds under open or new awards to:

1. Procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
2. Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system; or
3. Enter into, extend, or renew contracts with entities that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

I. REPLACEMENT EQUIPMENT AND SERVICES

FEMA grant funding may be permitted to procure replacement equipment and services impacted by this prohibition, provided the costs are otherwise consistent with the requirements of the NOFO.

II. DEFINITIONS

Per section 889(f)(2)-(3) of the FY 2019 NDAA and 2 C.F.R. § 200.216, covered telecommunications equipment or services means:

- i. Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation, (or any subsidiary or affiliate of such entities);
- ii. For the purpose of public safety, security of Government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);
- iii. Telecommunications or video surveillance services provided by such entities or using such equipment; or
- iv. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the People's Republic of China.

Examples of the types of products covered by this prohibition include phones, internet, video surveillance, and cloud servers when produced, provided, or used by the entities listed in the definition of “covered telecommunications equipment or services.” *See* 2 C.F.R. § 200.471.

b. Pre-award Costs

Pre-award costs are allowable only with the prior written approval of DHS/FEMA and if they are included in the award agreement. To request pre-award costs, a written request must be included with the application and be signed by the AOR. The request letter must include:

- an explanation of the pre-award costs incurred, including a justification for why the costs should be deemed allowable; and

- an itemized budget break-out that details all claimed pre-award costs, including dates incurred, to clearly distinguish them from post-award costs.

Recipients and subrecipients are cautioned that an Environmental Planning and Historic Preservation (EHP) review is required for all federally funded projects. Most EOCGP-funded projects that involve construction activities (including site prep and any ground disturbance activities) or modifications to existing buildings will require a full EHP review. Furthermore, the EHP review process usually must be completed before the project may begin. In some limited circumstances FEMA can conduct an after-the-fact (ATF) EHP review, which would retroactively provide approval for EHP-related activities and would allow grant funds to pay for pre-award costs for these activities. However, an ATF review may find EHP compliance issues that cannot be remedied because construction or installation had already begun. Such situations may compel FEMA to decline to provide pre-award costs, and even revoke federal funding for those portions of the project that fail to meet the EHP compliance requirements. See Section F.3.c of this NOFO for additional EHP guidance.

c. *Management and Administration (M&A) Costs*

M&A costs are allowed for activities directly related to the management and administration of the award, such as financial management, reporting, and program and financial monitoring. Some examples of M&A costs include grants management training for M&A staff, equipment and supplies for M&A staff to administer the grant award, travel costs for M&A staff to attend conferences or training related to the grant program, travel costs for the M&A staff to conduct subrecipient monitoring, contractual services to support the M&A staff with M&A activities, and auditing costs related to the grant award to the extent required or permitted by statute or 2 C.F.R. Part 200. Characteristics of M&A expenses can include the following: 1) direct costs that are incurred to administer a particular Federal award; 2) identifiable and unique to each Federal award; 3) charged based on the activity performed for that particular Federal award; and 4) not duplicative of the same costs that are included in the approved Indirect Cost Rate Agreement, if applicable.

State recipients may be reimbursed *up to* 4.8336663% of the total award amount (the federal share) of each subaward project for their M&A. This figure is based on the total dollar amount (\$15,960,933) appropriated by Congress to support M&A costs for state recipients under both the FY 2023 EOC and Pre-Disaster Mitigation Grant Programs. This 4.8336663% figure **excludes** the amount of any required non-federal match, which for EOCGP is 25%. Any funds retained must be used solely for M&A purposes associated with the EOCGP award. The Joint Explanatory Statement also notes that State recipients may use other eligible funds for M&A.

Subrecipients may use *up to* 5% of the funding passed through by the state solely for M&A purposes associated with the EOCGP award.

d. *Indirect Facilities & Administrative (F&A) Costs*

Indirect costs are allowable under this program as described in 2 C.F.R. Part 200, including 2 C.F.R. § 200.414. Applicants with a current negotiated indirect cost rate agreement that desire to charge indirect costs to an award must provide a copy of their negotiated indirect

cost rate agreement at the time of application. Not all applicants are required to have a current negotiated indirect cost rate agreement. Applicants that are not required by 2 C.F.R. Part 200 to have a negotiated indirect cost rate agreement but are required by 2 C.F.R. Part 200 to develop an indirect cost rate proposal must provide a copy of their proposal at the time of application. Applicants who do not have a current negotiated indirect cost rate agreement (including a provisional rate) and wish to charge the de minimis rate must reach out to the FEMA Regional Grants Management Specialist for further instructions. Applicants who wish to use a cost allocation plan in lieu of an indirect cost rate must also reach out to the FEMA Regional Grants Management Specialist for further instructions. Post-award requests to charge indirect costs will be considered on a case-by-case basis and based upon the submission of an agreement or proposal as discussed above or based upon on the de minimis rate or cost allocation plan, as applicable. See [Section H.12](#) of this NOFO for additional information on the procedures for establishing an indirect cost rate.

f. *Other Direct Costs*

i. *Planning*

Planning costs to support the EOC construction or upgrading activities are allowable. These planning activities include the following:

- i. Developing plans, protocols, or procedures for the operation and use related to new capabilities as a result of the construction or upgrading activities;
- ii. Conducting physical and cyber security assessments;
- iii. Ensuring EOC continuity of operations; and
- iv. Analyzing constructed or renovated space to support the design and implementation of protection systems (e.g., fire protection and suppression, atmospheric filtration, explosives mitigation).

ii. *Equipment*

Only equipment integral to EOC construction and upgrading activities is allowable. The allowable equipment categories for the FY 2023 EOC Grant Program are listed on the [Authorized Equipment List \(AEL\)](#). Although an item may be included within an allowable category on the list, the equipment must also directly support the function and operation of the EOC to be considered allowable.

The select allowable equipment includes equipment from the following AEL categories:

- Explosive Device Mitigation and Remediation (Category 2)
- Information Technology (Category 4)
- Cybersecurity Enhancement Equipment (Category 5)
- Interoperable Communications Equipment (Category 6)
- Power Equipment (Category 10)
- Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) Reference Materials (Category 11)
- Physical Security Enhancement Equipment (Category 14)
- CBRNE Logistical Support Equipment (Category 19)
- Other Authorized Equipment (Category 21)

If applicants have questions concerning the eligibility of equipment not specifically addressed in the AEL, they should contact their FEMA Regional EOC Grant Program Manager through the Centralized Scheduling and Information Desk (CSID) at (800) 368-6498 or AskCSID@dhs.gov Monday through Friday, 9 a.m. – 5 p.m. ET, for clarification.

FEMA will consider requests to purchase equipment that is not listed in the AEL on a case-by-case basis. Such requests should be submitted in writing to the applicable FEMA Regional Grant Program Office. FEMA’s review and approval of such requests will involve both the FEMA regional office and headquarters program staff to ensure nationwide consistency in the decision-making process and to support any necessary updates to the AEL.

Applicants should analyze the cost benefits of purchasing versus leasing equipment, especially high-cost items and those subject to rapid technological advances. Large equipment purchases must be identified and explained. For more information regarding property management standards for equipment, please reference 2 C.F.R. Part 200, including 2 C.F.R. §§ 200.310, 200.313, and 200.316. Also see 2 C.F.R. §§ 200.216, 200.471, and [FEMA Policy #405-143-1](#), or successor policy, regarding prohibitions on covered telecommunications equipment or services.

Recipients and sub-recipients that are using FY 2023 EOC Grant Program funds to support emergency communications activities must comply with the SAFECOM Guidance on Emergency Communications Grants, including provisions on technical standards that ensure and enhance interoperable communications. This SAFECOM Guidance can be found at [Funding Resources | CISA](#).

Recipients and sub-recipients are required to provide the AEL number for all communications equipment purchased with grant award funding (plus a description of the equipment and the quantity purchased of each item) to the FEMA GPD once items are procured as part of periodic programmatic grant reporting.

III. *Construction and Upgrading*

“Construction,” as defined in this program, refers to building a new facility or any changes to the footprint of an existing facility, while “upgrading” refers to internal improvements to an existing facility. For EOC projects that involve construction or upgrading of multipurpose facilities, such as public safety facilities, police/fire stations, etc., EOCGP funding may only be used for those parts of the facility that are directly associated with the EOC. For new facility construction, the use of EOCGP funds should be limited to the proportionate facility construction cost, generally based on the square footage (floor space) of the EOC compared to the square footage of the entire facility.

All proposed construction and upgrading activities must undergo an Environmental Planning and Historic Preservation (EHP) review, including approval of the review from FEMA, prior to undertaking any action related to the project. Failure of a grant recipient to meet these requirements may jeopardize Federal funding. See Section F.3.c of this NOFO for more information.

E. Application Review Information

1. Application Evaluation Criteria

a. *Programmatic Criteria*

Applications will be reviewed to ensure completeness, adherence to programmatic guidelines, and cost allowability.

b. *Financial Integrity Criteria*

Prior to making a federal award, FEMA is required by 31 U.S.C. § 3354, as enacted by the Payment Integrity Information Act of 2019, Pub. L. No. 116-117 (2020); 41 U.S.C. § 2313; and 2 C.F.R. § 200.206 to review information available through any Office of Management and Budget (OMB)-designated repositories of governmentwide eligibility qualification or financial integrity information, including whether the applicant is suspended or debarred. FEMA may also pose additional questions to the applicant to aid in conducting the pre-award risk review. Therefore, application evaluation criteria may include the following risk-based considerations of the applicant:

- i. Financial stability;
- ii. Quality of management systems and ability to meet management standards;
- iii. History of performance in managing federal award;
- iv. Reports and findings from audits; and
- v. Ability to effectively implement statutory, regulatory, or other requirements.

c. *Supplemental Financial Integrity Criteria and Review*

Prior to making a federal award where the anticipated total federal share will be greater than the simplified acquisition threshold, currently \$250,000:

- i. FEMA is required to review and consider any information about the applicant, including information on the applicant's immediate and highest-level owner, subsidiaries, and predecessors, if applicable, that is in the designated integrity and performance system accessible through the System for Award Management (SAM), which is currently the [Federal Awardee Performance and Integrity Information System](#) (FAPIIS).
- ii. An applicant, at its option, may review information in FAPIIS and comment on any information about itself that a federal awarding agency previously entered.
- iii. FEMA will consider any comments by the applicant, in addition to the other information in FAPIIS, in making a judgment about the applicant's integrity, business ethics, and record of performance under federal awards when completing the review of risk posed by applicants as described in 2 C.F.R. § 200.206.

2. Review and Selection Process

Applications will be reviewed to ensure compliance with administrative application requirements, and that all proposed activities and budget line-items are allowable under this program.

F. Federal Award Administration Information

1. Notice of Award

Before accepting the award, the AOR and recipient should carefully read the award package. The award package includes instructions on administering the grant award and the terms and conditions associated with responsibilities under federal awards. **Recipients must accept all conditions in this NOFO as well as any specific terms and conditions in the Notice of Award to receive an award under this program.**

Notification of award approval is made through the ND Grants system through an automatic electronic mail to the recipient's authorized official listed in the initial application. The recipient should follow the directions in the notification to confirm acceptance of the award.

Recipients must accept their awards no later than 60 days from the award date. The recipient shall notify FEMA of its intent to accept and proceed with work under the award or provide a notice of intent to decline through the ND Grants system. For instructions on how to accept or decline an award in the ND Grants system, please see the ND Grants Grant Recipient User Guide, which is available at [Non-Disaster Grants Management System | FEMA.gov](#) along with other ND Grants materials.

Funds will remain on hold until the recipient accepts the award through the ND Grants system and all other conditions of the award have been satisfied or until the award is otherwise rescinded. Failure to accept a grant award within the 60-day timeframe may result in a loss of funds.

2. Pass-Through Requirements

The SAA must pass-through 100% of funding to the subrecipients identified in **Appendix A** of this NOFO. Separate funding has been set aside for Recipient M&A costs. See Section D.13.c for more information.

3. Administrative and National Policy Requirements

In addition to the requirements of in this section and in this NOFO, FEMA may place specific terms and conditions on individual awards in accordance with 2 C.F.R. Part 200.

a. *DHS Standard Terms and Conditions*

All successful applicants for DHS grant and cooperative agreements are required to comply with DHS Standard Terms and Conditions, which are available online at: [DHS Standard Terms and Conditions](#).

The applicable DHS Standard Terms and Conditions will be those in effect at the time the award was made. What terms and conditions will apply for the award will be clearly stated in the award package at the time of award.

b. *Ensuring the Protection of Civil Rights*

As the Nation works towards achieving the [National Preparedness Goal](#), it is important to continue to protect the civil rights of individuals. Recipients and subrecipients must carry out

their programs and activities, including those related to the building, sustainment, and delivery of core capabilities, in a manner that respects and ensures the protection of civil rights for protected populations.

Federal civil rights statutes, such as Section 504 of the Rehabilitation Act of 1973 and Title VI of the Civil Rights Act of 1964, along with DHS and FEMA regulations, prohibit discrimination on the basis of race, color, national origin, sex, religion, age, disability, limited English proficiency, or economic status in connection with programs and activities receiving [federal financial assistance](#) from FEMA.

The DHS Standard Terms and Conditions include a fuller list of the civil rights provisions that apply to recipients. These terms and conditions can be found in the [DHS Standard Terms and Conditions](#). Additional information on civil rights provisions is available at [External Civil Rights Division | FEMA.gov](#).

Monitoring and oversight requirements in connection with recipient compliance with federal civil rights laws are also authorized pursuant to 44 C.F.R. Part 7.

In accordance with civil rights laws and regulations, recipients and subrecipients must ensure the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment.

c. *Environmental Planning and Historic Preservation (EHP) Compliance*

As a federal agency, FEMA is required to consider the effects of its actions on the environment and historic properties to ensure that all activities and programs funded by FEMA, including grant-funded projects, comply with federal EHP laws, Executive Orders, regulations, and policies, as applicable.

All non-critical new construction or substantial improvement of structures in a Special Flood Hazard Area must, at a minimum, apply the flood elevations of the Federal Flood Risk Management Standard's Freeboard Value Approach unless doing so would cause the project to be unable to meet applicable program cost-effectiveness requirements. All other types of projects may choose to apply the flood elevations of the Federal Flood Risk Management Standard's Freeboard Value Approach. See [Executive Order \(EO\) 14030, Climate-Related Financial Risk](#) and [FEMA Policy #-206-21-0003, Partial Implementation of the Federal Flood Risk Management Standard for Hazard Mitigation Assistance Programs \(Interim\)](#) ([fema.gov](#)).

All GPD actions, including grant-funded actions, must comply with National Flood Insurance Program criteria or any more restrictive federal, state, or local floodplain management standards or building code (44 CFR § 9.11(d)(6)). All GPD-funded non-critical actions in 1% annual chance floodplains (also known as 100-year floodplains) that involve new construction or substantial improvement of structures must be elevated, at a minimum, to the lower of:

- Two feet above the 1% annual chance flood elevation (also known as the base flood elevation), in accordance with the Federal Flood Risk Management Standard (FFRMS) "Freeboard Value Approach" (FVA); or

- The 0.2% annual chance flood elevation. Where 0.2% annual chance flood elevations are not available, such actions must be elevated to at least two feet above the 1% annual chance flood elevation.

All GPD-funded critical actions in 0.2% annual chance floodplains (also known as 500-year floodplains) that involve new construction or substantial improvement of structures must be elevated, at a minimum, to the higher of:

- Three feet above the 1% annual chance flood elevation; or
- The 0.2% annual chance flood elevation. Where 0.2% annual chance flood elevations are not available, such actions must be elevated to at least three feet above the 1% annual chance flood elevation.

See [Executive Order \(EO\) 11988, Floodplain Management](#), as amended by [EO 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input](#).

Recipients and subrecipients proposing projects that have the potential to impact the environment, including, but not limited to, the construction of communication towers, modification or renovation of existing buildings, structures, and facilities, or new construction including replacement of facilities, must participate in the FEMA EHP review process. The EHP review process involves the submission of a detailed project description along with any supporting documentation requested by FEMA in order to determine whether the proposed project has the potential to impact environmental resources or historic properties.

In some cases, FEMA is also required to consult with other regulatory agencies and the public in order to complete the review process. Federal law requires EHP review to be completed before federal funds are released to carry out proposed projects. FEMA may not be able to fund projects that are not in compliance with applicable EHP laws, Executive Orders, regulations, and policies.

DHS and FEMA EHP policy is found in directives and instructions available on the [FEMA.gov EHP page](#), the FEMA website page that includes documents regarding EHP responsibilities and program requirements, including implementation of the National Environmental Policy Act and other EHP regulations and Executive Orders.

The GPD EHP screening form is located at: [FEMA Form](#). Additionally, all recipients under this funding opportunity are required to comply with the [FEMA GPD EHP Policy Guidance, FEMA Policy #108-023-1](#).

d. *National Incident Management System (NIMS) Implementation*

In expending funds under this program, recipients that are state, local, tribal, or territorial governments must ensure and maintain adoption and implementation of NIMS. The state, local, tribal, or territorial government must show adoption of NIMS during any point of the period of performance. The list of objectives used for progress and achievement reporting is at [NIMS Implementation and Training | FEMA.gov](#).

Emergency management and incident response activities require carefully managed resources (personnel, teams, facilities, equipment, and/or supplies) to meet incident needs. Using standardized resource management concepts such as typing, credentialing, and inventorying, promote a strong national mutual aid capability needed to support delivery of core capabilities. Additional information on resource management, NIMS resource typing definitions, job titles, and position qualifications is on FEMA’s website at [NIMS Components - Guidance and Tools | FEMA.gov](#).

FEMA developed the [National Incident Management System Guideline for the National Qualification System](#) to describe national credentialing standards and to provide written guidance regarding the use of those standards. This guideline describes credentialing and typing processes and identifies tools which Federal Emergency Response Officials and emergency managers at all levels of government may use both routinely and to facilitate multijurisdictional coordinated responses.

Although state, local, tribal, and private sector partners (including nongovernmental organizations) are not required to credential their personnel in accordance with these guidelines, FEMA strongly encourages them to do so to leverage the federal investment in the Federal Information Processing Standards 201 infrastructure and to facilitate interoperability for personnel deployed outside their home jurisdiction.

Additional information about NIMS in general is available at [National Incident Management System | FEMA.gov](#).

4. Reporting

Recipients are required to submit various financial and programmatic reports as a condition of award acceptance. Future awards and funds drawdown may be withheld if these reports are delinquent.

a. *Financial Reporting Requirements*

I. FEDERAL FINANCIAL REPORT (FFR)

Recipients must report obligations and expenditures through the FFR form (SF-425) to FEMA.

Recipients may review the Federal Financial Reporting Form (FFR) (SF-425) at [Post-Award Reporting Forms | Grants.gov](#).

Recipients must file the FFR electronically using the Payment and Reporting Systems ([PARS](#)).

II. FFR REPORTING PERIODS AND DUE DATES

An FFR must be submitted quarterly throughout the POP, including partial calendar quarters, as well as in periods where no grant award activity occurs. The final FFR is due within 120 calendar days after the end of the POP. Future awards and fund drawdowns may be withheld if these reports are delinquent, demonstrate lack of progress, or are insufficient in detail.

Except for the final FFR due at 120 days after the end of the POP for purposes of closeout, the following reporting periods and due dates apply for the FFR:

Reporting Period	Report Due Date
October 1 – December 31	January 30
January 1 – March 31	April 30
April 1 – June 30	July 30
July 1 – September 30	October 30

b. Programmatic Performance Reporting Requirements

I. PERFORMANCE PROGRESS REPORT (PPR)

Recipients are responsible for providing updated performance reports on a biannual basis as an attachment in ND Grants. The PPR must include:

- A brief narrative of overall project(s) status;
- A summary of project expenditures; and
- A description of any potential issues that may affect project completion.

c. Program Performance Reporting Periods and Due Dates

The following reporting periods and due dates apply for the PPR:

Reporting Period	Report Due Date
January 1 – June 30	July 30
July 1 – December 31	January 30

d. Closeout Reporting Requirements

I. CLOSEOUT REPORTING

Within 120 calendar days after the end of the period of performance for the prime award or after an amendment has been issued to close out an award before the original POP ends, recipients must liquidate all financial obligations and must submit:

- i. The final request for payment, if applicable;
- ii. The final FFR (SF-425);
- iii. The final progress report detailing all accomplishments, including a narrative summary of the impact of those accomplishments throughout the period of performance;
- iv. A qualitative narrative summary of the impact of those accomplishments throughout the entire POP; and
- v. Other documents required by this NOFO, terms and conditions of the award, or other FEMA guidance.

In addition, pass-through entities are responsible for closing out their subawards as described in 2 C.F.R. § 200.344; subrecipients are still required to submit closeout materials within 90 calendar days of the period of performance end date. When a subrecipient completes all closeout requirements, pass-through entities must promptly complete all closeout actions for

subawards in time for the recipient to submit all necessary documentation and information to FEMA during the closeout of the prime award.

After the prime award closeout reports have been reviewed and approved by FEMA, a closeout notice will be completed to close out the grant. The notice will indicate the period of performance as closed, list any remaining funds that will be deobligated, and address the requirement of maintaining the grant records for at least three years from the date of the final FFR. The record retention period may be longer, such as due to an audit or litigation, for equipment or real property used beyond the period of performance, or due to other circumstances outlined in 2 C.F.R. § 200.334.

The recipient is responsible for refunding to FEMA any balances of unobligated cash that FEMA paid that are not authorized to be retained per 2 C.F.R. § 200.344(d).

II. ADMINISTRATIVE CLOSEOUT

Administrative closeout is a mechanism for FEMA to unilaterally move forward with closeout of an award using available award information in lieu of final reports from the recipient per 2 C.F.R. § 200.344(h)-(i). It is a last resort available to FEMA, and if FEMA needs to administratively close an award, this may negatively impact a recipient's ability to obtain future funding. This mechanism can also require FEMA to make cash or cost adjustments and ineligible cost determinations based on the information it has, which may result in identifying a debt owed to FEMA by the recipient.

When a recipient is not responsive to FEMA's reasonable efforts to collect required reports needed to complete the standard closeout process, FEMA is required under 2 C.F.R. § 200.344(h) to start the administrative closeout process within the regulatory timeframe. FEMA will make at least three written attempts to collect required reports before initiating administrative closeout. If the recipient does not submit all required reports in accordance with 2 C.F.R. § 200.344, this NOFO, and the terms and conditions of the award, FEMA must proceed to administratively close the award with the information available within one year of the period of performance end date. Additionally, if the recipient does not submit all required reports within one year of the period of performance end date, per 2 C.F.R. § 200.344(i), FEMA must report in FAPIIS the recipient's material failure to comply with the terms and conditions of the award.

If FEMA administratively closes an award where no final FFR has been submitted, FEMA uses that administrative closeout date in lieu of the final FFR submission date as the start of the record retention period under 2 C.F.R. § 200.334.

In addition, if an award is administratively closed, FEMA may decide to impose remedies for noncompliance per 2 C.F.R. § 200.339, consider this information in reviewing future award applications, or apply special conditions to existing or future awards.

e. *Additional Reporting Requirements*

I. DISCLOSING INFORMATION PER 2 C.F.R. § 180.335

This reporting requirement pertains to disclosing information related to government-wide

suspension and debarment requirements. Before a recipient enters into a grant award with FEMA, the recipient must notify FEMA if it knows if it or any of the recipient's principals under the award fall under one or more of the four criteria listed at 2 C.F.R. § 180.335:

- i. Are presently excluded or disqualified;
- ii. Have been convicted within the preceding three years of any of the offenses listed in 2 C.F.R. § 180.800(a) or had a civil judgment rendered against it or any of the recipient's principals for one of those offenses within that time period;
- iii. Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state or local) with commission of any of the offenses listed in 2 C.F.R. § 180.800(a); or
- iv. Have had one or more public transactions (federal, state, or local) terminated within the preceding three years for cause or default.

At any time after accepting the award, if the recipient learns that it or any of its principals falls under one or more of the criteria listed at 2 C.F.R. § 180.335, the recipient must provide immediate written notice to FEMA in accordance with 2 C.F.R. § 180.350.

II. REPORTING OF MATTERS RELATED TO RECIPIENT INTEGRITY AND PERFORMANCE

Per 2 C.F.R. Part 200, Appendix I § F.3, the additional post-award reporting requirements in 2 C.F.R. Part 200, Appendix XII may apply to applicants who, if upon becoming recipients, have a total value of currently active grants, cooperative agreements, and procurement contracts from all federal awarding agencies that exceeds \$10,000,000 for any period of time during the period of performance of an award under this funding opportunity.

Recipients that meet these criteria must maintain current information reported in FAPIIS about civil, criminal, or administrative proceedings described in paragraph 2 of Appendix XII at the reporting frequency described in paragraph 4 of Appendix XII.

III. SINGLE AUDIT REPORT

For audits of fiscal years beginning on or after December 26, 2014, recipients that expend \$750,000 or more from all federal funding sources during their fiscal year are required to submit an organization-wide financial and compliance audit report, also known as the single audit report.

The audit must be performed in accordance with the requirements of U.S. Government Accountability Office's (GAO) Government Auditing Standards, located at [Yellow Book | U.S. GAO](#), and the requirements of Subpart F of 2 C.F.R. Part 200, located at [eCFR :: 2 CFR Part 200 Subpart F -- Audit Requirements](#).

5. Monitoring and Oversight

Per 2 C.F.R. § 200.337, FEMA, through its authorized representatives, has the right, at all reasonable times, to make site visits or conduct desk reviews to review project accomplishments and management control systems to review award progress and to provide any required technical assistance. During site visits or desk reviews, FEMA will review recipients' files related to the award. As part of any monitoring and program evaluation activities, recipients must permit FEMA, upon reasonable notice, to review grant-related records and to interview the organization's staff and contractors regarding the program.

Recipients must respond in a timely and accurate manner to FEMA requests for information relating to the award.

Effective monitoring and oversight help FEMA ensure that recipients use grant funds for their intended purpose(s); verify that projects undertaken are consistent with approved plans; and ensure that recipients make adequate progress toward stated goals and objectives. Additionally, monitoring serves as the primary mechanism to ensure that recipients comply with applicable laws, rules, regulations, program guidance, and requirements. FEMA regularly monitors all grant programs both financially and programmatically in accordance with federal laws, regulations (including 2 C.F.R. Part 200), program guidance, and the terms and conditions of the award. All monitoring efforts ultimately serve to evaluate progress towards grant goals and proactively target and address issues that may threaten grant success during the period of performance.

FEMA staff will periodically monitor recipients to ensure that administrative processes, policies and procedures, budgets, and other related award criteria are meeting Federal Government-wide and FEMA regulations. Aside from reviewing quarterly financial and programmatic reports, FEMA may also conduct enhanced monitoring through either desk-based reviews, onsite monitoring visits, or both. Enhanced monitoring will involve the review and analysis of the financial compliance and administrative processes, policies, activities, and other attributes of each federal assistance award, and it will identify areas where the recipient may need technical assistance, corrective actions, or other support.

Financial and programmatic monitoring are complementary processes within FEMA's overarching monitoring strategy that function together to ensure effective grants management, accountability, and transparency; validate progress against grant and program goals; and safeguard federal funds against fraud, waste, and abuse. Financial monitoring primarily focuses on statutory and regulatory compliance with administrative grant requirements, while programmatic monitoring seeks to validate and assist in grant progress, targeting issues that may be hindering achievement of project goals and ensuring compliance with the purpose of the grant and grant program. Both monitoring processes are similar in that they feature initial reviews of all open awards, and additional, in-depth monitoring of grants requiring additional attention.

Recipients and subrecipients who are pass-through entities are responsible for monitoring their subrecipients in a manner consistent with the terms of the federal award at 2 C.F.R. Part 200, including 2 C.F.R. § 200.332. This includes the pass-through entity's responsibility to monitor the activities of the subrecipient as necessary to ensure that the subaward is used for authorized purposes, in compliance with federal statutes, regulations, and the terms and conditions of the subaward; and that subaward performance goals are achieved.

In terms of overall award management, recipient and subrecipient responsibilities include, but are not limited to: accounting of receipts and expenditures, cash management, maintaining adequate financial records, reporting and refunding expenditures disallowed by audits, monitoring if acting as a pass-through entity, or other assessments and reviews, and

ensuring overall compliance with the terms and conditions of the award or subaward, as applicable, including the terms of 2 C.F.R. Part 200.

G. DHS Awarding Agency Contact Information

1. Contact and Resource Information

a. *Program Office Contact*

FEMA has region-specific Preparedness Officers. If you do not know your Preparedness Officer, please contact CSID by phone at (800) 368-6498 or by email at askcsid@fema.dhs.gov, Monday through Friday, 9:00 AM – 5:00 PM ET.

b. *Centralized Scheduling and Information Desk (CSID)*

CSID is a non-emergency comprehensive management and information resource developed by FEMA for grants stakeholders. CSID provides general information on all FEMA grant programs and maintains a comprehensive database containing key personnel contact information at the federal, state, and local levels. When necessary, recipients will be directed to a federal point of contact who can answer specific programmatic questions or concerns. CSID can be reached by phone at (800) 368-6498 or by e-mail at askcsid@fema.dhs.gov, Monday through Friday, 9:00 AM – 5:00 PM ET.

c. *Grant Programs Directorate (GPD) Award Administration Division*

GPD's Award Administration Division (AAD) provides support regarding financial matters and budgetary technical assistance. Additional guidance and information can be obtained by contacting the AAD's Help Desk via e-mail at ASK-GMD@fema.dhs.gov.

d. *FEMA Regional Offices*

FEMA Regional Offices manage, administer, and conduct the application budget review, create the award package, approve, amend, and close out awards, as well as conduct cash analysis, financial and programmatic monitoring, and audit resolution for the EOC Grant Program. The Regions also provide technical assistance to EOC Grant Program recipients.

FEMA Regional Office contact information is available at [Regions, States and Territories | FEMA.gov](https://www.fema.gov/regions-states-territories).

e. *Equal Rights*

The FEMA Office of Equal Rights (OER) is responsible for compliance with and enforcement of federal civil rights obligations in connection with programs and services conducted by FEMA and recipients of FEMA financial assistance. All inquiries and communications about federal civil rights compliance for FEMA grants under this NOFO should be sent to FEMA-CivilRightsOffice@fema.dhs.gov.

f. *Environmental Planning and Historic Preservation*

GPD's EHP Team provides guidance and information about the EHP review process to recipients and subrecipients. All inquiries and communications about GPD projects under this NOFO or the EHP review process, including the submittal of EHP review materials, should be sent to gpdehpinfo@fema.dhs.gov.

2. Systems Information

a. *Grants.gov*

For technical assistance with [Grants.gov](https://www.grants.gov), call the customer support hotline 24 hours per day, 7 days per week (except federal holidays) at (800) 518-4726 or e-mail at support@grants.gov.

b. *Non-Disaster (ND) Grants*

For technical assistance with the ND Grants system, please contact the ND Grants Helpdesk at ndgrants@fema.dhs.gov or (800) 865-4076, Monday through Friday, 9:00 AM – 6:00 PM ET. User resources are available at [Non-Disaster Grants Management System | FEMA.gov](https://www.fema.gov/non-disaster-grants-management-system).

c. *Payment and Reporting System (PARS)*

FEMA uses the [Payment and Reporting System \(PARS\)](https://www.fema.gov/payment-reporting-system) for financial reporting, invoicing, and tracking payments. FEMA uses the Direct Deposit/Electronic Funds Transfer (DD/EFT) method of payment to recipients. For questions about the online system, please call the Customer Service Center at (866) 927-5646 or email ask-GMD@fema.dhs.gov.

H. Additional Information

1. **Termination Provisions**

FEMA may terminate a federal award in whole or in part for one of the following reasons. FEMA and the recipient must still comply with closeout requirements at 2 C.F.R. §§ 200.344-200.345 even if an award is terminated in whole or in part. To the extent that subawards are permitted under this NOFO, pass-through entities should refer to 2 C.F.R. § 200.340 for additional information on termination regarding subawards.

a. *Noncompliance*

If a recipient fails to comply with the terms and conditions of a federal award, FEMA may terminate the award in whole or in part. If the noncompliance can be corrected, FEMA may first attempt to direct the recipient to correct the noncompliance. This may take the form of a Compliance Notification. If the noncompliance cannot be corrected or the recipient is non-responsive, FEMA may proceed with a Remedy Notification, which could impose a remedy for noncompliance per 2 C.F.R. § 200.339, including termination. Any action to terminate based on noncompliance will follow the requirements of 2 C.F.R. §§ 200.341-200.342 as well as the requirement of 2 C.F.R. § 200.340(c) to report in FAPIIS the recipient's material failure to comply with the award terms and conditions. See also the section on Actions to Address Noncompliance in this NOFO.

b. *With the Consent of the Recipient*

FEMA may also terminate an award in whole or in part with the consent of the recipient, in which case the parties must agree upon the termination conditions, including the effective date, and in the case of partial termination, the portion to be terminated.

c. *Notification by the Recipient*

The recipient may terminate the award, in whole or in part, by sending written notification to FEMA setting forth the reasons for such termination, the effective date, and in the case of partial termination, the portion to be terminated. In the case of partial termination, FEMA

may determine that a partially terminated award will not accomplish the purpose of the federal award, so FEMA may terminate the award in its entirety. If that occurs, FEMA will follow the requirements of 2 C.F.R. §§ 200.341-200.342 in deciding to fully terminate the award.

2. Program Evaluation

Recipients and subrecipients are encouraged to incorporate program evaluation activities from the outset of their program design and implementation to meaningfully document and measure their progress towards meeting an agency priority goal(s). Title I of the Foundations for Evidence-Based Policymaking Act of 2018 ([Evidence Act](#)), [Pub. L. No. 115-435 \(2019\)](#) urges federal awarding agencies and federal assistance recipients and subrecipients to use program evaluation as a critical tool to learn, to improve equitable delivery, and to elevate program service and delivery across the program lifecycle. Evaluation means “an assessment using systematic data collection and analysis of one or more programs, policies, and organizations intended to assess their effectiveness and efficiency.” Evidence Act § 101 (codified at 5 U.S.C. § 311). Evaluation costs are allowable costs (either as direct or indirect), unless prohibited by statute or regulation.

In addition, recipients are required to participate in a DHS-led evaluation if selected, which may be carried out by a third-party on behalf of the Program Office or DHS. By accepting grant funds, recipients agree to participate in the evaluation, which may include analysis of individuals who benefit from the grant, and provide access to program operating personnel and participants, as specified by the evaluator(s) during the award.

3. Period of Performance Extensions

Extensions to the period of performance for this program are allowed. Extensions to the POP identified in the award will only be considered through formal, written requests to the recipient’s FEMA Preparedness Officer and must contain specific and compelling justifications as to why an extension is required. Recipients are advised to coordinate with the FEMA Preparedness Officer as needed when preparing an extension request.

All extension requests must address the following:

- a. The grant program, fiscal year, and award number;
- b. Reason for the delay –including details of the legal, policy, or operational challenges that prevent the final outlay of awarded funds by the deadline;
- c. Current status of the activity(ies);
- d. Approved POP termination date and new project completion date;
- e. Amount of funds drawn down to date;
- f. Remaining available funds, both federal and, if applicable, non-federal;
- g. Budget outlining how remaining federal and, if applicable, non-federal funds will be expended;
- h. Plan for completion, including milestones and timeframes for achieving each milestone and the position or person responsible for implementing the plan for completion; and

- i. Certification that the activity(ies) will be completed within the extended POP without any modification to the original statement of work, as described in the Investment Justification and as approved by FEMA.

Extension requests will be granted only due to compelling legal, policy, or operational challenges. Extension requests will only be considered for the following reasons:

- Contractual commitments by the recipient or subrecipient with vendors prevent completion of the project, including delivery of equipment or services, within the existing POP;
- The project must undergo a complex environmental review that cannot be completed within the existing POP;
- Projects are long-term by design, and therefore acceleration would compromise core programmatic goals; or
- Where other special or extenuating circumstances exist.

Recipients should submit all proposed extension requests to FEMA for review and approval at least 120 days prior to the end of the POP to allow sufficient processing time. Extensions are typically granted for no more than a six-month period.

4. Disability Integration

Pursuant to Section 504 of the Rehabilitation Act of 1973, recipients of FEMA financial assistance must ensure that their programs and activities do not discriminate against other qualified individuals with disabilities.

Grant recipients should engage with the whole community to advance individual and community preparedness and to work as a nation to build and sustain resilience. In doing so, recipients are encouraged to consider the needs of individuals with disabilities into the activities and projects funded by the grant.

FEMA expects that the integration of the needs of people with disabilities will occur at all levels, including planning; alerting, notification, and public outreach; training; purchasing of equipment and supplies; protective action implementation; and exercises/drills.

The following are examples that demonstrate the integration of the needs of people with disabilities in carrying out FEMA awards:

- Include representatives of organizations that work with/for people with disabilities on planning committees, work groups and other bodies engaged in development and implementation of the grant programs and activities.
- Hold all activities related to the grant in locations that are accessible to persons with physical disabilities to the extent practicable.
- Acquire language translation services, including American Sign Language, that provide public information across the community and in shelters.
- Ensure shelter-specific grant funds are in alignment with FEMA's [Guidance on Planning for Integration of Functional Needs Support Services in General Population Shelters](#).

- If making alterations to an existing building to a primary function area utilizing federal funds, complying with the most recent codes and standards and making path of travel to the primary function area accessible to the greatest extent possible.
- Implement specific procedures used by public transportation agencies that include evacuation and passenger communication plans and measures for individuals with disabilities.
- Identify, create, and deliver training to address any training gaps specifically aimed toward whole-community preparedness. Include and interact with individuals with disabilities, aligning with the designated program capability.
- Establish best practices in inclusive planning and preparedness that consider physical access, language access, and information access. Examples of effective communication access include providing auxiliary aids and services such as sign language interpreters, Computer Aided Real-time Translation (CART), and materials in Braille or alternate formats.

FEMA grant recipients can fund projects towards the resiliency of the whole community, including people with disabilities, such as training, outreach and safety campaigns, provided that the project aligns with this NOFO and the terms and conditions of the award.

5. Conflicts of Interest in the Administration of Federal Awards or Subawards

For conflicts of interest under grant-funded procurements and contracts, refer to the section on Procurement Integrity in this NOFO and 2 C.F.R. §§ 200.317 – 200.327.

To eliminate and reduce the impact of conflicts of interest in the subaward process, recipients and pass-through entities must follow their own policies and procedures regarding the elimination or reduction of conflicts of interest when making subawards. Recipients and pass-through entities are also required to follow any applicable federal and state, local, tribal, or territorial (SLTT) statutes or regulations governing conflicts of interest in the making of subawards.

The recipient or pass-through entity must disclose to the respective Regional EOC Program Manager, in writing, any real or potential conflict of interest that may arise during the administration of the federal award, as defined by the federal or SLTT statutes or regulations or their own existing policies, within five days of learning of the conflict of interest. Similarly, subrecipients, whether acting as subrecipients or as pass-through entities, must disclose any real or potential conflict of interest to the recipient or next-level pass-through entity as required by the recipient or pass-through entity's conflict of interest policies, or any applicable federal or SLTT statutes or regulations.

Conflicts of interest may arise during the process of FEMA making a federal award in situations where an employee, officer, or agent, any members of their immediate family and/or their partner has a close personal relationship, a business relationship, or a professional relationship, with an applicant, subapplicant, recipient, subrecipient, or FEMA employees.

6. Procurement Integrity

Through audits conducted by the DHS Office of Inspector General (OIG) and FEMA grant monitoring, findings have shown that some FEMA recipients have not fully adhered to the proper procurement requirements at 2 C.F.R. §§ 200.317 – 200.327 when spending grant funds. Anything less than full compliance with federal procurement requirements jeopardizes the integrity of the grant as well as the grant program. To assist with determining whether an action is a procurement or instead a subaward, please consult 2 C.F.R. § 200.331. For detailed guidance on the federal procurement standards, recipients and subrecipients should refer to various materials issued by FEMA’s Procurement Disaster Assistance Team (PDAT), such as the [PDAT Field Manual](#) and [Contract Provisions Guide](#). Additional resources, including an upcoming trainings schedule can be found on the PDAT Website: [Contracting with Federal Funds for Goods and Services Before, During and After Disasters | FEMA.gov](#).

The below highlights the federal procurement requirements for FEMA recipients when procuring goods and services with federal grant funds. FEMA will include a review of recipients’ procurement practices as part of the normal monitoring activities. **All procurement activity must be conducted in accordance with federal procurement standards at 2 C.F.R. §§ 200.317 – 200.327.** Select requirements under these standards are listed below. The recipient and any of its subrecipients must comply with all requirements, even if they are not listed below.

Under 2 C.F.R. § 200.317, when procuring property and services under a federal award, states (including territories) must follow the same policies and procedures they use for procurements from their non-federal funds; additionally, states must now follow 2 C.F.R. § 200.321 regarding socioeconomic steps, 200.322 regarding domestic preferences for procurements, 200.323 regarding procurement of recovered materials, and 2 C.F.R. § 200.327 regarding required contract provisions.

All other non-federal entities, such as tribes (collectively, non-state entities), must have and use their own documented procurement procedures that reflect applicable SLTT laws and regulations, provided that the procurements conform to applicable federal law and the standards identified in 2 C.F.R. Part 200. These standards include, but are not limited to, providing for full and open competition consistent with the standards of 2 C.F.R. § 200.319 and the required procurement methods at § 200.320.

a. *Important Changes to Procurement Standards in 2 C.F.R. Part 200*

OMB recently updated various parts of Title 2 of the Code of Federal Regulations, among them, the procurement standards. States are now required to follow the socioeconomic steps in soliciting small and minority businesses, women’s business enterprises, and labor surplus area firms per 2 C.F.R. § 200.321. All non-federal entities should also, to the greatest extent practicable under a federal award, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States per 2 C.F.R. § 200.322. More information on OMB’s revisions to the federal procurement standards can be found in [Purchasing Under a FEMA Award: OMB Revisions Fact Sheet](#).

The recognized procurement methods in 2 C.F.R. § 200.320 have been reorganized into informal procurement methods, which include micro-purchases and small purchases; formal

procurement methods, which include sealed bidding and competitive proposals; and noncompetitive procurements. The federal micro-purchase threshold is currently \$10,000, and non-state entities may use a lower threshold when using micro-purchase procedures under a FEMA award. If a non-state entity wants to use a micro-purchase threshold higher than the federal threshold, it must follow the requirements of 2 C.F.R. § 200.320(a)(1)(iii)-(v). The federal simplified acquisition threshold is currently \$250,000, and a non-state entity may use a lower threshold but may not exceed the federal threshold when using small purchase procedures under a FEMA award. *See* 2 C.F.R. § 200.1 (citing the definition of simplified acquisition threshold from [48 C.F.R. Part 2, Subpart 2.1](#)).

See 2 C.F.R. §§ 200.216, 200.471, and Appendix II as well as section D.13.a of the NOFO regarding prohibitions on covered telecommunications equipment or services.

b. *Competition and Conflicts of Interest*

Among the requirements of 2 C.F.R. § 200.319(b) applicable to all non-federal entities other than states, in order to ensure objective contractor performance and eliminate unfair competitive advantage, contractors that develop or draft specifications, requirements, statements of work, or invitations for bids or requests for proposals must be excluded from competing for such procurements. FEMA considers these actions to be an organizational conflict of interest and interprets this restriction as applying to contractors that help a non-federal entity develop its grant application, project plans, or project budget. This prohibition also applies to the use of former employees to manage the grant or carry out a contract when those former employees worked on such activities while they were employees of the non-federal entity.

Under this prohibition, unless the non-federal entity solicits for and awards a contract covering both development and execution of specifications (or similar elements as described above), and this contract was procured in compliance with 2 C.F.R. §§ 200.317 – 200.327, federal funds cannot be used to pay a contractor to carry out the work if that contractor also worked on the development of those specifications. This rule applies to all contracts funded with federal grant funds, including pre-award costs, such as grant writer fees, as well as post-award costs, such as grant management fees.

Additionally, some of the situations considered to be restrictive of competition include, but are not limited to:

- Placing unreasonable requirements on firms for them to qualify to do business;
- Requiring unnecessary experience and excessive bonding;
- Noncompetitive pricing practices between firms or between affiliated companies;
- Noncompetitive contracts to consultants that are on retainer contracts;
- Organizational conflicts of interest;
- Specifying only a “brand name” product instead of allowing “an equal” product to be offered and describing the performance or other relevant requirements of the procurement; and
- Any arbitrary action in the procurement process.

Per 2 C.F.R. § 200.319(c), non-federal entities other than states must conduct procurements in a manner that prohibits the use of statutorily or administratively imposed SLTT

geographical preferences in the evaluation of bids or proposals, except in those cases where applicable federal statutes expressly mandate or encourage geographic preference. Nothing in this section preempts state licensing laws. When contracting for architectural and engineering services, geographic location may be a selection criterion provided its application leaves an appropriate number of qualified firms, given the nature and size of the project, to compete for the contract.

Under 2 C.F.R. § 200.318(c)(1), non-federal entities other than states are required to maintain written standards of conduct covering conflicts of interest and governing the actions of their employees engaged in the selection, award, and administration of contracts. **No employee, officer, or agent may participate in the selection, award, or administration of a contract supported by a federal award if he or she has a real or apparent conflict of interest.** Such conflicts of interest would arise when the employee, officer or agent, any member of their immediate family, their partner, or an organization that employs or is about to employ any of the parties indicated herein, has a financial or other interest in or a tangible personal benefit from a firm considered for a contract. The officers, employees, and agents of the non-federal entity may neither solicit nor accept gratuities, favors, or anything of monetary value from contractors or parties to subcontracts. However, non-federal entities may set standards for situations in which the financial interest is not substantial, or the gift is an unsolicited item of nominal value. The standards of conduct must provide for disciplinary actions to be applied for violations of such standards by officers, employees, or agents of the non-federal entity.

Under 2 C.F.R. 200.318(c)(2), if the recipient or subrecipient (other than states) has a parent, affiliate, or subsidiary organization that is not a state, local, tribal, or territorial government, the non-federal entity must also maintain written standards of conduct covering organizational conflicts of interest. In this context, organizational conflict of interest means that because of a relationship with a parent company, affiliate, or subsidiary organization, the non-federal entity is unable or appears to be unable to be impartial in conducting a procurement action involving a related organization. The non-federal entity must disclose in writing any potential conflicts of interest to FEMA or the pass-through entity in accordance with applicable FEMA policy.

c. *Supply Schedules and Purchasing Programs*

Generally, a non-federal entity may seek to procure goods or services from a federal supply schedule, state supply schedule, or group purchasing agreement.

I. GENERAL SERVICES ADMINISTRATION SCHEDULES

States, tribes, and local governments, and any instrumentality thereof (such as local education agencies or institutions of higher education) may procure goods and services from a General Services Administration (GSA) schedule. GSA offers multiple efficient and effective procurement programs for state, tribal, and local governments, and instrumentalities thereof, to purchase products and services directly from pre-vetted contractors. The GSA Schedules (also referred to as the Multiple Award Schedules and the Federal Supply Schedules) are long-term government-wide contracts with commercial firms that provide access to millions of commercial products and services at volume discount pricing.

Information about GSA programs for states, tribes, and local governments, and instrumentalities thereof, can be found at [Programs for State and Local Governments | GSA](#) and [State and Local Governments | GSA](#).

For tribes, local governments, and their instrumentalities that purchase off of a GSA schedule, this will satisfy the federal requirements for full and open competition provided that the recipient follows the GSA ordering procedures; however, tribes, local governments, and their instrumentalities will still need to follow the other rules under 2 C.F.R. §§ 200.317 – 200.327, such as solicitation of minority businesses, women’s business enterprises, small businesses, or labor surplus area firms (§ 200.321), domestic preferences (§ 200.322), contract cost and price (§ 200.324), and required contract provisions (§ 200.327 and Appendix II).

II. OTHER SUPPLY SCHEDULES AND PROGRAMS

For non-federal entities other than states, such as tribes, local governments, and nonprofits, that want to procure goods or services from a state supply schedule, cooperative purchasing program, or other similar program, in order for such procurements to be permissible under federal requirements, the following must be true:

- The procurement of the original contract or purchasing schedule and its use by the non-federal entity complies with state and local law, regulations, and written procurement procedures.
- The state or other entity that originally procured the original contract or purchasing schedule entered into the contract or schedule with the express purpose of making it available to the non-federal entity and other similar types of entities.
- The contract or purchasing schedule specifically allows for such use, and the work to be performed for the non-federal entity falls within the scope of work under the contract as to type, amount, and geography.
- The procurement of the original contract or purchasing schedule complied with all the procurement standards applicable to a non-federal entity other than states under at 2 C.F.R. §§ 200.317 – 200.327.
- With respect to the use of a purchasing schedule, the non-federal entity must follow ordering procedures that adhere to applicable state, tribal, and local laws and regulations and the minimum requirements of full and open competition under 2 C.F.R. Part 200.

If a non-federal entity other than a state seeks to use a state supply schedule, cooperative purchasing program, or other similar type of arrangement, FEMA recommends the recipient discuss the procurement plans with its FEMA Preparedness Officer.

d. *Procurement Documentation*

Per 2 C.F.R. § 200.318(i), non-federal entities other than states and territories are required to maintain and retain records sufficient to detail the history of procurement covering at least the rationale for the procurement method, selection of contract type, contractor selection or rejection, and the basis for the contract price. States and territories are encouraged to

maintain and retain this information as well and are reminded that in order for any cost to be allowable, it must be adequately documented per 2 C.F.R. § 200.403(g).

Examples of the types of documents that would cover this information include but are not limited to:

- Solicitation documentation, such as requests for quotes, invitations for bids, or requests for proposals;
- Responses to solicitations, such as quotes, bids, or proposals;
- Pre-solicitation independent cost estimates and post-solicitation cost/price analyses on file for review by federal personnel, if applicable;
- Contract documents and amendments, including required contract provisions; and
- Other documents required by federal regulations applicable at the time a grant is awarded to a recipient.

Additional information on required procurement records can be found on pages 24-26 of the [PDAT Field Manual](#).

7. Financial Assistance Programs for Infrastructure

a. *Build America, Buy America Act*

Recipients and subrecipients must comply with the Build America, Buy America Act (BABAA), which was enacted as part of the Infrastructure Investment and Jobs Act §§ 70901-70927, Pub. L. No. 117-58 (2021); and Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers. See also [OMB Memorandum M-22-11, Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure](#).

None of the funds provided under this program may be used for a project for infrastructure unless the iron and steel, manufactured products, and construction materials used in that infrastructure are produced in the United States.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

To see whether a particular FEMA federal financial assistance program is considered an infrastructure program and thus required to include a Buy America preference, please see [Programs and Definitions: Build America, Buy America Act | FEMA.gov](#) and [Build America, Buy America Act Frequently Asked Questions \(FAQs\) | FEMA.gov](#). Additional information is found in [Buy America Preference in FEMA Financial Assistance Programs for Infrastructure, FEMA Interim Policy #207-22-0001](#).

b. *Waivers*

When necessary, recipients (and subrecipients through their pass-through entity) may apply for, and FEMA may grant, a waiver from these requirements.

A waiver of the domestic content procurement preference may be granted by the agency awarding official if FEMA determines that:

- Applying the domestic content procurement preference would be inconsistent with the public interest.
- The types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality.
- The inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25%.

For FEMA awards, the process for requesting a waiver from the Buy America preference requirements can be found on FEMA's website at: ["Buy America" Preference in FEMA Financial Assistance Programs for Infrastructure | FEMA.gov](https://www.fema.gov/financial-assistance-programs-for-infrastructure).

c. *Definitions*

Construction materials: an article, material, or supply—other than an item primarily of iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of non-ferrous metals, plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables), glass (including optic glass), lumber, paint, and drywall.

Domestic content procurement preference: Means all iron and steel used in the project are produced in the United States; the manufactured products used in the project are produced in the United States; or the construction materials used in the project are produced in the United States.

Federal financial assistance: Generally defined in 2 C.F.R. § 200.1 and includes all expenditures by a federal agency to a non-federal entity for an infrastructure project, except that it does not include expenditures for assistance authorities relating to major disasters or emergencies under sections 402, 403, 404, 406, 408, or 502 of the [Robert T. Stafford Disaster Relief and Emergency Assistance Act](#) relating to a major disaster or emergency declared under section 401 or 501, respectively, or pre and post disaster or emergency response expenditures.

Infrastructure: infrastructure projects which serve a public function, including at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property; and structures, facilities, and equipment that generate, transport, and distribute energy.

Produced in the United States means the following for:

- Iron and steel: All manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.
- Manufactured products: The product was manufactured in the United States, and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55% of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation.
- Construction Materials: All manufacturing processes for the construction material occurred in the United States.

Project: is any activity related to the construction, alteration, maintenance, or repair of infrastructure in the United States.

8. Record Retention

a. *Record Retention Period*

Financial records, supporting documents, statistical records, and all other non-Federal entity records pertinent to a Federal award generally must be maintained for at least three years from the date the final FFR is submitted. *See* 2 C.F.R. § 200.334. Further, if the recipient does not submit a final FFR and the award is administratively closed, FEMA uses the date of administrative closeout as the start of the general record retention period.

The record retention period **may be longer than three years or have a different start date** in certain cases. These include:

- Records for real property and equipment acquired with Federal funds must be retained for **three years after final disposition of the property**. *See* 2 C.F.R. § 200.334(c).
- If any litigation, claim, or audit is started before the expiration of the three-year period, the records **must be retained until** all litigation, claims, or audit findings involving the records **have been resolved and final action taken**. *See* 2 C.F.R. § 200.334(a).
- The **record retention period will be extended if the non-federal entity is notified in writing** of the extension by FEMA, the cognizant or oversight agency for audit, or the cognizant agency for indirect costs, or pass-through entity. *See* 2 C.F.R. § 200.334(b).
- Where FEMA requires recipients to report program income after the period of performance ends, the **program income record retention period begins at the end of the recipient's fiscal year in which program income is earned**. *See* 2 C.F.R. § 200.334(e).
- For indirect cost rate computations and proposals, cost allocation plans, or any similar accounting computations of the rate at which a particular group of costs is chargeable (such as computer usage chargeback rates or composite fringe benefit rates), the start of the record retention period depends on whether the indirect cost rate documents were submitted for negotiation. If the **indirect cost rate documents were submitted**

for negotiation, the record retention period begins from the date those documents were submitted for negotiation. If indirect cost rate documents were not submitted for negotiation, the record retention period begins at the end of the recipient's fiscal year or other accounting period covered by that indirect cost rate. See 2 C.F.R. § 200.334(f).

b. *Types of Records to Retain*

FEMA requires that non-federal entities maintain the following documentation for federally funded purchases:

- Specifications;
- Solicitations;
- Competitive quotes or proposals;
- Basis for selection decisions;
- Purchase orders;
- Contracts;
- Invoices; and
- Canceled checks.

Non-federal entities should keep detailed records of all transactions involving the grant. FEMA may at any time request copies of any relevant documentation and records, including purchasing documentation along with copies of cancelled checks for verification. *See, e.g., 2 C.F.R. §§ 200.318(i), 200.334, 200.337.*

In order for any cost to be allowable, it must be adequately documented per 2 C.F.R. § 200.403(g). Non-federal entities who fail to fully document all purchases may find their expenditures questioned and subsequently disallowed.

9. *Actions to Address Noncompliance*

Non-federal entities receiving financial assistance funding from FEMA are required to comply with requirements in the terms and conditions of their awards or subawards, including the terms set forth in applicable federal statutes, regulations, NOFOs, and policies. Throughout the award lifecycle or even after an award has been closed, FEMA or the pass-through entity may discover potential or actual noncompliance on the part of a recipient or subrecipient. This potential or actual noncompliance may be discovered through routine monitoring, audits, closeout, or reporting from various sources.

In the case of any potential or actual noncompliance, FEMA may place special conditions on an award per 2 C.F.R. §§ 200.208 and 200.339, FEMA may place a hold on funds until the matter is corrected, or additional information is provided per 2 C.F.R. § 200.339, or it may do both. Similar remedies for noncompliance with certain federal civil rights laws are authorized pursuant to 44 C.F.R. Parts 7 and 19.

In the event the noncompliance is not able to be corrected by imposing additional conditions or the recipient or subrecipient refuses to correct the matter, FEMA might take other remedies allowed under 2 C.F.R. § 200.339. These remedies include actions to disallow costs, recover funds, wholly or partly suspend or terminate the award, initiate suspension and

debarment proceedings, withhold further federal awards, or take other remedies that may be legally available. For further information on termination due to noncompliance, see the section on Termination Provisions in the NOFO.

FEMA may discover and take action on noncompliance even after an award has been closed. The closeout of an award does not affect FEMA's right to disallow costs and recover funds as long the action to disallow costs takes place during the record retention period. *See* 2 C.F.R. §§ 200.334, 200.345(a). Closeout also does not affect the obligation of the non-federal entity to return any funds due as a result of later refunds, corrections, or other transactions. 2 C.F.R. § 200.345(a)(2).

The types of funds FEMA might attempt to recover include, but are not limited to, improper payments, cost share reimbursements, program income, interest earned on advance payments, or equipment disposition amounts.

FEMA may seek to recover disallowed costs through a Notice of Potential Debt Letter, a Remedy Notification, or other letter. The document will describe the potential amount owed, the reason why FEMA is recovering the funds, the recipient's appeal rights, how the amount can be paid, and the consequences for not appealing or paying the amount by the deadline.

If the recipient neither appeals nor pays the amount by the deadline, the amount owed will become final. Potential consequences if the debt is not paid in full or otherwise resolved by the deadline include the assessment of interest, administrative fees, and penalty charges; administratively offsetting the debt against other payable federal funds; and transferring the debt to the U.S. Department of the Treasury for collection.

FEMA notes the following common areas of noncompliance for FEMA's grant programs:

- Insufficient documentation and lack of record retention;
- Failure to follow the procurement under grants requirements;
- Failure to submit closeout documents in a timely manner;
- Failure to follow EHP requirements; and
- Failure to comply with the POP deadline.

10. Audits

FEMA grant recipients are subject to audit oversight from multiple entities including the DHS OIG, the GAO, the pass-through entity, or independent auditing firms for single audits, and may cover activities and costs incurred under the award. Auditing agencies such as the DHS OIG, the GAO, and the pass-through entity (if applicable), and FEMA in its oversight capacity, must have access to records pertaining to the FEMA award. Recipients and subrecipients must retain award documents for at least three years from the date the final FFR is submitted, and even longer in many cases subject to the requirements of 2 C.F.R. § 200.334. In the case of administrative closeout, documents must be retained for at least three years from the date of closeout, or longer subject to the requirements of 2 C.F.R. § 200.334. If documents are retained longer than the required retention period, the DHS OIG, the GAO, and the pass-through entity, as well as FEMA in its oversight capacity, have the right to access these records as well. *See* 2 C.F.R. §§ 200.334, 200.337.

Additionally, non-federal entities must comply with the single audit requirements at 2 C.F.R. Part 200, Subpart F. Specifically, non-federal entities, other than for-profit subrecipients, that expend \$750,000 or more in federal awards during their fiscal year must have a single or program-specific audit conducted for that year in accordance with Subpart F. 2 C.F.R. § 200.501. A single audit covers all federal funds expended during a fiscal year, not just FEMA funds. The cost of audit services may be allowable per 2 C.F.R. § 200.425, but non-federal entities must select auditors in accordance with 2 C.F.R. § 200.509, including following the proper procurement procedures. For additional information on single audit reporting requirements, see Section F.4.e of this NOFO.

The objectives of single audits are to:

- Determine if financial statements conform to generally accepted accounting principles (GAAP);
- Determine whether the schedule of expenditures of federal awards is presented fairly;
- Understand, assess, and test the adequacy of internal controls for compliance with major programs; and
- Determine if the entity complied with applicable laws, regulations, and contracts or grants.

For single audits, the auditee is required to prepare financial statements reflecting its financial position, a schedule of federal award expenditures, and a summary of the status of prior audit findings and questioned costs. The auditee also is required to follow up and take appropriate corrective actions on new and previously issued but not yet addressed audit findings. The auditee must prepare a corrective action plan to address the new audit findings. 2 C.F.R. §§ 200.508, 200.510, 200.511.

Non-federal entities must have an audit conducted, either single or program-specific, of their financial statements and federal expenditures annually or biennially pursuant to 2 C.F.R. § 200.504. Non-federal entities must also follow the information submission requirements of 2 C.F.R. § 200.512, including submitting the audit information to the [Federal Audit Clearinghouse](#) within the earlier of 30 calendar days after receipt of the auditor's report(s) or nine months after the end of the audit period. The audit information to be submitted include the data collection form described at 2 C.F.R. § 200.512(c) and Appendix X to 2 C.F.R. Part 200 as well as the reporting package described at 2 C.F.R. § 200.512(b).

The non-federal entity must retain one copy of the data collection form and one copy of the reporting package for three years from the date of submission to the Federal Audit Clearinghouse. 2 C.F.R. § 200.512; *see also* 2 C.F.R. § 200.517 (setting requirements for retention of documents by the auditor and access to audit records in the auditor's possession).

FEMA, the DHS OIG, the GAO, and the pass-through entity (if applicable), as part of monitoring or as part of an audit, may review a non-federal entity's compliance with the single audit requirements. In cases of continued inability or unwillingness to have an audit conducted in compliance with 2 C.F.R. Part 200, Subpart F, FEMA and the pass-through

entity, if applicable, are required to take appropriate remedial action under 2 C.F.R. § 200.339 for noncompliance, pursuant to 2 C.F.R. § 200.505.

11. Payment Information

FEMA uses the Direct Deposit/Electronic Funds Transfer (DD/EFT) method of payment to recipients.

FEMA utilizes the Payment and Reporting System (PARS) for financial reporting, invoicing, and tracking payments. For additional information, refer to [PARS Security \(fema.gov\)](#).

12. Procedures for Establishing Indirect Cost Rates

The requirements and procedures for establishing indirect cost rates are the same for all the preparedness programs outlined in the FY 2023 [Preparedness Grants Manual](#). The process for establishing the indirect cost rate varies based on the type of entity and the amount of funding they receive:

- If the entity is a non-governmental entity, and is a subrecipient, indirect cost rate procedures are outlined in 2 CFR 200.332(a)(4). These types of entities may either use the de minimis rate or negotiate a rate with the pass-through entity.
- If the subrecipient is a state or local governmental entity, indirect cost rate procedures are established in 2 CFR 200, Appendix VII.
 - Per Paragraph D.1.b. of Appendix VII, state or local governmental entities receiving grant funds must develop an indirect cost rate proposal.
 - If the state or local entity receives more than \$35 million in grant funding, the proposal must be approved by the cognizant agency.
 - If a state or local entity receives \$35 million or less in grant funding, they have to develop an indirect cost rate proposal, but that indirect cost rate proposal does *not* need to be approved by the cognizant agency.
- If a state or local governmental entity wants to use the de minimis rate (instead of developing an indirect cost rate proposal), they can request a case-by-case exception from FEMA (per 2 CFR 200.102(b)).

13. Whole Community Preparedness

Preparedness is a shared responsibility that calls for the involvement of everyone—not just the government—in preparedness efforts. By working together, everyone can help keep the nation safe from harm and help keep it resilient when struck by hazards, such as natural disasters, acts of terrorism, and pandemics.

[Whole Community](#) includes:

- Individuals and families, including those with access and functional needs;
- Businesses;
- Faith-based and community organizations;
- Nonprofit groups;
- Schools and academia;
- Media outlets; and
- All levels of government, including state, local, tribal, territorial, and federal partners.

The phrase “Whole Community” often appears in preparedness materials, as it is one of the guiding principles. It means two things:

1. Involving people in the development of national preparedness documents; and
2. Ensuring their roles and responsibilities are reflected in the content of the materials.

Appendix A: FY 2023 EOC Grant Program Projects

Recipient (State)	Subrecipient	Project Name	Project Federal Amount	25% Project Cost-Share Amount	Total Recipient Federal Amount	Total Recipient Federal + Cost-Share	Recipient M&A Maximum	Subrecipient M&A Maximum
AK	Municipality of Anchorage	Emergency Operations Center Roof Replacement	\$500,000	\$166,667	\$500,000	\$666,667	\$24,168	\$25,000
AZ	Coconino County	Coconino County Emergency Management Enhancements	\$1,184,000	\$394,667	\$1,184,000	\$1,578,667	\$57,231	\$59,200
CA	City of Burbank	Burbank New Emergency Operations Center	\$1,235,750	\$411,917	\$7,918,995	\$10,558,660	\$382,778	\$61,788
	City of Commerce	City of Commerce - Public Safety Building/Sheriff's Substation (EOC)	\$1,482,900	\$494,300				\$74,145
	County of Lake	Lakeport Armory Facility Repurposing Project	\$988,600	\$329,533				\$49,430
	Phelan Pinon Hills Community Services District	PPHCSD Civic Center & Community Emergency Operations Center	\$2,000,000	\$666,667				\$100,000
	City of Montebello	Public Safety Critical Communications Upgrade Project	\$2,211,745	\$737,248				\$110,587
CO	Chaffee County Government	Chaffee County North End Public Safety Complex	\$1,000,000	\$333,333	\$2,308,000	\$3,077,333	\$111,561	\$50,000
	Jefferson County Sheriff's Office	Jefferson County Emergency Operations Center Relocation	\$480,000	\$160,000				\$24,000
	City of Monte Vista	Monte Vista Emergency Disaster Resources	\$828,000	\$276,000				\$41,400
CT	CT Dept of Emergency Services and Public Protection	Connecticut Department of Emergency Services & Public Protection State Interagency Coordination Center	\$656,000	\$218,667	\$6,059,850	\$8,079,800	\$292,913	\$32,800

Appendix A: FY 2023 EOC Grant Program Projects

Recipient (State)	Subrecipient	Project Name	Project Federal Amount	25% Project Cost-Share Amount	Total Recipient Federal Amount	Total Recipient Federal + Cost-Share	Recipient M&A Maximum	Subrecipient M&A Maximum
	Town of Middlefield	Emergency Operation Center Grant: Town of Middlefield, CT	\$2,224,350	\$741,450				\$111,218
	Town of Madison	Madison CT Emergency Operations Center	\$2,471,500	\$823,833				\$123,575
	Town of Old Lyme	Old Lyme Emergency Operations Center	\$708,000	\$236,000				\$35,400
FL	Martin County	Emergency Operations Center Resiliency	\$750,000	\$250,000	\$6,578,175	\$8,770,900	\$317,967	\$37,500
	Hardee County, Florida	Funding for Hardee County Emergency Operation Center	\$481,391	\$160,464				\$24,070
	Suwannee County Board of County Commissioners	Suwannee County EOC Construction	\$2,346,784	\$782,261				\$117,339
	Wakulla County Board of Commissioners	Wakulla County Emergency Operations Center	\$3,000,000	\$1,000,000				\$150,000
GA	City of Atlanta	Atlanta Emergency Operations Center	\$248,000	\$82,667	\$2,688,167	\$3,584,223	\$129,937	\$12,400
	Chatham County Board of Commissioners	Chatham County Emergency Operations Center	\$1,200,000	\$400,000				\$60,000
	City of East Point	East Point Emergency Operations Center	\$1,079,000	\$359,667				\$53,950
	Miller County Government	Emergency Operations Center Communications Upgrade	\$161,167	\$53,722				\$8,058
HI	County of Maui	Maui Emergency Operations Center	\$1,400,000	\$466,667	\$1,400,000	\$1,866,667	\$67,671	\$70,000
IA	Buchanan County Emergency Management	Buchanan County Emergency Operations Center	\$208,000	\$69,333	\$208,000	\$277,333	\$10,054	\$10,400

Appendix A: FY 2023 EOC Grant Program Projects

Recipient (State)	Subrecipient	Project Name	Project Federal Amount	25% Project Cost-Share Amount	Total Recipient Federal Amount	Total Recipient Federal + Cost-Share	Recipient M&A Maximum	Subrecipient M&A Maximum
IL	City of Rockford	City of Rockford Emergency Operations Center	\$1,000,000	\$333,333	\$1,000,000	\$1,333,333	\$48,337	\$50,000
LA	Desoto Parish	Louisiana Sheriff's Task Force Emergency Operations Center	\$375,000	\$125,000	\$8,132,000	\$10,842,667	\$393,074	\$18,750
	City of New Orleans Emergency Operations Center	New Orleans Office of Emergency Preparedness	\$4,757,000	\$1,585,667				\$237,850
	Vermilion Parish	Vermilion Safe Room	\$3,000,000	\$1,000,000				\$150,000
MA	Massachusetts Emergency Management Agency	Massachusetts Emergency Management Agency EOC Funding	\$2,700,000	\$900,000	\$2,700,000	\$3,600,000	\$130,509	\$135,000
MD	Allegany County	Allegany County Department of Emergency Services Emergency Operations Center Upgrade	\$41,000	\$13,667	\$6,211,476	\$8,281,968	\$300,242	\$2,050
	St. Mary's County Government	Emergency Communications Center Expansion	\$1,537,000	\$512,333				\$76,850
	Anne Arundel County	Emergency Operations Center	\$2,471,500	\$823,833				\$123,575
	Frederick County Government	Emergency Operations Center	\$869,968	\$289,989				\$43,498
	Garrett County	Garrett County Emergency Communications 9-1-1	\$698,848	\$232,949				\$34,942
	Prince George's County, Maryland	Prince George's County Emergency Operations Center	\$593,160	\$197,720				\$29,658
ME	Hancock County Emergency Management Agency	Hancock County Emergency Operations Center	\$1,500,000	\$500,000	\$1,500,000	\$2,000,000	\$72,505	\$75,000

Appendix A: FY 2023 EOC Grant Program Projects

Recipient (State)	Subrecipient	Project Name	Project Federal Amount	25% Project Cost-Share Amount	Total Recipient Federal Amount	Total Recipient Federal + Cost-Share	Recipient M&A Maximum	Subrecipient M&A Maximum
MI	Charter Township of Bloomfield	Bloomfield Township Emergency Operation Center	\$181,266	\$60,422	\$181,266	\$241,688	\$8,762	\$9,063
MS	Lafayette County Emergency Management Agency	Lafayette County Emergency Operations Center	\$3,000,000	\$1,000,000	\$5,900,000	\$7,866,667	\$285,186	\$150,000
	Pearl River County	Pearl River County Multipurpose and Emergency Operations Center	\$2,900,000	\$966,667				\$145,000
NH	Manchester Fire Department	City of Manchester Emergency Operations Center Renovations	\$338,000	\$112,667	\$1,396,791	\$1,862,388	\$67,516	\$16,900
	Walpole Fire District	Walpole Fire and EMS Emergency Operations Center Project	\$1,058,791	\$352,930				\$52,940
NJ	Borough of Carteret	Carteret OEM Building Renovation and Expansion Project	\$1,000,000	\$333,333	\$1,370,725	\$1,827,633	\$66,256	\$50,000
	South Plainfield Police Department	South Plainfield Emergency Operations Center Modernization	\$370,725	\$123,575				\$18,536
NM	New Mexico Department of Homeland Security and Emergency Management	State of New Mexico Emergency Operations Center	\$617,000	\$205,667	\$617,000	\$822,667	\$29,824	\$30,850
NY	Village of Kiryas Joel	Kiryas Joel Emergency Operations Center Project	\$825,000	\$275,000	\$4,001,813	\$5,335,751	\$193,434	\$41,250
	Livingston County	Livingston County Emergency Operations Center Resilient Microgrid	\$250,000	\$83,333				\$12,500
	New York City Office of Emergency Management	New York Emergency Management Queens Borough Coordination Center	\$926,813	\$308,938				\$46,341

Appendix A: FY 2023 EOC Grant Program Projects

Recipient (State)	Subrecipient	Project Name	Project Federal Amount	25% Project Cost-Share Amount	Total Recipient Federal Amount	Total Recipient Federal + Cost-Share	Recipient M&A Maximum	Subrecipient M&A Maximum
	County of Orleans	Orleans County Emergency Management and Operations Center	\$2,000,000	\$666,667				\$100,000
OR	City of Dallas	City of Dallas Emergency Operations Center	\$83,000	\$27,667	\$780,000	\$1,040,000	\$37,703	\$4,150
	Grant County Sheriff's Office Emergency Management	Grant County Emergency Operations Center Modernization	\$299,000	\$99,667				\$14,950
	Harney County	Harney County Generator for Continuity of Operations	\$221,000	\$73,667				\$11,050
	Morrow County	Morrow County Primary EOC Generator	\$177,000	\$59,000				\$8,850
PA	Borough of Archbald	Archbald Borough Municipal Complex Project	\$2,965,800	\$988,600	\$3,311,810	\$4,415,747	\$160,082	\$148,290
	Palmer Municipal Fire Department	Palmer Fire Department Emergency Operations Center	\$346,010	\$115,337				\$17,301
RI	Town of Glocester	Glocester Emergency Operations Center	\$1,000,000	\$333,333	\$1,525,000	\$2,033,333	\$73,713	\$50,000
	RI Emergency Management Agency	Rhode Island Emergency Operations Improvements	\$525,000	\$175,000				\$26,250
SC	Calhoun County	Calhoun County Emergency Operations Center	\$1,668,263	\$556,088	\$9,168,263	\$12,224,351	\$443,163	\$83,413
	SC Emergency Management Division	South Carolina Emergency Management Division	\$7,500,000	\$2,500,000				\$375,000
TX	Duval County	Duval County Emergency Operations Center	\$2,965,800	\$988,600	\$3,225,308	\$4,300,411	\$155,901	\$148,290
	City of Stafford	Stafford Emergency Operations Center Update	\$259,508	\$86,503				\$12,975

Appendix A: FY 2023 EOC Grant Program Projects

Recipient (State)	Subrecipient	Project Name	Project Federal Amount	25% Project Cost-Share Amount	Total Recipient Federal Amount	Total Recipient Federal + Cost-Share	Recipient M&A Maximum	Subrecipient M&A Maximum
UT	West Valley City	West Valley City Mobile Emergency Operations Center Project	\$800,000	\$266,667	\$800,000	\$1,066,667	\$38,669	\$40,000
VA	Arlington County	Countywide Incident Command Center (CICC)	\$1,000,000	\$333,333	\$2,482,900	\$3,310,533	\$120,015	\$50,000
	City of Virginia Beach	Emergency Operations Center IT Modernization	\$1,482,900	\$494,300				\$74,145
VT	Town of Rutland	Rutland Town Public Safety Center	\$158,176	\$52,725	\$158,176	\$210,901	\$7,646	\$7,909
WA	City of Bothell	Emergency Coordination Center - North, Backup Power Generator	\$741,450	\$247,150	\$5,643,570	\$7,524,760	\$272,791	\$37,073
	Walla Walla County	Emergency Operations Center Relocation	\$750,000	\$250,000				\$37,500
	Kittitas County	Regional Emergency Management Operations and Search and Rescue Facility	\$1,186,320	\$395,440				\$59,316
	Clallam County	The Clallam County and City of Port Angeles Joint Emergency Services and Public Safety Facility	\$2,965,800	\$988,600				\$148,290
WV	Morgan County Office of Emergency Services	Morgan County Alternative Communications Operations	\$189,000	\$63,000	\$189,000	\$252,000	\$9,136	\$9,450
TOTALS:			\$89,140,285		\$89,140,285		\$4,308,744	

CIVIC CENTER DEVELOPMENT PHASE I
PHELAN PINON HILLS COMMUNITY SERVICES DISTRICT
TECHNICAL SPECIFICATIONS

Refer to attached Technical Specifications, prepared by various professionals for this Project.

PHELAN PINON HILLS CIVIC CENTER DEVELOPMENT PHASE I PROJECT

TECHNICAL SPECIFICATIONS - TABLE OF CONTENTS

These technical specifications were prepared by various professionals qualified in their respective disciplines. The following professionals were responsible for preparing these technical specifications, and their initials are indicated by each specification section as being the responsible architect of record (AOR) and engineer of record (EOR) for corresponding sections prepared by each respective AOR/EOR. Profession seals on these technical specifications correspond to each individual listed and the respective specification sections each is responsible for:

- Steven G. Tanaka, P.E. (SGT), Wallace Group, License C49779
- Thomas R. Steeno (TRS), Steeno Design Studio, Inc., Licensed Architect #26448
- Matthew J. Wilkins, Wallace Group, LA # 6398



SPECIFICATIONS GROUP**RESPONSIBLE AOR/EOR****GENERAL REQUIREMENTS SUBGROUP****Division 01 – General Requirements**

01 11 00	Summary of Work	SGT
01 11 16	Work by Owner	SGT
01 20 00	Price and Payment Procedures.....	SGT
01 26 13	Requests for Information.....	SGT
01 30 00	Administrative Requirements	SGT
01 32 16.13	Network Analysis Schedules	SGT
01 35 00	Special Project Procedures	SGT
01 50 00	Temporary Facilities and Controls.....	SGT
01 57 23	Temporary Storm Water Pollution Control.....	SGT
01 60 00	Product Requirements	SGT
01 70 00	Execution and Closeout Requirements	SGT

FACILITY CONSTRUCTION SUBGROUP**Division 02 – Existing Conditions -NOT USED****Division 03 - Concrete**

03 11 00	Concrete Forming	TRS
03 20 00	Concrete Reinforcing	TRS
03 30 00	Cast In Place	TRS

Division 04 – Masonry

04 22 23	Architectural Concrete Unit Masonry.....	TRS
04 73 00	Simulated Masonry	TRS

Division 05 – Metals

05 12 00	TRS Steel	TRS
05 51 33	Metal Ladders	TRS
05 52 00	Metal Railings	TRS

Division 06 – Wood, Plastics, and Composites

06 10 00	Rough Carpentry.....	TRS
06 20 00	Finish Carpentry	TRS
06 41 16	Plastic Laminate-Clad Architectural Cabinets.....	TRS

Division 07 – Thermal and Moisture Protection

07 50 00	Membrane Roofing	TRS
07 60 00	Flashing and Sheet Metal	TRS
07 90 00	Joint Protection	TRS

Division 08 – Openings

08 10 00	Doors and Frames	TRS
08 51 13	Aluminum Windows	TRS

Division 09 – Finishes		RESPONSIBLE AOR/EOR
09 20 00	Plaster and Gypsum Board	TRS
09 30 00	Tile Setting Materials and Accessories.....	TRS
09 30 14	Porcelain Tile Floor Finishing	TRS
09 51 00	Acoustical Ceilings.....	TRS
09 65 00	Resilient Flooring	TRS
09 65 19	Resilient Tile Flooring	TRS
09 68 13	Tile Carpeting	TRS
09 77 33	Fiber Reinforced Plastic Panels	TRS

Division 10 - Specialties	
10 28 00	Toilet and Bath Accessories.....TRS
10 44 00	Fire Protection Specialties

Division 11through 14 – NOT USED

FACILITY SERVICES SUBGROUP

Division 21 – Fire Suppression – NOT USED

Division 22 – Plumbing	
22 10 00	Plumbing Piping.....TRS

Division 23 – Heating, Ventilating, and Air Conditioning	
23 00 00	Heating, Ventilating, and Air Conditioning

Division 25 – Integrated Automation – NOT USED

Division 26 - Electrical	
26 05 33.13	Conduit for Electrical Systems
26 05 33 16	Boxes for Electrical Systems.....
26 05 53	Conductors
26 05 70	Wiring Devices.....
26 24 16	Panelboards.....
26 24 19	Motor Control Centers.....

SITE AND INFRASTRUCTURE SUBGROUP

Division 31 – Earthwork – NOT USED

Division 32 – Exterior Improvements

32 01 90	Landscape Maintenance.....	MJW
32 84 00	Planting Irrigation.....	MJW
32 93 00	Plants.....	MJW

Division 33 to 35 – Not Used

PROCESS EQUIPMENT SUBGROUP – Not Used

SECTION 01 11 00

SUMMARY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work Included.
- B. Work Not Included.
- C. Location of Site and Site Access
- D. Work by Owner.
- E. Owner supplied products.
- F. Contractor's use of site and premises.
- G. Work sequence.
- H. Geotechnical Report.
- I. Specifications and Drawings.

1.02 WORK INCLUDED

- A. The work will include a new 14,034 SF Civic Center building, which will include a 3,592 SF Community Emergency Response Center (EOC). This facility will be located at the intersection of Warbler Road and Sheep Creek Road, Phelan, California. This Project will be funded in part using federal funds from the Department of Homeland Security, Federal Emergency Management Agency, Fiscal Year 2023 Emergency Operations Center (EOC) Grant.
- B. The Work consists of items listed in the Base Bid. Refer to Section 01 20 00 for further definition.

1.03 WORK NOT INCLUDED

- A. Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is NOT included in this Contract.
 - 1. Work shown, but marked "NIC" (Not in Contract) or otherwise designated to be performed by others.

1.04 LOCATION OF SITE AND SITE ACCESS

- A. The Site is located at the intersection of Warbler Road and Sheep Creek Road, Phelan, California.
- B. All Work is on lands owned by the Phelan Pinon Hills CSD, and in County of San Bernardino right-of-way, subject to conditions of indicated permits.

1.05 WORK BY OWNER

- A. Contractor shall coordinate with other Work as it may impact this project. Such coordination shall be included in the contract price for the various items of Work, and no additional compensation shall be allowed.
- B. Refer to Section 01 11 16, Work by Owner, for owner-furnished-contractor-installed (OFCI) and owner-furnished-owner-installed (OFOI) equipment.

1.06 OWNER SUPPLIED PRODUCTS

- 1. Refer to Paragraph 1.05 above, and Section 01 11 16, Work by Owner.

1.07 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Access to Site: Limited to the Project Site shown on the contract drawings, Sheep Creek Road at Warbler Road, Phelan Piñon Hills CSD. The Project Site is on parcels APN 3066-261-10 and 3066-251-18.
- B. The main access to the Project Site will be off of Sheet Creek Road, north of Warbler Road.
- C. Time Restrictions for Performing Work: 7 am to 5 pm, Monday through Friday, excluding weekends and holidays.
- D. Rights-Of-Way: A portion of the Work is in public right-of-way as shown on the drawings. Owner has secured necessary County of San Bernardino encroachment permit for construction in the County right of way. Contractor shall maintain all Work areas in right-of-way and lands owned by the Owner. Clean debris and trash on a daily basis, and at a minimum restore site to original conditions at the completion of the Work.
- E. Construction Access Restriction and Security. Provide temporary 6-foot chain link fencing to ensure that there is no entry of unauthorized personnel to the off-site work areas. Maintain access to the Owner and authorized personnel, to Owner's facilities at all times. Provide dual locks to allow access by Contractor and Owner.
- F. Final Cleanup: The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the Work by the Owner will be withheld until the Contractor

has satisfactorily complied with the foregoing requirements for final cleanup of the project site

1.08 WORK SEQUENCE

- A. Submit Construction Work Plan at Pre-Construction Meeting, dovetailing sequencing details with Schedule as required in Section 01 32 16.13, Construction Progress Schedule. Owner and Engineer shall approve such plan prior to Contractor starting construction operations.
- B. Prior to commencement of work and within 7 calendar days of Notice to Proceed, verify and confirm, to the Owner's Representative in writing, the existing grades, elevations and conditions of the site. Any discrepancies between existing conditions and the contract documents must be brought to the Owner's attention during that time frame.
- C. Prepare schedules as set forth in Section 01 32 16.13, Construction Progress Schedule.

1.09 GEOTECHNICAL INVESTIGATION - A geotechnical investigation has been performed for the Owner in order to obtain relative data concerning the character of material in and upon which the project is to be built. This geotechnical report was prepared by ALR Engineering, dated October 30, 2013, and revised April 25, 2022. This report is incorporated into these Contract Documents

- A. In regards the soils to be encountered, the data contained in the report may be used for information only of the soil encountered at the location and on the date stated. The Contractor is solely responsible for satisfying itself as to the kind and type of soil to be encountered and any water or other subsurface conditions which might affect the construction of the project.
- B. Only where specifically called out in these specifications, the report may be used for design parameters in the preparation of shop drawings for the Project.

1.010 SPECIFICATIONS AND DRAWINGS

- A. The Specifications are those bound in this Project Manual, referenced specifications in the 2024 Greenbook, and specification notes and requirements included on the Drawings, which include the PPHCSD utility standards. All sections of the Project Manual, including Notice Inviting Bids and Instructions to Bidders, are part of the Contract Documents for this Work. The Project Manual consists of the Notice Inviting Bids, Instructions to Bidders, Contract, General Conditions of the Contract for Construction, Special Provisions, Division 01 through 32 technical specifications, and 2024 Greenbook technical specifications where specifically referenced.
- B. The Drawings consist of 66 sheets prepared by Steeno and other subconsultants.
- C. Where reference is made to "Engineer" and/or "Architect", such reference shall mean the Architect of Record and/or Engineer of Record, the licensed

professional who prepared and signed/stamped the specific drawings and specifications pertaining to a specific item of Work within these Contract Documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Work in this Section shall include, but not be limited to, the following:
1. Coordinate with Owner during the delivery, receipt of owner-furnished-contractor-installed (OFCI) and owner-furnished-owner-installed (OFOI) equipment/materials.
 2. Transport OFCI equipment from identified storage facility to Project Site, and install OFCI equipment, all as part of the Contract at no additional cost to Owner. OFOI equipment and materials will be the responsibility of the Owner.
 - a. Specific OFCI equipment will be delivered to the Project Site, while other OFCI equipment will be delivered to the off-site storage facility. Contractor shall be responsible for receiving and off-loading OFCI equipment delivered to the Project Site.
 3. OFCI and OFOI equipment includes:
 - a. Accessories, refer to attached listing (at the end of this Section). Wall mirrors are OFCI. Owner to store at the off-site storage facility (building).
 - b. Equipment/Appliances (OFCI), refer to attached listing (at the end of this Section). Owner to store at the off-site storage facility (building).
 - c. Furniture (OFOI), refer to attached listing (at the end of this Section) Owner to store at the off-site storage facility (building).
 - d. Electrical Equipment (OFCI) to be delivered to Project Site:
 - 1) EATON Switchgear Package, which includes Distribution Board "MS", Distribution Board "EX-Modular-DB", Distribution Board "CC-DB",
 - 2) 200 KW Generator "NG" and By-Pass Isolation "ATS" as shown on Sheets E2 Single Line and per attached BOM.
- B. Owner has an off-site storage facility (building) to receive and store certain OFCI and OFOI equipment, as identified above. This off-site storage facility is located at 10433 Mountain Road, Pinon Hills, CA 92372. The building is secured/locked, and Owner will provide Contractor with key to the building. The building is equipped with two large rollup doors, and driveway, to accommodate access for loading/unloading.
- C. Pre-Installation Meeting(s). Contractor, Owner, Owner's Representative and AOR/EOR shall hold a pre-installation meeting for indicated equipment, to verify all stub-ups and points of connection are placed in the proper location as shown on the drawings, to verify proper location to identify if any such stub-up locations require updates or changes prior to concrete pour, to verify all required utility connections are accommodated on the drawings for proper operation of the OFCI equipment, and that such utilities will be of the size and utility service type shown on the drawings. The following OFCI items require a pre-installation meeting:
1. EATON Switchgear Package
 2. 200 KW Generator

- D. Prior to shipment of OFCI equipment to be shipped directly to the Project Site, Contractor shall verify that the equipment is ready to be received, including providing concrete equipment pads, utility piping, pipe couplings and other materials related to proper connection of utilities to the OFCI equipment.

1.2 SUBMITTALS

- A. Submittal review of OFCI equipment and OFOI equipment is the responsibility of the Owner.
- B. Operations and Maintenance manuals and equipment warranty information for OFCI and OFOI equipment will be provided to Contractor by the Owner. Contractor shall include all such O&M and warranty information in the O&M Manual required as part of Close-out Submittals.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 GENERAL

- A. Perform all Work of this Section in accordance with the approved Work Plan, and in close coordination with the Owner, Owner's Representative, and AOR/EOR.

3.2 RECEIVING AND HANDLING OFCI AND OFOI EQUIPMENT

- A. Closely coordinate with Owner and Owner's Representative for coordination and timing of shipment of OFCI equipment delivered to the Project Site.
- B. OFCI Equipment Delivered to Project Site
 - 1. Contractor shall off-load OFCI equipment delivered to the Project Site, including providing necessary crane or other equipment to off-load such equipment.
 - a. Contractor shall accommodate site access for equipment delivery and off-loading. Notify Owner's Representative a minimum of 3 working days prior to scheduled delivery, to allow Owner's Representative to be present to witness such equipment delivery/off-loading.
 - b. Prior to delivery of OFCI equipment to the Project Site, Contractor shall have prepared all equipment pads required to receive such equipment, including adequate concrete cure times.
 - c. Upon off-loading OFCI equipment, Contractor shall document and verify equipment has been shipped and off-loaded in un-damaged and new condition. Any noted damage, not caused by Contractor's off-loading of equipment, shall be addressed by the Manufacturer, at no additional cost to the Owner. If equipment sustains damage during off-loading, Contractor shall repair/replace equipment at no additional cost to Owner.

- d. Contractor shall be responsible for proper storage of OFCI equipment delivered to the Project Site, prior to installation.
- C. OFCI Equipment Delivered to Off-Site Storage Facility
 - 1. Coordinate and cooperate with Owner, Owner's Representative, and AOR/EOR.
 - 2. OFCI Equipment Delivered to Off-Site Storage Facility is the responsibility of the Owner. Loading and transporting such equipment from the Off-Site Storage Facility to the Project Site shall be the responsibility of the Contractor.
 - a. Verify with Owner and Owner's Representative that equipment is undamaged prior to loading equipment. Transport equipment to the Project Site. Off-load and properly store such OFCI equipment until ready for installation.
- D. OFOI Equipment Delivered to Off-Site Storage Facility
 - 1. Do not transport such identified equipment to the Project Site. Such delivery will be the responsibility of the Owner.

3.3 INSTALLATION AND FIELD SERVICES

- A. Coordinate with Manufacturers' Representatives for those equipment items requiring field support during installation and start-up.

END OF SECTION

QUOTE TO:
PHELAN/ PINON HILLS COMMUNITY SERVICES DISTRICT
ATT: GEORGE CARDENAS
(760) 868-1212 x319
GCardenas@PPHCSD.org



FROM:
ALLGOOD INTERIORS, INC.
CONTACT: MARIA ALLGOOD
714-742-1054
MARIA@ALLGOODINTERIORS.COM

8.13.2025

PROJECT:
Phelan/ Pinon Hills Community Services District - Civic Center
9535 Sheep Creek Rd.
Phealn, CA 92329

FF& E - FURNITURE, FINISHES & EQUIPMENT

Per itemized quotes on the following pages:

ACCESSORIES	\$ 2,667
EQUIPMENT	\$ 13,755
FURNITURE	\$174,329
WALLCOVERING	\$ 19,620
LIGHTING	\$ 49,835

TOTAL	\$260,206
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- Based on drawings & specifications dated 4.11.2025 from Steeno Design Studio, Inc.
- Refer to Contract for excluded items or services.

**** THANK YOU FOR THIS OPPORTUNITY! ****

QUOTE TO: PPHCSD
 9535 Sheep Creek RD
 Phelan, CA 92329
 Att: George Cardenas
 (760) 617-3677
 GCardenas@PPHCSD.org



QUOTE

QUOTE : PPHCSD-AS-081025
 DATE August 10, 2025
 CUSTOMER ID: PPHCSD CIVIC CENTER

Ship To: Jobsite/GC
 PPHCSD CIVIC CENTER
 9535 Sheep Creek RD
 Phelan, CA 92329

FROM: Allgood Interiors, Inc.
 36 Wakonda
 Dove Canyon, CA 92679
 Contact: Maria Allgood (714) 742-1054

ITEM	JOB	TERMS	LEAD TIME
Item: Accessory AS-1,3,4,5,6,7,8	PPHCSD	Proforma	6-8 weeks
QUANTITY	DESCRIPTION OF ITEMS	PRICE	Ext.
3	AS-1: Hands Free Trash OFOI	\$ 270.00	\$ 810.00
	See Sheet ID-1.0 & ID-4.2		
3	AS-3: Under Counter Trash Receptacle OFOI	\$ 70.00	\$ 210.00
	See Sheet ID-1.0, ID-2.0 & ID-2.1		
2	AS-4: Portable Queue Stanchion Posts OFOI	\$ 230.00	\$ 460.00
	See Sheet ID-1.0		
1	AS-5: Wall Mounted Mirror OFCI	\$ 245.00	\$ 245.00
	See Sheet ID-1.0		
3	AS-6: Pill Shaped Oblong Mirror OFCI	\$ 160.00	\$ 480.00
	See Sheet ID-4.1 & 4.2		
2	AS-7: Automatic Trash Can OFOI	\$ 135.00	\$ 270.00
	See Sheet ID-4.2		
SUBTOTAL			\$ 2,475.00
Sales Tax-7.75%			\$ 192.00
Estimated Handling/Freight			
TOTAL PAID			
BALANCE DUE			\$ 2,667.00

APPROVED BY

Date

SIGNATURE

QUOTE TO: PPHCSD
 9535 Sheep Creek RD
 Phelan, CA 92329
 Att: George Cardenas
 (760) 617-3677
 GCardenas@PPHCSD.org



QUOTE

QUOTE : PPHCSD-EQ-081025
 DATE August 10, 2025
 CUSTOMER ID: PPHCSD CIVIC CENTER

Ship To: Jobsite/GC
 PPHCSD CIVIC CENTER
 9535 Sheep Creek RD
 Phelan, CA 92329

ALL EQUIPMENT LISTED BELOW IS
 OWNER-FURNISHED-CONTRACTOR-INSTALLED
 (OFCI).

FROM: Allgood Interiors, Inc.
 36 Wakonda
 Dove Canyon, CA 92679
 Contact: Maria Allgood (714) 742-1054

ITEM	JOB	TERMS	LEAD TIME
item: Equipment (appliances)	PPHCSD	Proforma	6-10 Weeks

QUANTITY	DESCRIPTION OF ITEMS	PRICE	Ext.
	Equipment		
1	EQ-1: Counter Depth Refrigerator	\$ 1,855.00	\$ 1,855.00
	See sheet ID.1.0 & 2.1		
1	EQ-2: SS Gas Oven @ 30" x 29"	\$ 1,650.00	\$ 1,650.00
	See sheet ID-1.0 & ID-2.1		
1	EQ-3: Above Range Microwave	\$ 325.00	\$ 325.00
	See sheet ID-1.0 & ID-2.1		
1	EQ-6: Dishwasher @ 24" x 24" x 34" h.	\$ 590.00	\$ 590.00
	See sheet ID-1.0 & ID-2.1		
3	EQ-7: Mini Frige @ 22" x 24" x 34" H	\$ 350.00	\$ 1,050.00
	See sheet ID-1.0 & ID-2.0		
2	EQ-8: Counter Top Microwave @ 16" x 19" x 11.5" Ht.	\$ 195.00	\$ 390.00
	See sheet ID-1.0, ID-2.1 & ID-4.2		
1	EQ-13: Side by Side Refrigerator @ 36" x 32" x 69" Ht.	\$ 1,975.00	\$ 1,975.00
	See sheet ID-1.0 & ID-4.2		
1	EQ-14: SS Work Table @ 36" x 24"	\$ 280.00	\$ 280.00
	See sheet ID-4.2		
1	EQ-15: SS Work Table @ 72" x 24"	\$ 445.00	\$ 445.00
	See sheet ID-4.2		
SUB-TOTAL			\$ 8,560.00

[illegible]



QUOTE TO: PPHCSD
9535 Sheep Creek RD
Phelan, CA 92329
Attn: George Cardenas
(760) 617-3677
GCardenas@PPHCSD.org









QUOTE: Furniture-FF&E

QUOTE : PPHCSD-WC-081025
DATE August 10, 2025
CUSTOMER ID: PPHCSD CIVIC CENTER

Ship To: Jobsite/GC
PPHCSD CIVIC CENTER
9535 Sheep Creek RD
Phelan, CA 92329

ALL FURNITURE ITEMS BELOW ARE
OWNER-FURNISHED-OWNER-INSTALL
ED (OFOI)

FROM: Allgood Interiors, Inc.
36 Wakonda
Dove Canyon, CA 92679
Contact: Maria Allgood (714) 742-1054

ITEM	JOB	TERMS	LEAD TIME
Furniture	PPHCSD	Proforma	8-12 Weeks
QUANTITY	DESCRIPTION OF ITEMS	PRICE	Ext.
	OFFICE FURNITURE-Pg 1		
1	F-1: SETTEE @ 72" X 27" X 34" HT. LOCATION: SEE SHEET ID-1.0	 \$ 1,640.00	\$ 1,640.00
1	F-2: : SETTEE @48" X 27" 34" HT. LOCATION: SEE SHEET ID-1.0	 \$ 1,150.00	\$ 1,150.00
2	F-3: TABLE WITH BASE @30" X 48" LOCATION: SEE SHEET ID-1.0	 \$ 480.00	\$ 960.00
1	F-4: TABLE WITH BASE ! 24" X 30" LOCATION: SEE SHEET ID-1.0	 \$ 325.00	\$ 325.00
8	F-5: BARISTA ARMLESS CHAIR @ 16" X 14.5" X 34" HT. LOCATION: SEE SHEET ID-1.0	 \$ 290.00	\$ 2,320.00
1	F-6: ISLAND TABLE @ 72" X 30" LOCATION: SEE SHEET ID-1.0	 \$ 790.00	\$ 790.00
3	F-7:ACCENT BARREL ARM CHAIR LOCATION: SEE SHEET ID-1.0	 \$ 495.00	\$ 1,485.00
1	F-8:ROUND 31.5" COFFEE TABLE W/ STORAGE LOCATION: SEE SHEET ID-1.0	 \$ 650.00	\$ 650.00
1	F-9: CONSOLE TABLE @ 47.2" X 15.7" X 29.9" HT. LOCATION: SEE SHEET ID-1.0	 \$ 380.00	\$ 380.00
1	F-10: LOT OF POTTED PLANT (3) LOCATION: SEE SHEET ID-1.0	 \$ 1,900.00	\$ 1,900.00
1	F-11: CONFERENCE TABLE @ 144" X 47.2" LOCATION: SEE SHEET ID-1.0	 \$ 2,200.00	\$ 2,200.00
23	F-12: FLEX HIGH BACK OFFIC CHAIR LOCATION: SEE SHEET ID-1.0	 \$ 390.00	\$ 8,970.00
		SUB-TOTAL	\$ 22,770.00

QUANTITY	DESCRIPTION OF ITEMS	PRICE	Ext.
	FURNITURE-Con't Pg 2		
50	F-13: GUEST STACKABLE CHAIR @ 21" X 24.75" X 33" HT. LOCATION: SEE SHEET ID-1.0 (2 EXTRA)	\$ 275.00	\$ 13,750.00
2	F-14: TABLE DESK WITH DATA PORT @36" X 72" LOCATION: SEE SHEET ID-1.0	\$ 1,800.00	\$ 3,600.00
1	F-15:PODIUM @ 24" X 21" X 46" HT. LOCATION: SEE SHEET ID-1.0	\$ 590.00	\$ 590.00
14	F-16: METAL FRAME DESK @ 36" X 71" LOCATION: SEE SHEET ID-1.0 (ASSEMBLE)	\$ 1,800.00	\$ 25,200.00
14	F-17: METAL FRAME CREDENZA @ 24" X 71" LOCATION: SEE SHEET ID-1.0 (ASSEMBLE)	\$ 1,550.00	\$ 21,700.00
40	F-18: ARMLESS STACKING CHAIR @ 19" X 18" X 31.5" LOCATION: SEE SHEET ID-1.0 (2 EXTRA)	\$ 320.00	\$ 12,800.00
6	F-19: CAFE AU LAIT TABLE @ 36" ROUND LOCATION: SEE SHEET ID-1.0	\$ 650.00	\$ 3,900.00
16	F-20: HARPER HIGH BACK OFFICE CHAIR @ 27" X 29" LOCATION: SEE SHEET ID-1.0	\$ 550.00	\$ 8,800.00
7	F-21: BOOK CASE @ 36" X 12" X 72" HT. LOCATION: SEE SHEET ID-1.0	\$ 520.00	\$ 3,640.00
1	F-22: LATERAL FILE W/SHELVES @ 36" X 13" X 43" HT. LOCATION: SEE SHEET ID-1.0 (ASSEMBLE)	\$ 1,690.00	\$ 1,690.00
14	F-23: SHORT MOBLE STEEL BOX @ 15 3/4" X 20.5" X 24" LOCATION: SEE SHEET ID-1.0	\$ 650.00	\$ 9,100.00
2	F-24: U SHAPED EXECUTIVE DESK @ 71" X 108" LOCATION: SEE SHEET ID-1.0 (ASSEMBLE)	\$ 4,800.00	\$ 9,600.00
1	F-25: RIVET PULL UP TABLE @ 10" X 18" LOCATION: SEE SHEET ID-1.0	\$ 220.00	\$ 220.00
1	F-29: WALNUT CONSOLE @ 39" X 9.25" X 32.5" HT. LOCATION: SEE SHEET ID-1.0	\$ 480.00	\$ 480.00
6	F-30: FREESTANDING DIVIDERS @ 52" HT. X 73" W LOCATION: SEE SHEET ID-1.0	\$ 650.00	\$ 3,900.00
6	F-31: L-SHAPED DESK @ 72" X 72" LOCATION: SEE SHEET ID-1.0	\$ 880.00	\$ 5,280.00
8	F-32: MOBLE STORAGE W/CASTERS @ 20.5" X 16.5" X 26"HT. LOCATION: SEE SHEET ID-1.0	\$ 390.00	\$ 3,120.00
10	F-33: DESK CHAIRS W/BLACK MESH @ 22.5" X 22.5" X 37" HT. LOCATION: SEE SHEET ID-1.0	\$ 320.00	\$ 3,200.00
(CONTINUED ON FOLLOWING PAGE)			
		SUB-TOTAL	\$ 153,340.00

QUOTE TO: PPHCSD
 9535 Sheep Creek RD
 Phelan, CA 92329
 Att: George Cardenas
 (760) 617-3677
 GCardenas@PPHCSD.org













QUOTE

QUOTE : PPHCSD-LT-081025
 DATE August 10, 2025
 CUSTOMER ID: PPHCSD CIVIC CENTER

Ship To: Jobsite/GC
 PPHCSD CIVIC CENTER
 9535 Sheep Creek RD
 Phelan, CA 92329

FROM: Allgood Interiors, Inc.
 36 Wakonda
 Dove Canyon, CA 92679
 Contact: Maria Allgood (714) 742-1054

ITEM	JOB	TERMS	LEAD TIME
Item: Lighting Lt-1 to Lt-9	PPHCSD	Proforma	8-12 weeks

QUANTITY	DESCRIPTION OF ITEMS	PRICE	Ext.
1	LT-1: Chandelier @ 37 3/4 Wide See Sheet A-5.0 	\$ 1,300.00	\$ 1,300.00
1	LT-2: LED Pendant @ 63" l x 15.8 Ht See Sheet A-5.0 	\$ 470.00	\$ 470.00
3	LT-3: Pendant @ 21.5 x 15" Ht See Sheet A-5.0 	\$ 790.00	\$ 2,370.00
1	LT-4: Chandelier @ 42" Hl x 42" Dia. See Sheet A-5.0 	\$ 8,500.00	\$ 8,500.00
4	LT-5: Chandelier @ 34" H x 42" Dia. See Sheet A-5.0 	\$ 3,500.00	\$ 14,000.00
1	LT-6: Chandelier @ 34" H x 60" Dia. See Sheet A-5.0 	\$ 6,500.00	\$ 6,500.00
4	LT-7: Backlit Mirror 48" x 35" See Sheet A-5.0, ID-4.0, 4.2 	\$ 1,320.00	\$ 5,280.00
8	LT-8: Wall Sconce 20.75" H x 4.5" W See Sheet A-5.0, ID-2.4 	\$ 490.00	\$ 3,920.00
9	LT-9: Wall Sconce 20" L x 20" W x 12.5"H See Sheet A-5.0, A-2 	\$ 290.00	\$ 2,610.00
2	LT-10: Ext. Fan/Light 60" Blade Span See Sheet A-5.0 	\$ 650.00	\$ 1,300.00
		SUBTOTAL	\$ 46,250.00
		Sales Tax-7.75%	\$ 3,585.00
		Handling/Freight	TBD
		AMOUNT PAID	
		BALANCE DUE	\$ 49,835.00

APPROVED BY	Date
SIGNATURE	

QUOTE TO: PPHCSD
 9535 Sheep Creek RD
 Phelan, CA 92329
 Att: George Cardenas
 (760) 617-3677
 GCardenas@PPHCSD.org






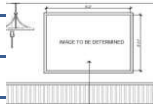



QUOTE

QUOTE : PPHCSD-WC-081025
 DATE August 10, 2025
 CUSTOMER ID: PPHCSD CIVIC CENTER

Ship To: Jobsite/GC
 PPHCSD CIVIC CENTER
 9535 Sheep Creek RD
 Phelan, CA 92329

FROM: Allgood Interiors, Inc.
 36 Wakonda
 Dove Canyon, CA 92679
 Contact: Maria Allgood (714) 742-1054

ITEM	JOB	TERMS	LEAD TIME
Item: Wallcovering WC-1 to 7	PPHCSD	Proforma	6-8 weeks
QUANTITY	DESCRIPTION OF ITEMS	PRICE	Ext.
1	WC-1: Custom Vintage Image 	\$ 2,800.00	\$ 2,800.00
	See Elevation 4 on ID-2.1		
1	WC-2: Custom Vintage Water Tower Image 	\$ 1,600.00	\$ 1,600.00
	See Elevation 4 on ID-2.0		
52	Yds-WC-3: Arlo Vinyl Wallcovering 	\$ 52.00	\$ 2,704.00
	See Elevation on ID-2.0 and 2.1		
37	Yds-WC-4: Cassidy Vinyl Wallcovering 	\$ 50.00	\$ 1,850.00
	See Elevation on ID- 2.1		
54	Yds-WC- 5: Avidon Vinyl Wallcovering (Entry, ID-2.0) 	\$ 53.00	\$ 2,862.00
64	Yds-WC- 5: Avidon Vinyl Wallcovering (Comm. Rm, ID-2.3)	\$ 53.00	\$ 3,392.00
1	WC-6: Custom Vintage Image -To Be Determined 	\$ 1,200.00	\$ 1,200.00
	See Elevation on ID- 2.3		
1	WC- 7 Custom Landscape Image 	\$ 1,800.00	\$ 1,800.00
	See Elevation on ID- 2.3		
SUBTOTAL			\$ 18,208.00
Sales Tax-7.75%			\$ 1,412.00
Handling/Freight			
TOTAL PAID			
BALANCE DUE			\$ 19,620.00

APPROVED BY

Date

SIGNATURE

Prepared By:

Michael Cook
1370 S. Valley Vista Suite 100
Diamond Bar, CA 91765
michael.cook1@graybar.com
D:909-551-8074

Proposal Name: Phelan Pinon Hills CSD

Quote Name: Phelan Pinon Hills CSD

Proposal Number: P-250716-5388954

Quote Number: Q-6144432

Quote Date: 07/18/2025

Through Addenda Number: 0

Sales Representative: Sergio Espinoza

Conditions of Sale

This Quotation is subject to Coordinated Project Terms. See <https://www.se.com/us/en/download/document/0100PL0043/>

Quoted price in currencies other than U.S. Dollars is per the annual Schneider Electric exchange guidance.
Quote is valid for 30 days. Quoted lead times are approximate and subject to change.

Schneider Electric reserves the right to amend, withdraw or otherwise alter this submission without penalty or charge as a result of any event beyond its control arising from or due to the current Covid-19 epidemic or events subsequent to this epidemic / pandemic including changes in laws, regulations, by laws or direction from a competent authority.

Clarifications and Exceptions

- ◆ The bill of material is based on our best interpretation of the information provided with the request for quotation. The quotation supplied for this project may not meet the local code/ordinance requirement unless specifically identified in the customer documentation supplied for review. The bill of material should be reviewed to ensure that the equipment quoted meets the project requirements. The following clarifications are provided to emphasize issues not specifically stated in the bill of material.
- ◆ All equipment provided with dimensions as shown on Square D generated drawings and Bill-of-Materials. (Quotation drawings are Not for Construction)
- ◆ Seismic Calculations are not included unless shown as a separate item. Weights and bolt down information can be provided if requested. Seismic qualification of nonstructural components by Schneider Electric is just one link in the total chain of responsibility required to maximize the probability that the equipment will be intact and functional after a seismic event. During a seismic event the equipment must be able to transfer the loads that are created through the mounting pad and anchorage to the load-bearing path of the building structural system. Anchorage of equipment to the primary building structure is required to validate this seismic certification. The structural engineer or design engineer of record is responsible for detailing the equipment anchorage requirements for the given installation. The installer and manufacturers of the anchorage system are responsible for assuring that the mounting requirements are met. Schneider Electric is not responsible for the specification and performance of anchorage systems.
- ◆ Selective Coordination: Compliance to 2005 NEC Article 701.18 currently adopted version of NEC Articles 700 and 701 - Selective Coordination may require significant changes to the system design, which may affect structural and architectural systems, and are subject to Schneider Electric standard

terms & conditions of sale. A short circuit study must be provided and is available for an additional charge.

- ◆ Our proposal does NOT address any Buy America requirements. If this project is subject to Buy America requirements, we will need more information and/or time to evaluate.
- ◆ Special services such as factory witness tests, field tests, programming, software installations, short circuit or coordination studies are not included unless shown as a separate line item.
- ◆ All equipment is quoted as F.O.B. point of shipment and standard lead time unless otherwise noted.
- ◆ Taxes and tariffs are specifically excluded from this quotation.

Pricing

Total DISTRIBUTOR SELL PRICE US Dollars

\$ 352,966.36

Seq #	Qty	Product Description
1	1	<p>Designation : SWBD "MS-"</p> <p>Product Details :</p> <p>1 - Square D Standard Swbd-QED-2 Switchboard</p> <p>-----</p> <p>Square D Standard Swbd Designed and Tested in accordance with: UL 891/NATIONAL ELECTRIC CODE/NEMA PB-2 System Voltage - 208Y/120V 3Ph 4W 60Hz System Ampacity - 4000A Source Description - Single Main Bussing - Aluminum Plated w/Tin and Copper Plated w/Silver Neutral Bus - 100% Max Available Fault Current (RMS) - 65kA Enclosure - Type 3R Non-Walk-in Accessibility: Front Only Rodent Barrier Exterior Paint Color - ANSI 49 Lineup with MasterPact MTZ Breaker(s) Strip Heaters - Internal Power Source with Humidistat and Thermostat Ground Lug provided for each device SIS Control Wire Bottom Closure Plates Aluminum Ground Bus Certified Test Report Required Seismic Qualified</p> <p>Dimensions</p> <p>-----</p> <p>2 - 48" Wide Section(s) 1 - 24" Wide Section(s) 6 - 30" Wide Section(s) 9 - 59.5" Deep Enclosure(s) 1 - Dimensions: 300.00" W X 59.5" D X 91.5"H Approximate Weight: 12012.00 lbs / 5448.64 kgs</p> <p>Incoming Requirements</p> <p>-----</p> <p>Suitable for Use As Service Entrance Entry Point: Left of Lineup, Through the Bottom Connection Type: Cable in Bussed Auxiliary EUSERC Terminals per Southern Cal Edison (CA) provided Incoming Utility Metering Compartment is NOT provided</p> <p>Mains</p> <p>-----</p> <p>1 - 4000AF/4000AT 100% 3 Pole Stored Energy, Fixed Mounted Circuit Breaker, ANSI: Type MTZ 2 Device Designation: MCB Micrologic X 6.0, Long Time, Short Time, Instantaneous, Ground Fault DM - Energy Reduction Maintenance Setting (ERMS) Auxiliary Switches 4A-4B Overcurrent Trip Switch 1A/1B Form C Contact (SDE) Programmable Contact Module, ESM Contact Wear Indication - Visual Padlock Attachment Energy Reduction Maintenance Switch</p> <p>Feeders</p>

1 - 800AS/800AT 208V 80% Rated 65 kA 3 Pole
UL, Fixed Mounted Electronic Trip

Circuit Breaker: Type PG

Device Designation: EX-MODULAR-DB

Standard Trip Unit, Long Time, Short

Time, Instantaneous

Padlock Attachment

Hot Sequence Utility: Southern Cal Edison
(CA)

Standard Door Pattern 1-30in Door, 2

Sockets

1 - 600AS/600AT 208V 80% Rated 65 kA 3 Pole
UL, Fixed Mounted Electronic Trip

Circuit Breaker: Type PG

Device Designation: EV-1

Standard Trip Unit, Long Time, Short

Time, Instantaneous

Padlock Attachment

Hot Sequence Utility: Southern Cal Edison
(CA)

Standard Door Pattern 1-30in Door, 2

Sockets

1 - 1000AS/1000AT 208V 80% Rated 65 kA 3 Pole
UL, Fixed Mounted Electronic Trip

Circuit Breaker: Type PG

Device Designation: CC-DB

Standard Trip Unit, Long Time, Short

Time, Instantaneous

Padlock Attachment

Hot Sequence Utility: Southern Cal Edison
(CA)

Standard Door Pattern 1-30in Door, 2

Sockets

1 - 1000AS/1000AT 208V 80% Rated 65 kA 3 Pole
UL, Fixed Mounted Electronic Trip

Circuit Breaker: Type PG

Device Designation: GYM-DB

Standard Trip Unit, Long Time, Short

Time, Instantaneous

Padlock Attachment

Hot Sequence Utility: Southern Cal Edison
(CA)

Standard Door Pattern 1-30in Door, 2

Sockets

1 - 600AS/600AT 208V 80% Rated 65 kA 3 Pole
UL, Fixed Mounted Electronic Trip

Circuit Breaker: Type PG

Device Designation: PK-DB

Standard Trip Unit, Long Time, Short

Time, Instantaneous

Padlock Attachment

Hot Sequence Utility: Southern Cal Edison
(CA)

Standard Door Pattern 1-30in Door, 2

Sockets

1 - 600AS/600AT 208V 80% Rated 65 kA 3 Pole
UL, Fixed Mounted Micrologic Prepared

Space: Type PG

Device Designation: PV-FUTURE

Estimated days to ship, excluding transit: 170 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
2	1	Designation : EX MODULAR DB Product Details : 1 - Square D Standard Swbd-QED-2 Switchboard ----- Square D Standard Swbd Designed and Tested in accordance with: UL 891/NATIONAL ELECTRIC CODE/NEMA PB-2 System Voltage - 208Y/120V 3Ph 4W 60Hz

System Ampacity - 800A
 Source Description - Single Main
 Bussing - Silver Plated Copper
 Neutral Bus - 100%
 Max Available Fault Current (RMS) - 65kA
 Enclosure - Type 3R Non-Walk-in
 Accessibility: Front Only
 Equipment Nameplate White Surface/Black
 Letters, Adhesive (Field Installed)
 Rodent Barrier
 Exterior Paint Color - ANSI 49
 Strip Heaters - Internal Power Source with
 Humidistat and Thermostat
 Ground Lug provided for each device
 SIS Control Wire
 Copper Ground Bus
 Bottom Closure Plates
 Certified Test Report Required
 Seismic Qualified

Dimensions

 1 - 30" Wide Section(s)
 1 - 36" Wide Section(s)
 1 - Dimensions: 66.00" W X 35.5" D X 91.5"H
 2 - 35.5" Deep Enclosure(s)
 Approximate Weight: 1534.00 lbs / 695.82 kgs

Incoming Requirements

 Suitable for Use As Service Entrance
 Entry Point: Left of Lineup, Through the
 Bottom
 Connection Type: Cable in Bussed Auxiliary
 Power Meter - PM5563RD
 3 CTs PM5563 w/ Display - 3 phase 4 wire wye
 800A

Mains

 1 - 800AS/800AT 208V 80% Rated 65 kA 3 Pole
 UL, Fixed Mounted Electronic Trip
 Circuit Breaker: Type PG
 Standard Trip Unit, Long Time, Short
 Time, Instantaneous
 Padlock Attachment

Feeders

 6 - 150AS/125AT 208V 80% Rated 125 kA 3 Pole
 UL, Group Mounted Electronic Trip
 Circuit Breaker: Type HL
 Standard Trip Unit, Long Time, Short
 Time, Instantaneous
 Padlock Attachment

Estimated days to ship, excluding transit: 100 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
3	1	Designation : CC-DB Product Details : 1 - Square D Custom Swbd-QED-2 Switchboard ----- Square D Custom Swbd Designed and Tested in accordance with: UL 891/NATIONAL ELECTRIC CODE/NEMA PB-2 System Voltage - 208Y/120V 3Ph 4W 60Hz System Ampacity - 1000A Source Description - Single Main Bussing - Silver Plated Copper

Neutral Bus - 100%
 Max Available Fault Current (RMS) - 65kA
 Enclosure - Type 1
 Accessibility: Front Only
 Equipment Nameplate White Surface/Black
 Letters, Adhesive (Field Installed)
 Exterior Paint Color - ANSI 49
 Ground Lug provided for each device
 SIS Control Wire
 Copper Ground Bus
 ASCO Controller with 07ATS - Auto Transfer
 Switch 1000 Amp, Switched Neutral
 Emergency Cable Entrance - Bottom
 . 40KB - Emergency Bottom Entry 1000 Amp
 Certified Test Report Required
 Seismic Qualified

Dimensions

 1 - 30" Wide Section(s)
 1 - 48" Wide Section(s)
 1 - 36" Wide Section(s)
 3 - 36" Deep Enclosure(s)
 Dimensions: 114.00" W X 36" Max D X 91.5" H
 Approximate Weight: 3074.00 lbs / 1394.37 kgs

Incoming Requirements

 UL Dead Front
 Entry Point: Left of Lineup, Through the
 Bottom
 Connection Type: Cable
 Power Meter - PM5563RD
 3 CTs PM5563 w/ Display - 3 phase 4 wire wye
 1000A

Mains

 1 - 1000AS/1000AT 208V 80% Rated 65 kA 3 Pole
 UL, Fixed Mounted Electronic Trip
 Circuit Breaker: Type PG
 Device Designation: MCB
 Power Trip Unit, Long Time, Short Time,
 Instantaneous
 Padlock Attachment
 Energy Reduction Maintenance Switch

Feeders

 4 - 250AS/200AT 208V 80% Rated 125 kA 3 Pole
 UL, Group Mounted Electronic Trip
 Circuit Breaker: Type JL
 Standard Trip Unit, Long Time, Short
 Time, Instantaneous
 Padlock Attachment

Estimated days to ship, excluding transit: 210 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
4	1	Designation : CC-AC-1 Product Details : 1 - NQ ML Panel (INTERIOR)-NQ Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 10kA Fully Rated Main Lug Only: 200A Incoming Conductors: 1 - #6 - 350 kcmil Bus: 225A Rated Copper: Silver/Tin Plated CU Ground Bar 42 Circuit Interior

Type 1,Box: 38H x 20W x 5.75D
Incoming: Bottom Trim: Flush with Door
Box Cat No: MH38 Front Cat No: NC38F
Ref. Drawing: PBA701A
Feeder:
3 - 60A/3P QOB
30 - 20A/1P QOB Prepared Space
3 - 20A/1P QOB
Optional Features:
Standard Panel (Box Ahead),Copper Solid
Neutral,Seismic Qualification -
IBC/ASCE7/CBC/NBCC,Copper Ground Bar
Branch User Placement
Standard Nameplate:
Engraved as Follows
Line 1: CC-AC-1
Size: 3.50" Wide x 1.00" High (Std)
Color: White Surface / Black Letters
Plastic/Adhesive - Screw-on
1 - MH38-PANELBOARD ENCLOSURE/BOX TYPE 1 38H 20W

1 - NC38F-PANELBOARD COVER/TRIM NF TYPE 1 F 38H

Estimated days to ship, excluding transit: 45 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
5	1	Designation : PANEL CC-B Product Details : 1 - NQ ML Panel (INTERIOR)-NQ Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 10kA Fully Rated Main Lug Only: 200A Incoming Conductors: 1 - #6 - 350 kcmil AL Ground Bar Bus: 225A Rated Copper: Silver/Tin Plated 42 Circuit Interior Type 1,Box: 38H x 20W x 5.75D Incoming: Bottom Trim: Flush with Door Box Cat No: MH38 Front Cat No: NC38F Ref. Drawing: PBA701A Feeder: 2 - 60A/3P QOB 1 - 30A/3P QOB 20 - 20A/1P QOB 13 - 20A/1P QOB Prepared Space Optional Features: Standard Panel (Box Ahead),Seismic Qualification - IBC/ASCE7/CBC/NBCC,Standard Solid Neutral,Standard Ground Bar Branch User Placement Standard Nameplate: Engraved as Follows Line 1: PANEL CC-B Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on 1 - MH38-PANELBOARD ENCLOSURE/BOX TYPE 1 38H 20W 1 - NC38F-PANELBOARD COVER/TRIM NF TYPE 1 F 38H

Estimated days to ship, excluding transit: 45 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
6	1	Designation : PANEL CC-A Product Details : 1 - NQ ML Panel (INTERIOR)-NQ Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 10kA Fully Rated

Main Lug Only: 200A
 Incoming Conductors: 1 - #6 - 350 kcmil
 Bus: 225A Rated Copper: Silver/Tin Plated
 CU Ground Bar
 42 Circuit Interior
 Type 1,Box: 38H x 20W x 5.75D
 Incoming: Bottom Trim: Flush with Door
 Box Cat No: MH38 Front Cat No: NC38F
 Ref. Drawing: PBA701A
 Feeders:
 42 - 20A/1P QOB
 Optional Features:
 Standard Panel (Box Ahead),Copper Solid
 Neutral,Seismic Qualification -
 IBC/ASCE7/CBC/NBCC,Copper Ground Bar
 Standard Nameplate:
 Engraved as Follows
 Line 1: PANEL CC-A
 Size: 3.50" Wide x 1.00" High (Std)
 Color: White Surface / Black Letters
 Plastic/Adhesive - Screw-on
 1 - MH38-PANELBOARD ENCLOSURE/BOX TYPE 1 38H 20W

 1 - NC38F-PANELBOARD COVER/TRIM NF TYPE 1 F 38H

Estimated days to ship, excluding transit: 45 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
7	1	Designation : PANEL CC-EM Product Details : 1 - NQ ML Panel (INTERIOR)-NQ Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 10kA Fully Rated Main Lug Only: 200A Incoming Conductors: 1 - #6 - 350 kcmil AL Ground Bar Bus: 225A Rated Aluminum: Tin Plated 42 Circuit Interior Type 1,Box: 38H x 20W x 5.75D Incoming: Bottom Trim: Flush with Door Box Cat No: MH38 Front Cat No: NC38F Ref. Drawing: PBA701A Feeders: 1 - 60A/3P QOB 26 - 20A/1P QOB 11 - 20A/1P QOB Prepared Space 1 - 30A/2P QOB Optional Features: Standard Panel (Box Ahead),Standard Solid Neutral,Standard Ground Bar Branch User Placement 1 - MH38-PANELBOARD ENCLOSURE/BOX TYPE 1 38H 20W 1 - NC38F-PANELBOARD COVER/TRIM NF TYPE 1 F 38H

Estimated days to ship, excluding transit: 45 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
8	1	Designation : PANEL EV-2 Product Details : 1 - NF ML Panel (INTERIOR)-NF Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 65kA Fully Rated Main Lug Only: 600A Incoming Conductors: 1 - (2) 1/0 - 600 kcmil Bus: 600A Rated Copper: Silver/Tin Plated CU Ground Bar 42 Circuit Interior Type 1,Box: 56H x 20W x 5.75D

Incoming: Bottom Trim: Flush with Door
 Box Cat No: MH56 Front Cat No: NC56VF
 Ref. Drawing: PBA551
 Feeders:
 13 - 40A/2P EGB
 16 - 20A/1P EGB Prepared Space
 Optional Features:
 Standard Panel (Box Ahead),Copper Solid
 Neutral,Seismic Qualification -
 IBC/ASCE7/CBC/NBCC,Copper Ground Bar
 Branch User Placement
 Standard Nameplate:
 Engraved as Follows
 Line 1: PANL EV-2
 Size: 3.50" Wide x 1.00" High (Std)
 Color: White Surface / Black Letters
 Plastic/Adhesive - Screw-on
 1 - MH56-PANELBOARD ENCLOSURE/BOX TYPE 1 56H 20W

 1 - NC56VF-PANELBOARD COVER/TRIM NF TYPE 1 VF 56H

Estimated days to ship, excluding transit: 45 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
9	1	Designation : PANEL EV-1 Product Details : 1 - NF ML Panel (INTERIOR)-NF Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 65kA Fully Rated Main Lug Only: 600A Incoming Conductors: 1 - (2) 1/0 - 600 kcmil Bus: 600A Rated Copper: Silver/Tin Plated CU Ground Bar 42 Circuit Interior Type 1,Box: 56H x 20W x 5.75D Incoming: Bottom Trim: Flush with Door Box Cat No: MH56 Front Cat No: NC56VF Ref. Drawing: PBA551 Feeders: 12 - 40A/2P EGB 18 - 20A/1P EGB Prepared Space Optional Features: Standard Panel (Box Ahead),Copper Solid Neutral,Seismic Qualification - IBC/ASCE7/CBC/NBCC,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on 1 - MH56-PANELBOARD ENCLOSURE/BOX TYPE 1 56H 20W 1 - NC56VF-PANELBOARD COVER/TRIM NF TYPE 1 VF 56H

Estimated days to ship, excluding transit: 45 working days after customer release to manufacturer. See Conditions of Sale.

Seq #	Qty	Product Description
10	1	Designation : Start-up Product Details : 1 - SRVSQDSER-Startup Services - Straight Time The following startup scope of work is Schneider Electric's manufacturer recommended scope of work for Startup Services. Schneider Electric will perform the Scope of Work per Schneider Electric document 1910DB1302-120213 Scopes of Work for

Electrical Acceptance Testing.
Work will be performed during Straight Time
(any scheduled 8 hour period between 06:00
and 18:00 hours Monday thru Friday).

Startup scope of work includes Schneider
Electric technician supervision during
energization of equipment. Quote price is
based on energization during final day of
inspection and testing.

To allow us to better service your needs,
please contact Schneider Electric Services
a minimum of 4-6 weeks prior to date of
service. Lead times are not guaranteed,
but requests less than 4-6 weeks may result
in additional charges based on FSR
availability and required logistics. To
schedule dates of service, please contact
your local Schneider Electric project
manager or call: 1-888-778-2733.
Additionally, to avoid repricing, startup
must be performed within 3 months of
equipment ship date. Formal report to be
issued electronically within 2 weeks of
service completion.

1 Day Informal Training

Following user entered devices included in
startup:
None

12 month complimentary extended warranty.
Schneider Electric Services is pleased to
offer a complimentary 12 month warranty
extension above and beyond our standard
warranty and any purchased extended
warranties.

The 12 month warranty extension only
applies to equipment that is successfully
tested, started up, invoiced by SE, and
paid in full by the customer.

1 - 12MTEXTWARRWSTUP-SIBS 12 MO EXTENDED WARRANTY W/ STARTUP

Schneider Electric Services is pleased to
offer a complimentary 12 month warranty
extension above and beyond our standard
warranty and any purchased extended
warranties.

The 12 month warranty extension only
applies to equipment that is successfully
tested, started up, invoiced by SE, and
paid in full by the customer.

Seq #	Qty	Product Description
11	1	Designation : Arc Energy Reduction Stdy Product Details : 1 - SRVINAAARCETOER-ENG STD - NEC AER EVAL & DOC equipment containing 1200A+ breakers) For each equipment location with a breaker 1200A or greater, an NEC arc energy evaluation will be performed for compliance with 240.87(B). Breaker characteristics will be evaluated and settings recommended (Inst or ERMS) to comply. Documentation will be provided to fulfill 240.87(A) requirements.

The data preferred to perform this analysis includes:

1. Utility Fault Current and voltage at which the fault current is reported.
2. Service Transformer Size and Voltage.
3. Cable Data from service transformer to the 1200A+ breaker location.

Reminder please upload one-line drawings and study specs or send to StudiesSupport@PSE

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--

T-bus
36.5 in

T-bus
36.5 in

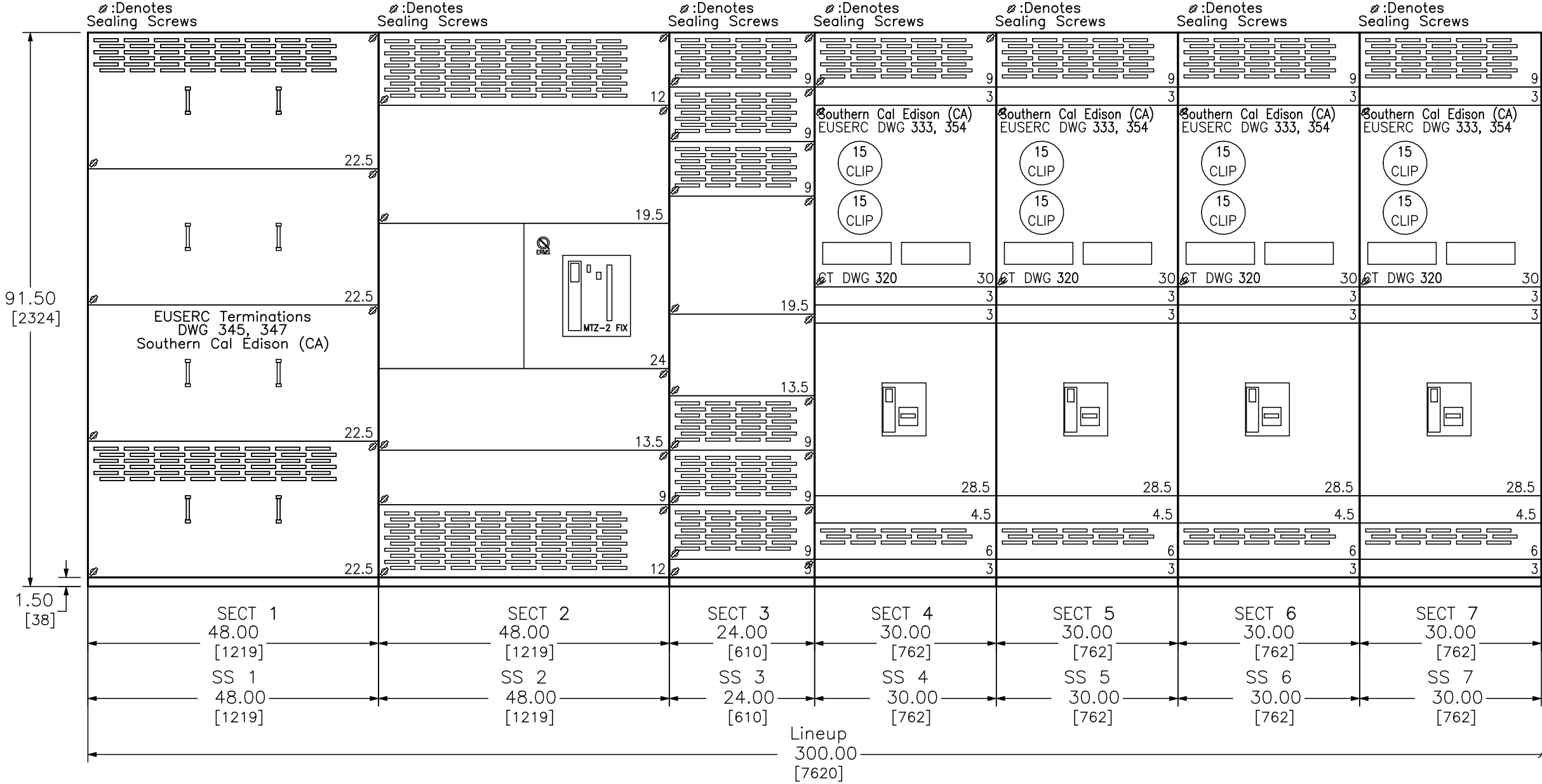
T-bus
19.5 in

T-bus
19.5 in

T-bus
19.5 in

T-bus
19.5 in

T-bus
19.5 in



DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ELEVATION VIEW
ENGR:		<div>SQUARE D</div> <div>by Schneider Electric</div>	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	FQ-6144432-187020675-01
		PG 1	OF 6
		REV	-

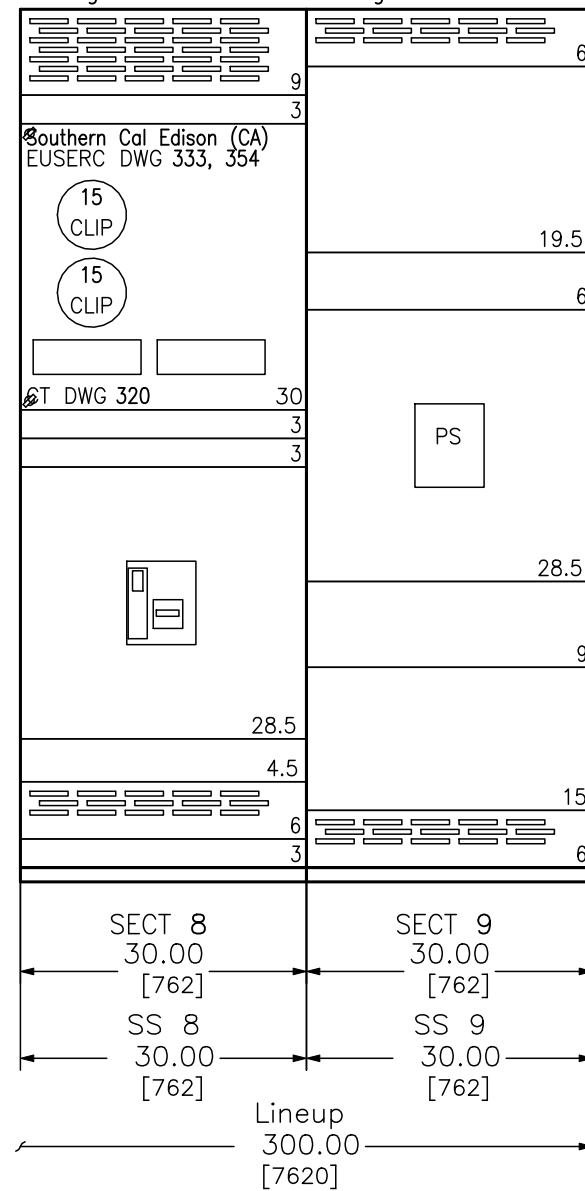
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-	-----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--

T-bus
19.5 in



T-bus
19.5 in

Ø: Denotes Sealing Screws

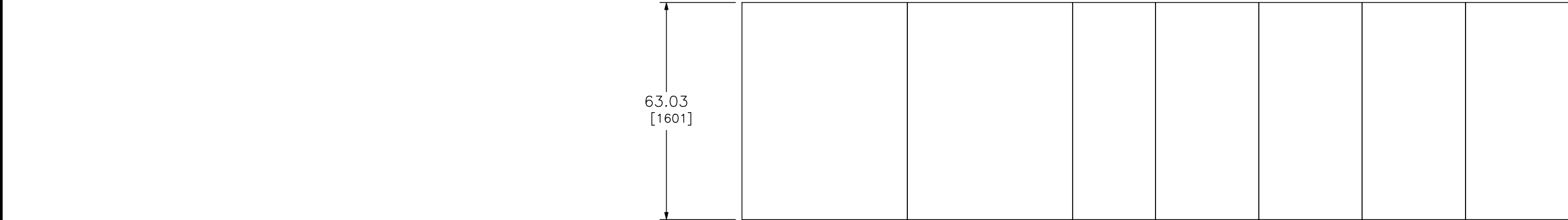
Ø: Denotes Sealing Screws



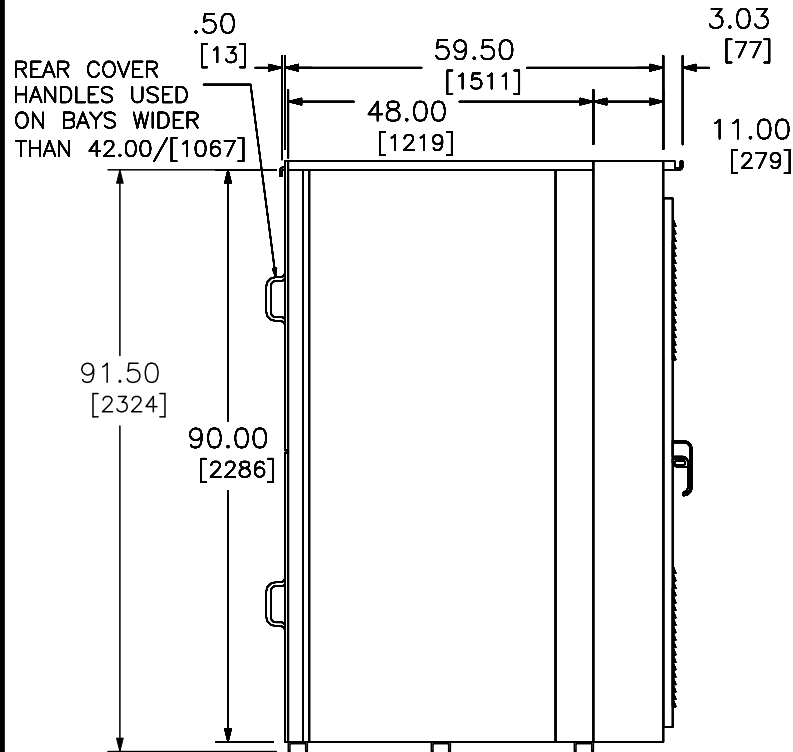
DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS"		
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard		
DRAWN BY:	CAD	DRAWING TYPE:	ELEVATION VIEW		
ENGR:					
DATE:	July 17 2025				
DRAWING STATUS:	QUOTE	DWG#	FQ-6144432-187020675-01	PG 2	OF 6
				REV	-

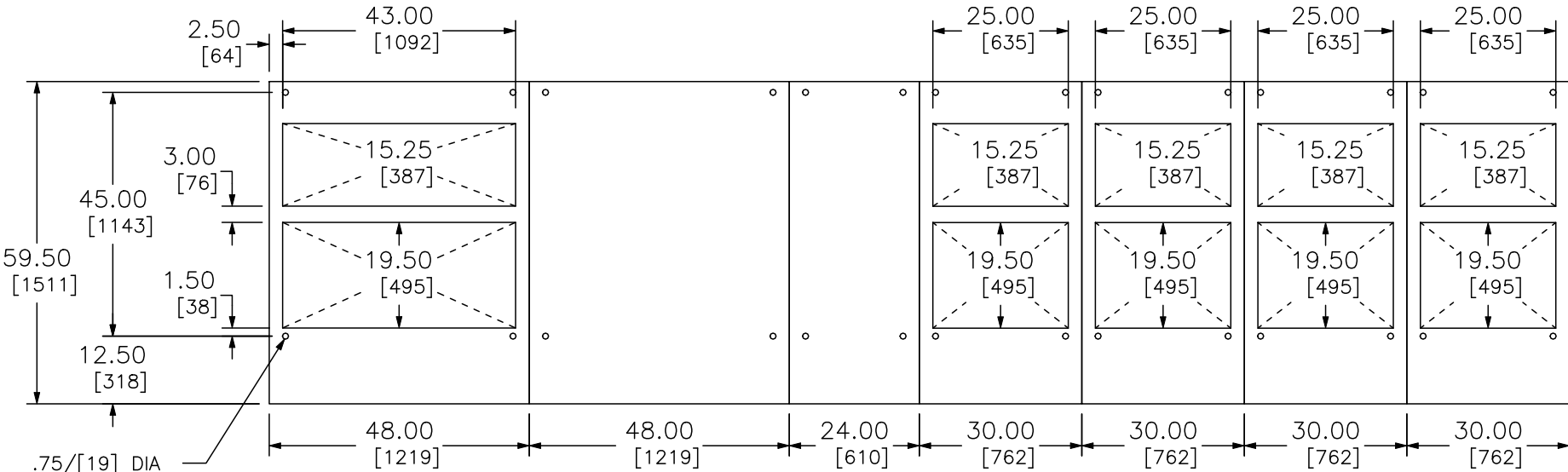
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TOP VIEW – FRONT



LEFT SIDE VIEW



FLOOR PLAN – FRONT

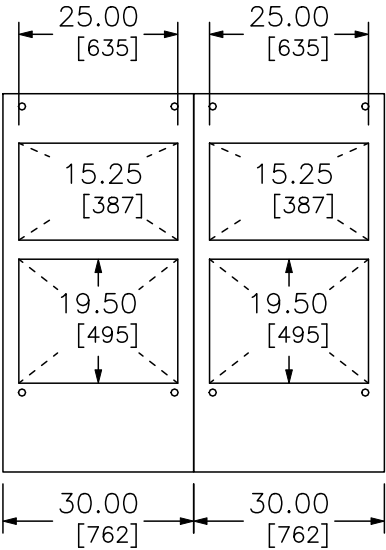
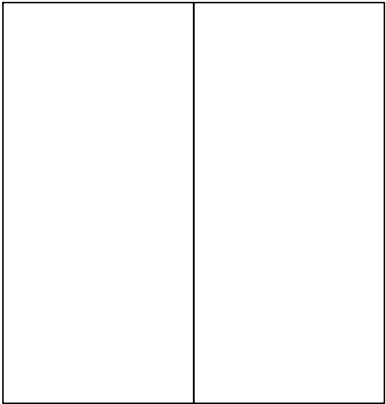
NOTE: ALL DEVICES REQUIRING DRILLING OR INSERTION IN MOUNTING PAD SUCH AS CONDUIT, ANCHORING STUDS, SLEEVE INSERTS, ETC. SHOULD BE INSTALLED BEFORE SETTING EQUIPMENT IN PLACE.

DUAL DIMENSIONS: INCHES MILLIMETERS

NOTE:
A MINIMUM OF 2.00/[51]
CLEARANCE BEHIND THE
SWITCHBOARD IS REQUIRED
FOR TOP COVER OVERHANG.

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	SIDE, TOP VIEW & FLOOR PLAN
ENGR:		<div>SQUARE D</div> by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	FQ-6144432-187020675-01
		PG	3 OF 6
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--



DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ELEVATION -- TOP & FLOOR
ENGR:		<div>SQUARE D</div> <div>by Schneider Electric</div>	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE		
		DWG# FQ-6144432-187020675-01	PG 4 OF 6 REV -

REV	DESCRIPTION	BY	DATE	—	----	--	--/--/--	—	----	--	--/--/--
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SWITCHBOARD GENERAL NOTES

PRODUCT DESCRIPTION & RATINGS

Power System Data

208Y/120V 3Ph 4W 60Hz / 3 Phase Wye
Solidly Grounded
System Short Circuit Current Rating: 65kA RMS
Incoming Section 1 Cable Through the Bottom Left of Lineup

Bus System Data

4000A Tin/Aluminum & Silver/Copper Main Bus
(2) .25x2.00 IN/6x51 & (6) .25x1.50 IN/6x83 Cu Bus Bar Per Phase/Neutral
(1) .25x3.0 IN/6x76 mm Al Ground Bus

Enclosure Data

Type 3R Free Standing
Exterior Paint Color: ANSI 49
Front Accessibility Only Required
Handling: Rollers
Strip Heater w. Thermostat & Humidistat
Rodent barriers
1.5H Corrosion Resist Base Channels
Steel Bottom Closure Plate
Utility sealing hardware installed for unmetered bus compartments
Utility sealing hardware installed for unmetered bus compartments
Utility sealing hardware installed for unmetered bus compartments
Utility sealing hardware installed for unmetered bus compartments
Utility sealing hardware installed for unmetered bus compartments
Base channels cannot be removed from EUSERC switchboard line-ups
Utility sealing hardware installed for unmetered bus compartments

Estimated Shipping Weight

Shipping Split 1 1183.00 lbs / 536.61 kgs
Shipping Split 2 1483.00 lbs / 672.69 kgs
Shipping Split 3 800.00 lbs / 362.88 kgs
Shipping Split 4 1466.00 lbs / 664.98 kgs
Shipping Split 5 1466.00 lbs / 664.98 kgs
Shipping Split 6 1466.00 lbs / 664.98 kgs
Shipping Split 7 1466.00 lbs / 664.98 kgs
Shipping Split 8 1466.00 lbs / 664.98 kgs
Shipping Split 9 1216.00 lbs / 551.58 kgs
Complete Lineup 12012.00 lbs / 5448.64 kgs

Code Standards

U.L. Deadfront and suitable for use as Service Entrance
when not more than six (6) disconnecting means are provided.

Rating Nameplates

ST1– Deadfront – Section Bus 4000A
ST2– Service Entrance – Section Bus 4000A
ST3– Deadfront – Section Bus 4000A
ST4– Deadfront – Section Bus 800A
ST5– Deadfront – Section Bus 600A
ST6– Deadfront – Section Bus 1000A
ST7– Deadfront – Section Bus 1000A
ST8– Deadfront – Section Bus 600A
ST9– Deadfront – Section Bus 600A

PRODUCT INFORMATION

Wiring

All wiring to be SIS Wire type

Instruction Bulletins

Reference 80043–055 For Handling, Installation,
(Continued on next page.)

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS–"
JOB LOCATION:		EQUIPMENT TYPE:	QED–2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	GENERAL NOTES
ENGR:		<div>SQUARE D</div> <div>by Schneider Electric</div>	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE		
DWG# FQ–6144432–187020675–01		PG 5	OF 6
		REV	–

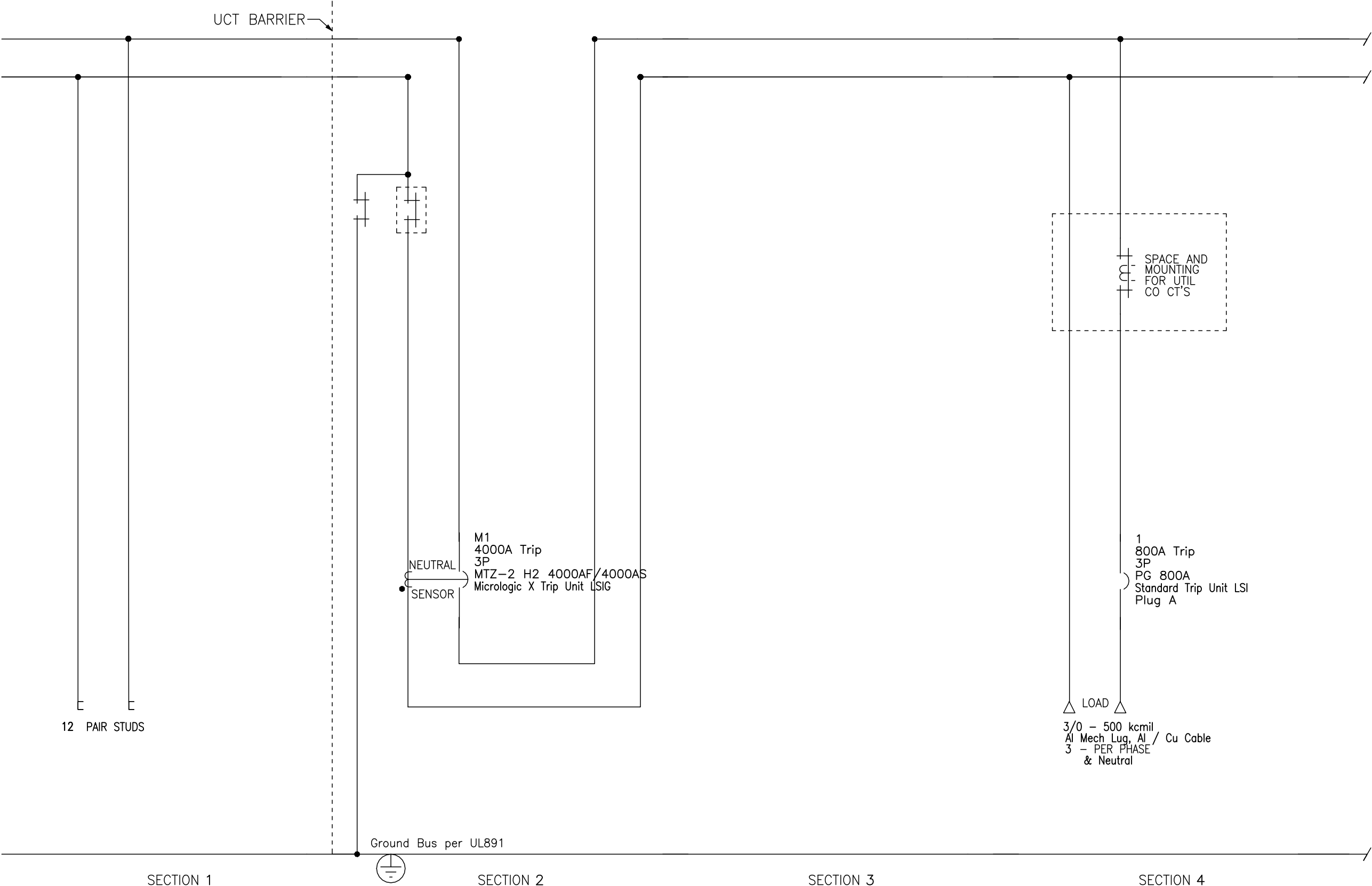
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SWITCHBOARD GENERAL NOTES CONTINUED
Anchoring, Inspection And Maintenance Information

- Product Accessories/Options**
Certified Test Report
Seismic Qualified
24V Trip Unit Display Power
Locally Mounted ERMS Switch

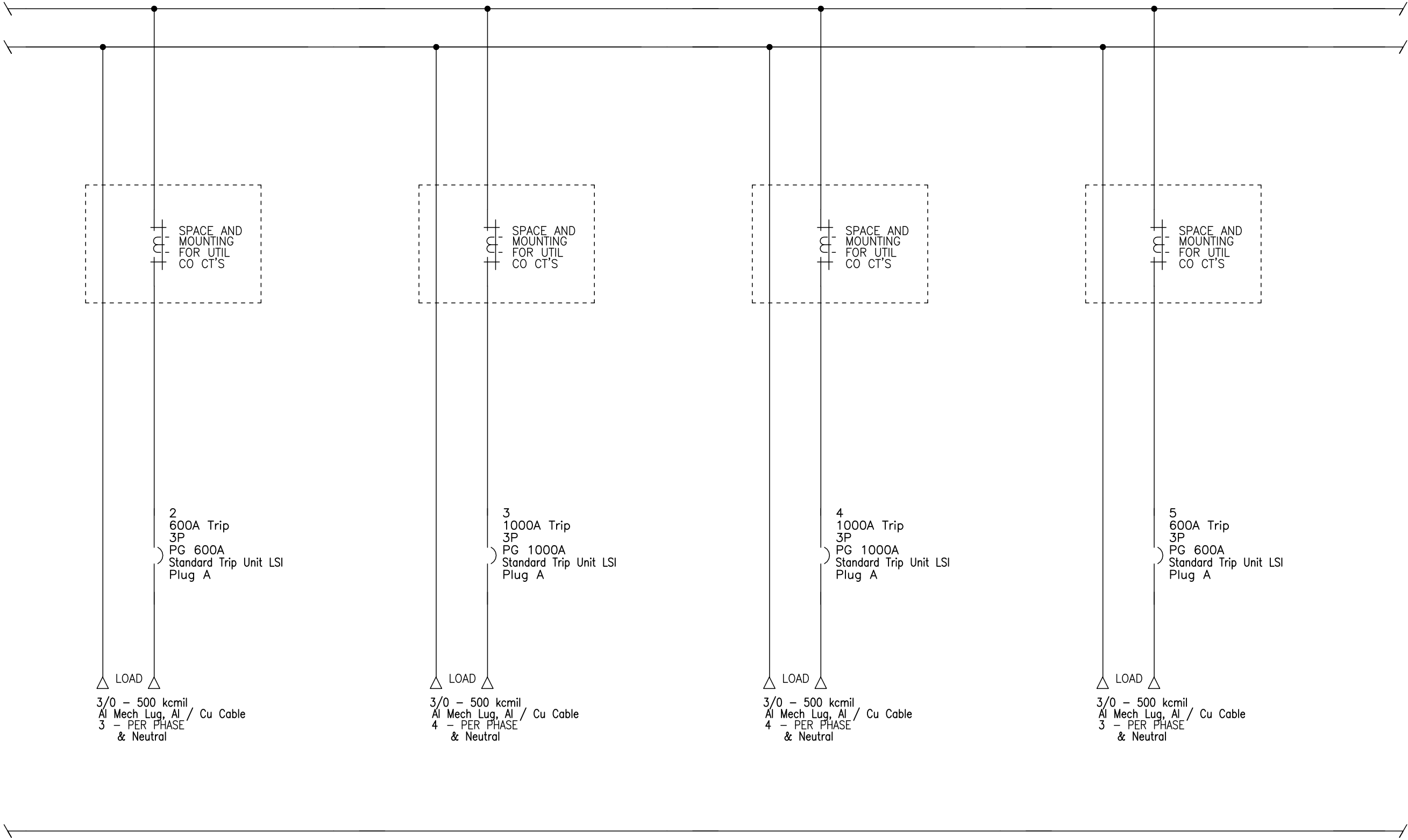
JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	GENERAL NOTES
ENGR:		<div>SQUARE D[®] by Schneider Electric</div>	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	FQ-6144432-187020675-01
		PG	6
		OF	6
		REV	-

REV	DESCRIPTION	BY	DATE												
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JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	OQ-6144432-187020675-01
		PG	1
		OF	4
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
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SECTION 5

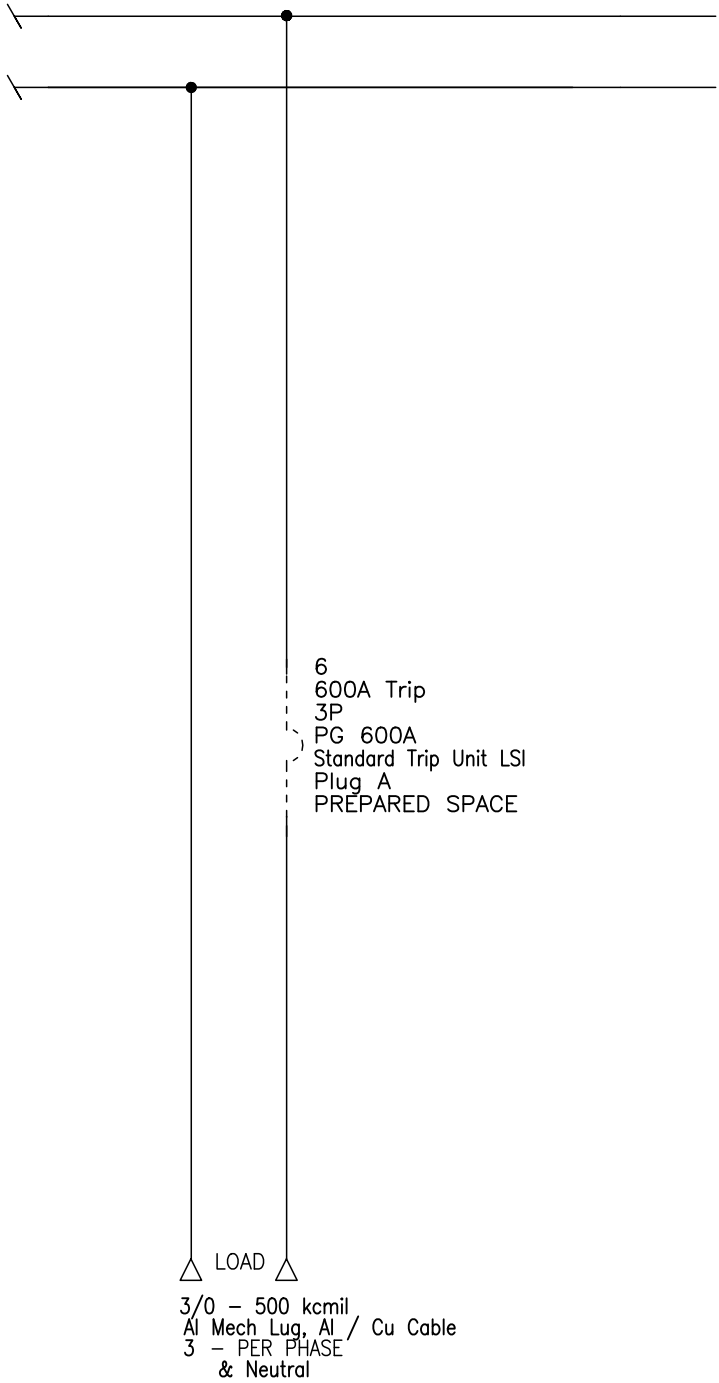
SECTION 6

SECTION 7

SECTION 8

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE
ENGR:		 by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	OQ-6144432-187020675-01
		PG 2	OF 4
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--



SECTION 9

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS--"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE
ENGR:		<div>SQUARE D</div> <div>by Schneider Electric</div>	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	OQ-6144432-187020675-01
		PG	3 OF 4
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--

POWER STYLE QED-2 SWITCHBOARD													
SECT NO	CKT NO	IMD /GMD CONFIG	DEVICE/FRAME RATING	TRIP AMP	FUSE/ TRIP	#P	DESIGNATION	N/P	LUG/WIRE INFORMATION				ACCESSORIES / NOTES
									QTY	PHASE WIRE RANGE	QTY	NEUT WIRE RANGE	
1	-	-	Incoming Connection	-	-	-	-	-	12	Pair Studs	12	Pair Studs	
2	M1	FIX	MTZ-2 H2 4000AF/4000AS	4000A	X-LSIG	3P	MCB	No	-	-	-	-	GF,SDE1,OF4,EN1 PLA,ERMS,D9
4	UCT	-	800A	-	-	-	Southern Cal Edison (CA)	No	-	-	-	-	
4	1	FIX	PG 800A Plug A	800A	S-LSI	3P	EX-MODULAR-DB	No	3	3/0 - 500 kcmil	3	3/0 - 500 kcmil	PLA
5	UCT	-	600A	-	-	-	Southern Cal Edison (CA)	No	-	-	-	-	
5	2	FIX	PG 600A Plug A	600A	S-LSI	3P	EV-1	No	3	3/0 - 500 kcmil	3	3/0 - 500 kcmil	PLA
6	UCT	-	1000A	-	-	-	Southern Cal Edison (CA)	No	-	-	-	-	
6	3	FIX	PG 1000A Plug A	1000A	S-LSI	3P	CC-DB	No	4	3/0 - 500 kcmil	4	3/0 - 500 kcmil	PLA
7	UCT	-	1000A	-	-	-	Southern Cal Edison (CA)	No	-	-	-	-	
7	4	FIX	PG 1000A Plug A	1000A	S-LSI	3P	GYM-DB	No	4	3/0 - 500 kcmil	4	3/0 - 500 kcmil	PLA
8	UCT	-	600A	-	-	-	Southern Cal Edison (CA)	No	-	-	-	-	
8	5	FIX	PG 600A Plug A	600A	S-LSI	3P	PK-DB	No	3	3/0 - 500 kcmil	3	3/0 - 500 kcmil	PLA
9	-	-	Strip Heater	-	-	-	-	-	-	-	-	-	SHR
9	6	FIX	PG 600A (PS)	(600A)	(LSI)	3P	PV-FUTURE	No	3	3/0 - 500 kcmil	3	3/0 - 500 kcmil	

LEGEND	
D9	Energy Reduction Maintenance Settings
EN1	MTZ Breaker Power Supply
ERMS	Energy Reduction Maintenance SW
GF	Ground Fault
OF4	4 Form C Breaker Aux Contacts
PLA	Padlock Attachment-Fixed
SDE1	Over Current Trip Switch
SHR	Strip Heater

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	SWBD "MS-"
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	SCHEDULE
ENGR:		<div>SQUARE D</div> <div>by Schneider Electric</div>	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE		
DWG# OQ-6144432-187020675-01		PG 4	OF 4
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	---	---/--/--	-	----	--	--/--/--	-	----	--	--/--/--

SWITCHBOARD GENERAL NOTES
PRODUCT DESCRIPTION & RATINGS

Power System Data

208Y/120V 3Ph 4W 60Hz / 3 Phase Wye
Solidly Grounded
System Short Circuit Current Rating: 65kA RMS
Incoming Section 1 Cable Through the Bottom Left of Lineup

Bus System Data

800A Silver Plated Copper Main Bus
(2) .25x1.50 IN/6x38 mm Cu Bus Bar Per Phase/Neutral
(1) .25x.875 IN/6x22 mm Cu Ground Bus

Enclosure Data

Type 3R Free Standing
Exterior Paint Color: ANSI 49
Front Accessibility Only Required
Handling: Rollers
Strip Heater w. Thermostat & Humidistat
Rodent barriers
1.5H Corrosion Resist Base Channels
Nameplate Mounting Type: Adhesive (Field Installed)
Equipment Nameplate: White Surface/Black Letters
Steel Bottom Closure Plate

Estimated Shipping Weight

Shipping Split 1 594.00 lbs / 269.44 kgs
Shipping Split 2 940.00 lbs / 426.38 kgs
Complete Lineup 1534.00 lbs / 695.82 kgs

Code Standards

U.L. Deadfront and suitable for use as Service Entrance
when not more than six (6) disconnecting means are provided.

Rating Nameplates

ST1- Deadfront - Section Bus 800A
ST2- Service Entrance - Section Bus 800A

PRODUCT INFORMATION

Wiring

All wiring to be SIS Wire type

Instruction Bulletins

Reference 80043-055 For Handling, Installation,
Anchoring, Inspection And Maintenance Information

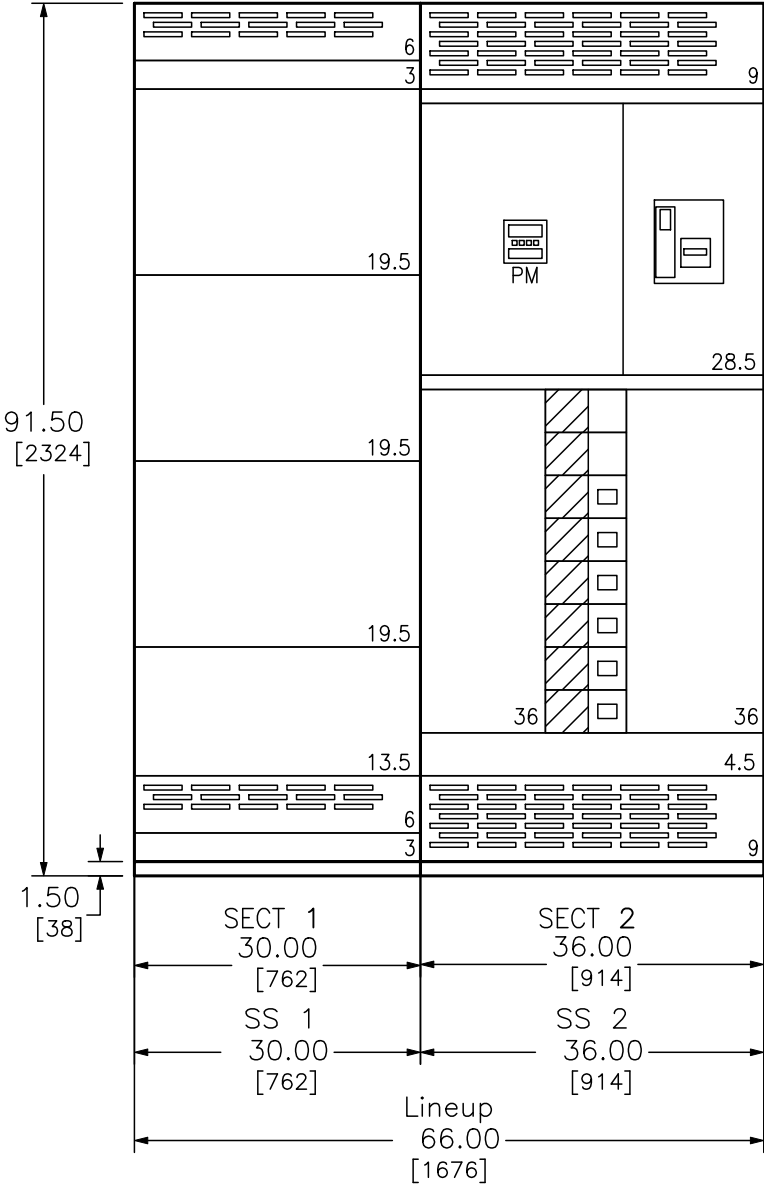
Product Accessories/Options


Certified Test Report
Seismic Qualified

DUAL DIMENSIONS: INCHES
MILLIMETERS

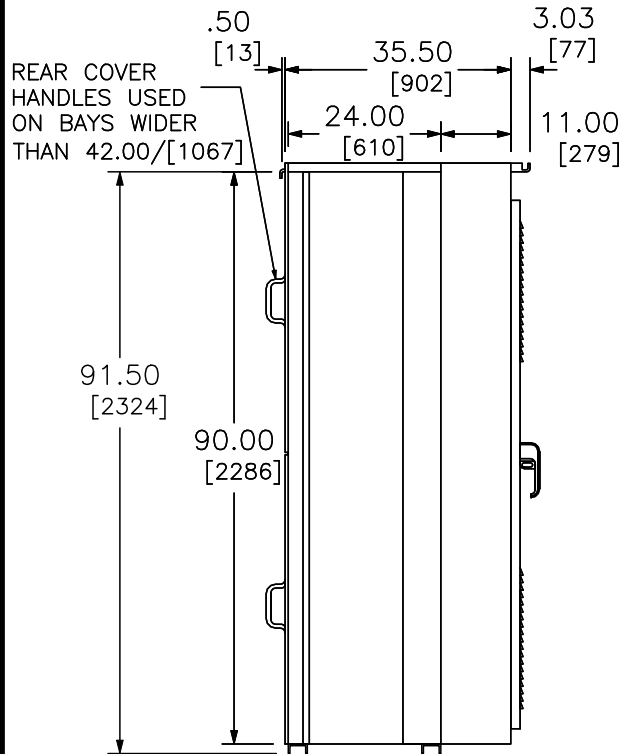
T-bus
19.5 in

T-bus
19.5 in

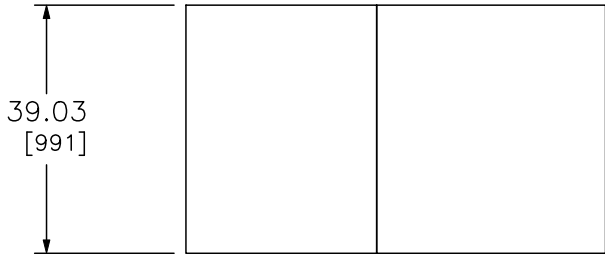


JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	EX MODULAR DB
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	GENERAL NOTES
ENGR:		 by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	FQ-6144432-187026089-01
		PG 1	OF 2
		REV	-

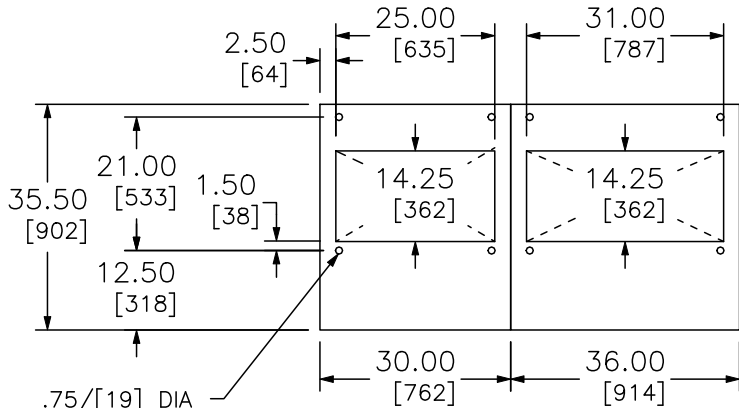
REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--



LEFT SIDE VIEW



TOP VIEW – FRONT



FLOOR PLAN – FRONT

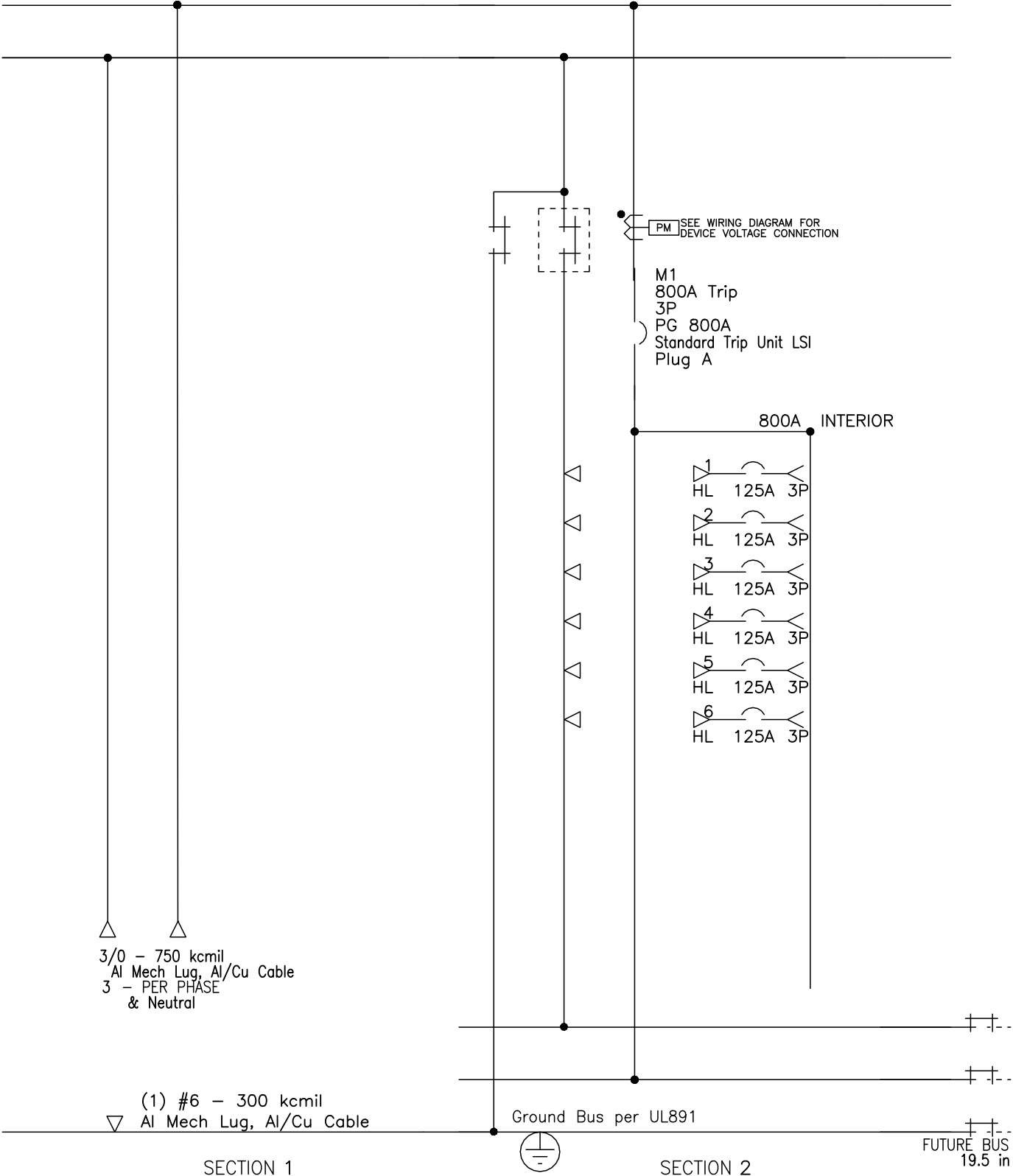
NOTE:
A MINIMUM OF 2.00/[51]
CLEARANCE BEHIND THE
SWITCHBOARD IS REQUIRED
FOR TOP COVER OVERHANG.

NOTE: ALL DEVICES REQUIRING DRILLING OR INSERTION IN MOUNTING PAD
SUCH AS CONDUIT, ANCHORING STUDS, SLEEVE INSERTS, ETC.
SHOULD BE INSTALLED BEFORE SETTING EQUIPMENT IN PLACE.

DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	EX MODULAR DB
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	SIDE, TOP VIEW & FLOOR PLAN
ENGR:			SQUARE D by Schneider Electric
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	FQ-6144432-187026089-01
		PG 2	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	--	----	--	--/--/--	--	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--



JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	EX MODULAR DB
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE
ENGR:		SQUARE D by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	OQ-6144432-187026089-01
		PG 1	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--

POWER STYLE QED-2 SWITCHBOARD													
SECT NO	CKT NO	IMD /GMD CONFIG	DEVICE/FRAME RATING	TRIP AMP	FUSE/ TRIP	#P	DESIGNATION	N/P	LUG/WIRE INFORMATION				ACCESSORIES / NOTES
									QTY	PHASE WIRE RANGE	QTY	NEUT WIRE RANGE	
1	-	-	Incoming Connection	-	-	-	-	-	3	3/0 - 750 kcmil	3	3/0 - 750 kcmil	SHR
-	-	-	Equipment Nameplate	-	-	-	EX MODULAR DB	Yes	-	-	-	-	-
1	-	-	Strip Heater	-	-	-	-	-	-	-	-	-	SHR
2	-	-	Strip Heater	-	-	-	-	-	-	-	-	-	SHR
2	M1	FIX	PG 800A Plug A	800A	S-LSI	3P		No	-	-	-	-	PLA,PM5K
2	1	4.5 in	HL 150A	125A	S-LSI	3P		No	1	#14 - 3/0 AWG	1	#14 - 3/0 AWG	PLA
2	2	4.5 in	HL 150A	125A	S-LSI	3P		No	1	#14 - 3/0 AWG	1	#14 - 3/0 AWG	PLA
2	3	4.5 in	HL 150A	125A	S-LSI	3P		No	1	#14 - 3/0 AWG	1	#14 - 3/0 AWG	PLA
2	4	4.5 in	HL 150A	125A	S-LSI	3P		No	1	#14 - 3/0 AWG	1	#14 - 3/0 AWG	PLA
2	5	4.5 in	HL 150A	125A	S-LSI	3P		No	1	#14 - 3/0 AWG	1	#14 - 3/0 AWG	PLA
2	6	4.5 in	HL 150A	125A	S-LSI	3P		No	1	#14 - 3/0 AWG	1	#14 - 3/0 AWG	PLA

LEGEND	
PLA	Padlock Attachment-Fixed
PM5K	Power Meter PM55XX
SHR	Strip Heater

NAMEPLATE INFORMATION:	JOB NAME: Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION: EX MODULAR DB
MOUNTING TYPE: Adhesive (Field Installed)	JOB LOCATION:	EQUIPMENT TYPE: QED-2 Switchboard
EQUIPMENT: White Surface/Black Letters	DRAWN BY: CAD	DRAWING TYPE: SCHEDULE
	ENGR:	<div>SQUARE D</div> <div>by Schneider Electric</div>
	DATE: July 17 2025	
	DRAWING STATUS: QUOTE	
		DWG# OQ-6144432-187026089-01
		PG 2 OF 2
		REV -

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--

SWITCHBOARD GENERAL NOTES
PRODUCT DESCRIPTION & RATINGS

Power System Data

208Y/120V 3Ph 4W 60Hz / 3 Phase Wye
Solidly Grounded
System Short Circuit Current Rating: 65kA RMS
Incoming Section 1 Cable Through the Bottom Left of Lineup

Bus System Data

1000A Silver Plated Copper Main Bus
(2) .25x1.50 IN/6x38 mm Cu Bus Bar Per Phase/Neutral
(1) .25x.875 IN/6x22 mm Cu Ground Bus

Enclosure Data

Type 1 Free Standing
Exterior Paint Color: ANSI 49
Front Accessibility Only Required
Handling: Rollers & Lifting Assemblies
Nameplate Mounting Type: Adhesive (Field Installed)
Equipment Nameplate: White Surface/Black Letters

Estimated Shipping Weight

Shipping Split 1 692.00 lbs / 313.89 kgs
Shipping Split 2 1547.00 lbs / 701.72 kgs
Shipping Split 3 835.00 lbs / 378.76 kgs
Complete Lineup 3074.00 lbs / 1394.37 kgs

Code Standards

U.L. Deadfront
Section 2 built to UL1008 standards

Rating Nameplates

ST1- Deadfront - Section Bus 1000A
ST2- Deadfront - Section Bus 1000A
ST3- Deadfront - Section Bus 1000A

PRODUCT INFORMATION

Wiring

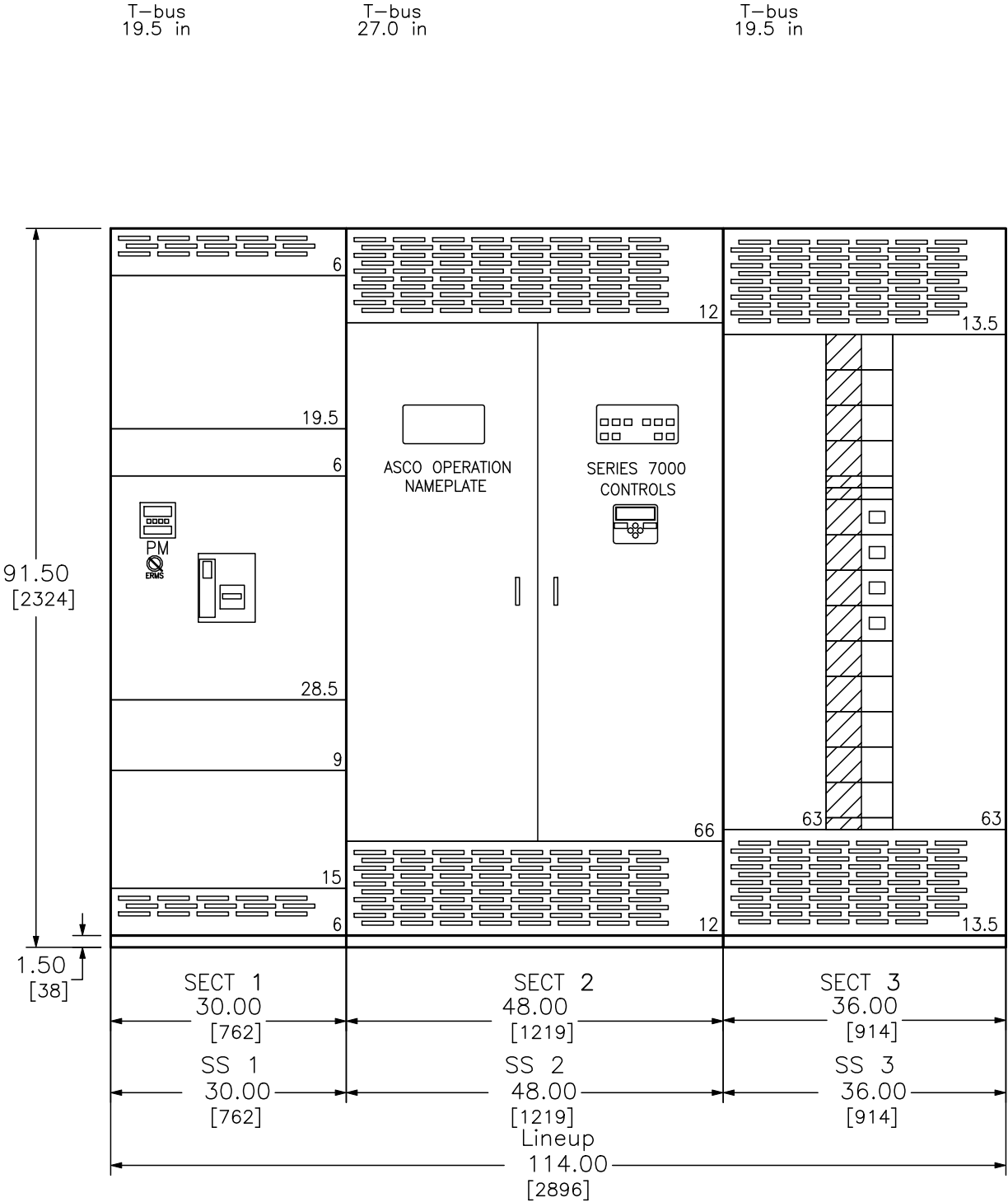
All wiring to be SIS Wire type

Instruction Bulletins


Reference 80043-055 For Handling, Installation,
Anchoring, Inspection And Maintenance Information

Product Accessories/Options

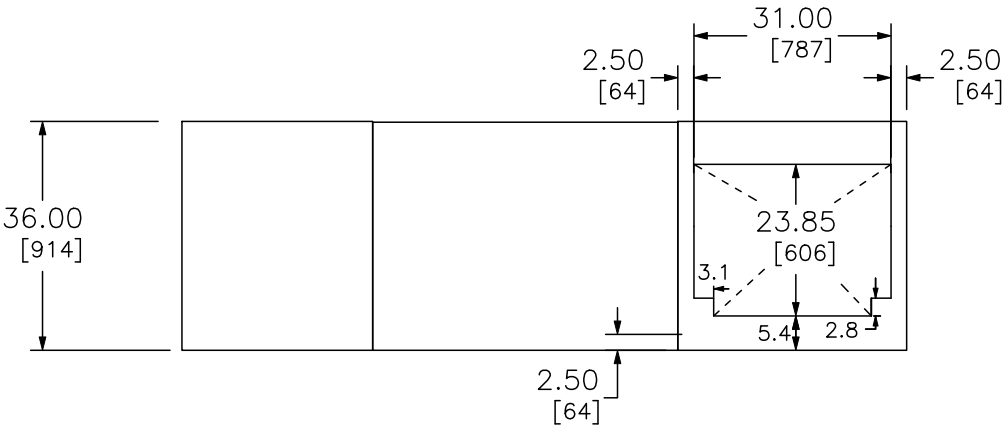
ASCO Controller with Open Transition
- Automatic Transfer
- Emergency Cable Entrance: Bottom
- Switched Neutral
Certified Test Report
Seismic Qualified
24V Trip Unit Display Power
Locally Mounted ERMS Switch



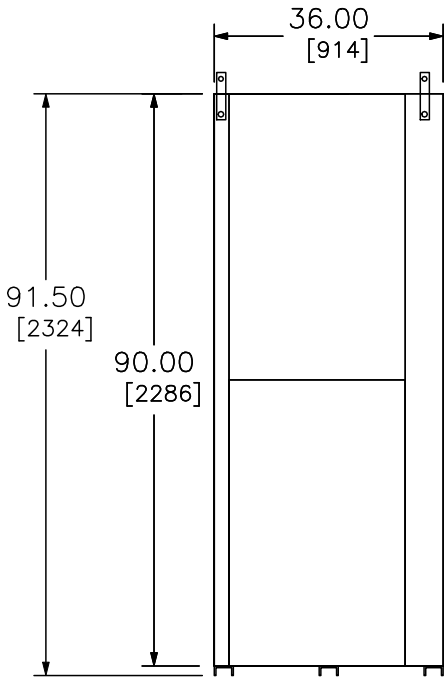
DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	CC-DB
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ELEVATION VIEW
ENGR:		 by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	NOT FOR CONSTRUCTION	DWG# FQ-6144432-187028577-01
			PG 1 OF 2 REV -

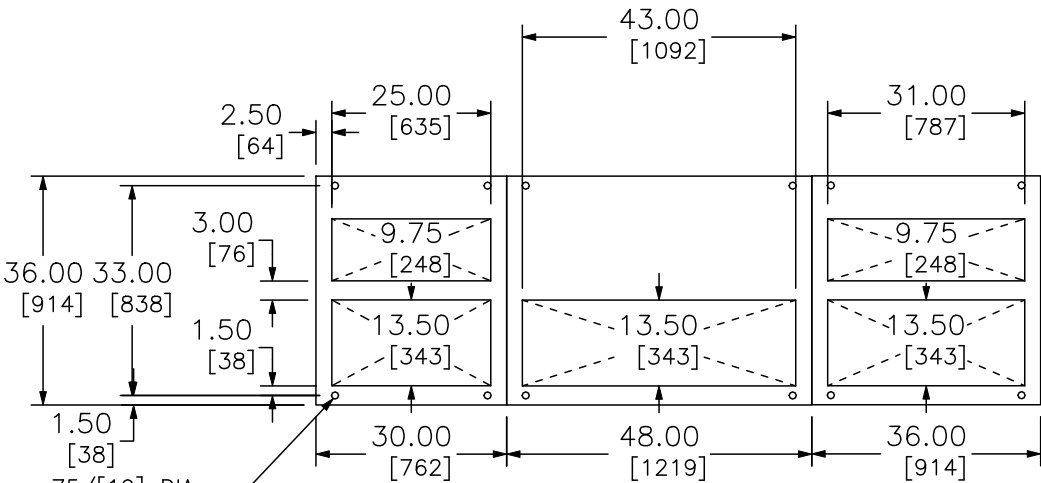
REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--



TOP VIEW – FRONT



LEFT SIDE VIEW



.75/[19] DIA
MTG HOLES OFFSET
3.00/[76] TYP
FROM SIDE

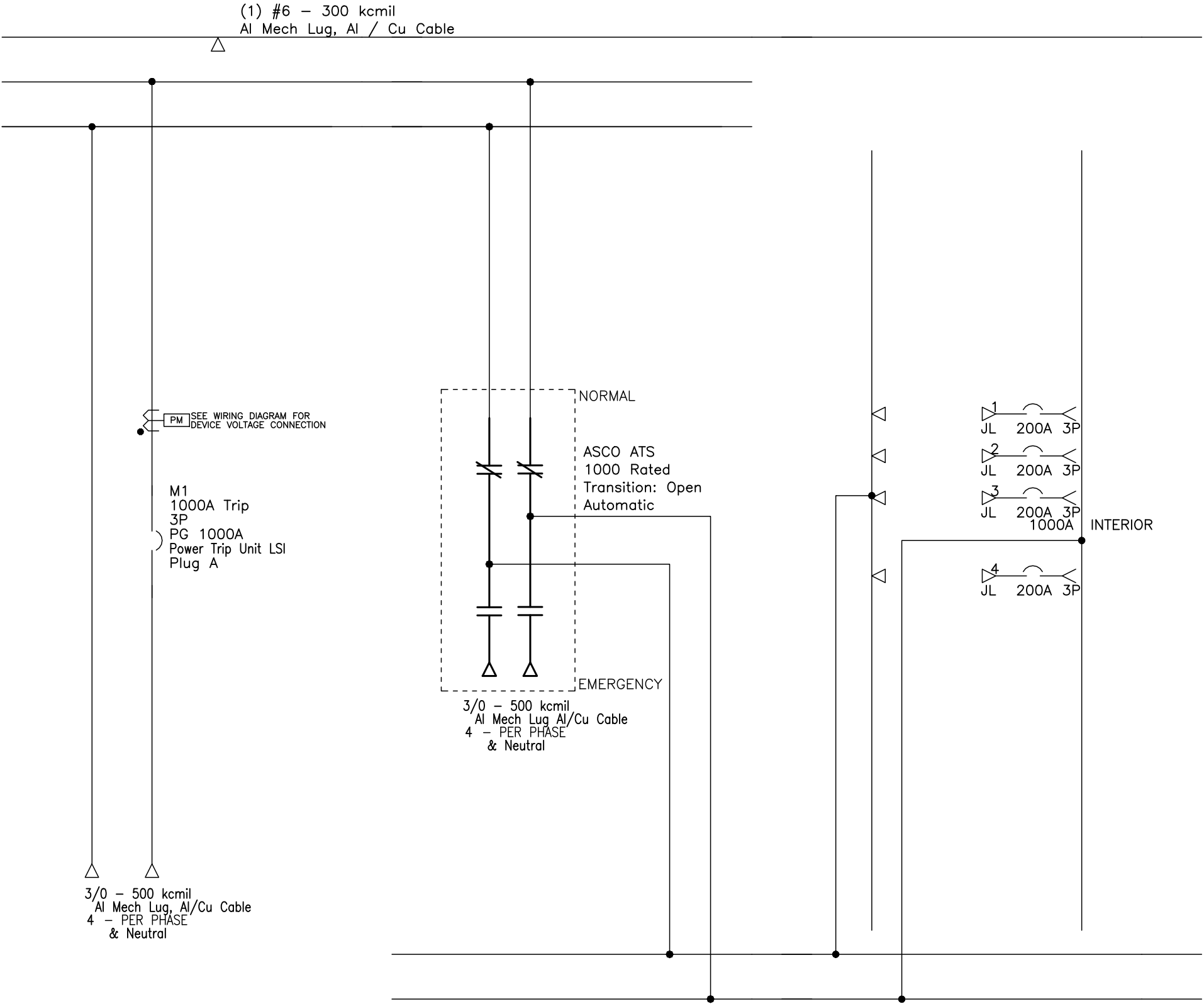
FLOOR PLAN – FRONT

NOTE: ALL DEVICES REQUIRING DRILLING OR INSERTION IN MOUNTING PAD
SUCH AS CONDUIT, ANCHORING STUDS, SLEEVE INSERTS, ETC.
SHOULD BE INSTALLED BEFORE SETTING EQUIPMENT IN PLACE.

DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	CC-DB
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	SIDE, TOP VIEW & FLOOR PLAN
ENGR:		SQUARE D by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	NOT FOR CONSTRUCTION	DWG# FQ-6144432-187028577-01
			PG 2 OF 2 REV -

REV	DESCRIPTION	BY	DATE											
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--	-	----	--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--	-	----	--



SECTION 1

SECTION 2

SECTION 3

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	CC-DB
JOB LOCATION:		EQUIPMENT TYPE:	QED-2 Switchboard
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE
ENGR:		SQUARE D by Schneider Electric	
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	OQ-6144432-187028577-01
		PG 1	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--	-	----	--	--/--/--

POWER STYLE QED-2 SWITCHBOARD														LEGEND	
SECT NO	CKT NO	IMD /GMD CONFIG	DEVICE/FRAME RATING	TRIP AMP	FUSE/ TRIP	#P	DESIGNATION	N/P	LUG/WIRE INFORMATION				ACCESSORIES / NOTES		
									QTY	PHASE WIRE RANGE	QTY	NEUT WIRE RANGE			
-	-	-	Equipment Nameplate	-	-	-	CC-DB	Yes	-	-	-	-	-		
1	M1	FIX	PG 1000A Plug A	1000A	P-LSI	3P	MCB	No	4	3/0 - 500 kcmil	4	3/0 - 500 kcmil	PLA,PM5K,ERMS,TU		
2	ATS	FIX	ASCO ATS H FRAME 1000A	-	-	4P		No	4	3/0 - 500 kcmil	4	3/0 - 500 kcmil	40KB		
3	1	4.5 in	JL 250A	200A	S-LSI	3P		No	1	3/0 - 350 kcmil	1	3/0 - 350kcmil	PLA		
3	2	4.5 in	JL 250A	200A	S-LSI	3P		No	1	3/0 - 350 kcmil	1	3/0 - 350kcmil	PLA		
3	3	4.5 in	JL 250A	200A	S-LSI	3P		No	1	3/0 - 350 kcmil	1	3/0 - 350kcmil	PLA		
3	4	4.5 in	JL 250A	200A	S-LSI	3P		No	1	3/0 - 350 kcmil	1	3/0 - 350kcmil	PLA		

40KB	Emergency Bottom Entry 1000A
ERMS	Energy Reduction Maintenance SW
PLA	Padlock Attachment-Fixed
PM5K	Power Meter PM55XX
TU	24V Trip Unit Display Power

NAMEPLATE INFORMATION:		JOB NAME: Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION: CC-DB		
MOUNTING TYPE: Adhesive (Field Installed)		JOB LOCATION:	EQUIPMENT TYPE: QED-2 Switchboard		
EQUIPMENT: White Surface/Black Letters		DRAWN BY: CAD	DRAWING TYPE: SCHEDULE		
		ENGR:	<div>SQUARE D</div> <div>by Schneider Electric</div>		
		DATE: July 17 2025			
		DRAWING STATUS: QUOTE			
		DWG# OQ-6144432-187028577-01	PG 2	OF 2	REV -

REV	DESCRIPTION	BY	DATE	---	----	---	---	---
-	----	---	---/---/---	-	----	---	---	---

CKT NO	ACCESSORIES	TYPE	RATING AMP/P		RATING AMP/P	TYPE	ACCESSORIES	CKT NO
1		QOB	60/3		60/3	QOB		2
3								4
5								6
7					20/1	QOB		8
9		QOB	60/3		20/1	QOB		10
11					20/1	QOB		12
13	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	14
15	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	16
17	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	18
19	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	20
21	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	22
23	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	24
25	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	26
27	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	28
29	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	30
31	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	32
33	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	34
35	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	36
37	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	38
39	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	40
41	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	42



PHYSICAL DATA

ENCLOSURE Type 1

Flush with Door
FRONT CAT#: NC38F
BOX CAT#: MH38

DIMENSIONS:

38"(965mm)Hx20"(508mm)Wx5.75"(146mm)D

WIRE BENDING SPACE:

TOP - 5"(127)mm
BOTTOM - 9.26"(236)mm
SIDE - 6.13"(156)mm

PBA: 701A

BUSSING: 225A RATED COPPER BUS

Silver/Tin Plated

OPTIONAL FEATURES:

SEISMICALLY QUALIFIED : IBC/ASCE7/CBC/NBCC

BRANCH USER PLACEMENT

Copper GROUND BAR

COPPER SOLID NEUTRAL

Maximum Panel Weight 95.0

Depth Center of Gravity 5.75

Elevation Center of Gravity 19.0

Vertical Center of Gravity 10.0

---STANDARD EQUIPMENT NAMEPLATE---

Engraved as Follows

LINE 1: CC-AC-1

(Continued on next page.)

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz

System Ampacity: 200A

10kA SYMS. SCCR

Fully Rated

MAIN: MAIN LUGS : 200A

Bottom FEED

INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:

Wire Bending Space:

Phase Lugs:1 - #6 - 350 kcmil

-----BRANCH SUMMATION-----

3 - 60A/3P QOB

30 - 20A/1P-PS QOB

3 - 20A/1P QOB


JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	CC-AC-1
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	00-6144432-187031508-01



PG 1 OF 2 REV -

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

PHYSICAL DATA CONTINUED
 COLOR: White Surface / Black Letters
 SIZE: 3.50" Wide x 1.00" High (Std)
 TYPE: Plastic/Adhesive – Screw-on

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	CC-AC-1
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025	by Schneider Electric	
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187031508-01
		PG	2 OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

REQUIREMENTS FOR SEISMIC RATING

SQUARE D PANELBOARDS HAVE BEEN TESTED TO IBC/ASCE7/CBC/NBCC.

THE PANELBOARD TYPES LISTED BELOW MEET THE IBC/ASCE7/CBC/NBCC.

PANELBOARD TYPE	ENCLOSURE TYPE
NQ	TYPE 1, 3R, 5, 12, 4/4X (SS)
NQ COLUMN WIDTH	TYPE 1
NF (STANDARD OR COLUMN WIDTH)	TYPE 1, 3R, 5, 12, 4/4X (SS)
I-LINE	TYPE 1, 3R, 5, 12, 4/4X (SS)
QMB	TYPE 1, 3R, 5, 12, 4/4X (SS)

GUIDELINES:

- 1) BOLT-ON CIRCUIT BREAKERS ARE REQUIRED ON NQ AND NF PANELBOARDS.
- 2) ENCLOSURES MUST BE SECURED TO THE WALL OR STRUCTURE BY UTILIZING ALL MOUNTING HOLES PROVIDED IN THE ENCLOSURE AND SECURED WITH SAE GRADE 5 STEEL BOLTS SIZED PER THE MOUNTING HOLES.

ANCHORING CONDITIONS

TO MAINTAIN SEISMIC QUALIFICATIONS, EQUIPMENT MUST BE INSTALLED PER MANUAL (SEE GENERAL NOTES) IN ADDITION TO ANY SEISMIC ANCHORING DETAILS PROVIDED BY OTHERS. DO NOT INSTALL EQUIPMENT BEFORE APPROVED SEISMIC ANCHORING DETAILS HAVE BEEN OBTAINED AND SITE PREPARATIONS HAVE BEEN MADE IN ACCORDANCE WITH THE APPROVED SEISMIC ANCHORING DETAILS. ALL POST-INSTALLED ANCHORS SHALL BE APPROVED FOR SEISMIC LOADS.

CENTER OF GRAVITY:


THE CG INFORMATION PROVIDED BELOW SHOULD ONLY BE USED FOR SEISMIC ANCHORING CALCULATIONS.

ELEVATION CENTER OF GRAVITY: 19.0	"ABOVE BOTTOM OF ENCLOSURE
DEPTH CENTER OF GRAVITY: 5.75	"FROM BACK WALL OF ENCLOSURE
VERTICAL CENTER OF GRAVITY: 10.0	"FROM LEFT WALL OF ENCLOSURE

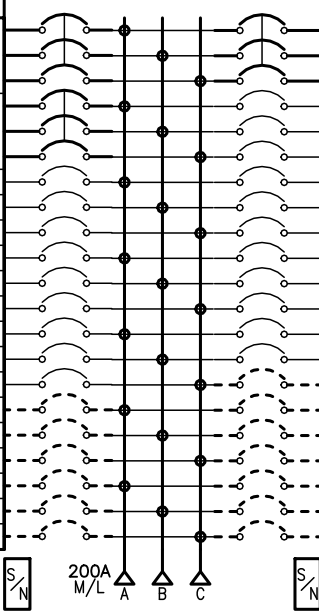
SECTION WEIGHT:

THE WEIGHTS GIVEN BELOW ARE THE MAXIMUM FOR EACH SECTION AND SHOULD BE USED FOR CALCULATING SEISMIC ANCHORING REQUIREMENTS

MAXIMUM PANEL WEIGHT: 95.0 LBS / 43.0KGS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	CC-AC-1
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	00-6144432-187031508-S1
		PG 1	OF 1
		REV	-

REV	DESCRIPTION	BY	DATE	---	----	---	---	---
-	----	---	---/---/---	-	----	---	---	---


CKT NO	ACCESSORIES	TYPE	RATING AMP/P		RATING AMP/P	TYPE	ACCESSORIES	CKT NO
1		QOB	60/3		60/3	QOB		2
3								4
5								6
7					20/1	QOB		8
9		QOB	30/3		20/1	QOB		10
11					20/1	QOB		12
13		QOB	20/1		20/1	QOB		14
15		QOB	20/1		20/1	QOB		16
17		QOB	20/1		20/1	QOB		18
19		QOB	20/1		20/1	QOB		20
21		QOB	20/1		20/1	QOB		22
23		QOB	20/1		20/1	QOB		24
25		QOB	20/1		20/1	QOB		26
27		QOB	20/1		20/1	QOB		28
29		QOB	20/1		20/1	QOB	PREPARED SPACE	30
31	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	32
33	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	34
35	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	36
37	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	38
39	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	40
41	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	42

PHYSICAL DATA

ENCLOSURE Type 1
Flush with Door
FRONT CAT#: NC38F
BOX CAT#: MH38
DIMENSIONS:
38''(965mm)Hx20''(508mm)Wx5.75''(146mm)D
WIRE BENDING SPACE:
TOP - 5''(127)mm
BOTTOM - 9.26''(236)mm
SIDE - 6.13''(156)mm
PBA: 701A
BUSSING: 225A RATED COPPER BUS
Silver/Tin Plated
OPTIONAL FEATURES:
SEISMICALLY QUALIFIED : IBC/ASCE7/CBC/NBCC
BRANCH USER PLACEMENT
ALUMINUM SOLID NEUTRAL
ALUMINUM GROUND BAR
Maximum Panel Weight 95.0
Depth Center of Gravity 5.75
Elevation Center of Gravity 19.0
Vertical Center of Gravity 10.0
---STANDARD EQUIPMENT NAMEPLATE---
Engraved as Follows
LINE 1: PANEL CC-B
(Continued on next page.)


ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz
System Ampacity: 200A
10kA SYMS. SCCR
Fully Rated
MAIN: MAIN LUGS : 200A
Bottom FEED
INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:
Wire Bending Space:
Phase Lugs:1 - #6 - 350 kcmil
-----BRANCH SUMMATION-----
2 - 60A/3P QOB 1 - 30A/3P QOB
20 - 20A/1P QOB 13 - 20A/1P-PS QOB

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-B
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187032412-01
		PG 1	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

PHYSICAL DATA CONTINUED
 COLOR: White Surface / Black Letters
 SIZE: 3.50" Wide x 1.00" High (Std)
 TYPE: Plastic/Adhesive – Screw-on

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-B
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025	by Schneider Electric	
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187032412-01
		PG	2 OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

REQUIREMENTS FOR SEISMIC RATING

SQUARE D PANELBOARDS HAVE BEEN TESTED TO IBC/ASCE7/CBC/NBCC.

THE PANELBOARD TYPES LISTED BELOW MEET THE IBC/ASCE7/CBC/NBCC.

PANELBOARD TYPE	ENCLOSURE TYPE
NQ	TYPE 1, 3R, 5, 12, 4/4X (SS)
NQ COLUMN WIDTH	TYPE 1
NF (STANDARD OR COLUMN WIDTH)	TYPE 1, 3R, 5, 12, 4/4X (SS)
I-LINE	TYPE 1, 3R, 5, 12, 4/4X (SS)
QMB	TYPE 1, 3R, 5, 12, 4/4X (SS)

GUIDELINES:

- 1) BOLT-ON CIRCUIT BREAKERS ARE REQUIRED ON NQ AND NF PANELBOARDS.
- 2) ENCLOSURES MUST BE SECURED TO THE WALL OR STRUCTURE BY UTILIZING ALL MOUNTING HOLES PROVIDED IN THE ENCLOSURE AND SECURED WITH SAE GRADE 5 STEEL BOLTS SIZED PER THE MOUNTING HOLES.

ANCHORING CONDITIONS

TO MAINTAIN SEISMIC QUALIFICATIONS, EQUIPMENT MUST BE INSTALLED PER MANUAL (SEE GENERAL NOTES) IN ADDITION TO ANY SEISMIC ANCHORING DETAILS PROVIDED BY OTHERS. DO NOT INSTALL EQUIPMENT BEFORE APPROVED SEISMIC ANCHORING DETAILS HAVE BEEN OBTAINED AND SITE PREPARATIONS HAVE BEEN MADE IN ACCORDANCE WITH THE APPROVED SEISMIC ANCHORING DETAILS. ALL POST-INSTALLED ANCHORS SHALL BE APPROVED FOR SEISMIC LOADS.

CENTER OF GRAVITY:


THE CG INFORMATION PROVIDED BELOW SHOULD ONLY BE USED FOR SEISMIC ANCHORING CALCULATIONS.

ELEVATION CENTER OF GRAVITY: 19.0	"ABOVE BOTTOM OF ENCLOSURE
DEPTH CENTER OF GRAVITY: 5.75	"FROM BACK WALL OF ENCLOSURE
VERTICAL CENTER OF GRAVITY: 10.0	"FROM LEFT WALL OF ENCLOSURE

SECTION WEIGHT:

THE WEIGHTS GIVEN BELOW ARE THE MAXIMUM FOR EACH SECTION AND SHOULD BE USED FOR CALCULATING SEISMIC ANCHORING REQUIREMENTS

MAXIMUM PANEL WEIGHT: 95.0 LBS / 43.0KGS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-B
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	00-6144432-187032412-S1
		PG 1	OF 1
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P		RATING AMP/P	TYPE	ACCESSORIES	CKT NO
1		QOB	20/1		20/1	QOB		2
3		QOB	20/1		20/1	QOB		4
5		QOB	20/1		20/1	QOB		6
7		QOB	20/1		20/1	QOB		8
9		QOB	20/1		20/1	QOB		10
11		QOB	20/1		20/1	QOB		12
13		QOB	20/1		20/1	QOB		14
15		QOB	20/1		20/1	QOB		16
17		QOB	20/1		20/1	QOB		18
19		QOB	20/1		20/1	QOB		20
21		QOB	20/1		20/1	QOB		22
23		QOB	20/1		20/1	QOB		24
25		QOB	20/1		20/1	QOB		26
27		QOB	20/1		20/1	QOB		28
29		QOB	20/1		20/1	QOB		30
31		QOB	20/1		20/1	QOB		32
33		QOB	20/1		20/1	QOB		34
35		QOB	20/1		20/1	QOB		36
37		QOB	20/1		20/1	QOB		38
39		QOB	20/1		20/1	QOB		40
41		QOB	20/1		20/1	QOB		42



PHYSICAL DATA

ENCLOSURE Type 1

Flush with Door
FRONT CAT#: NC38F
BOX CAT#: MH38

DIMENSIONS:

38"(965mm)Hx20"(508mm)Wx5.75"(146mm)D

WIRE BENDING SPACE:

TOP - 5"(127)mm
BOTTOM - 9.26"(236)mm
SIDE - 6.13"(156)mm

PBA: 701A

BUSSING: 225A RATED COPPER BUS

Silver/Tin Plated

OPTIONAL FEATURES:

SEISMICALLY QUALIFIED : IBC/ASCE7/CBC/NBCC

Copper GROUND BAR

COPPER SOLID NEUTRAL

Maximum Panel Weight 95.0

Depth Center of Gravity 5.75

Elevation Center of Gravity 19.0

Vertical Center of Gravity 10.0

---STANDARD EQUIPMENT NAMEPLATE---

Engraved as Follows

LINE 1: PANEL CC-A

COLOR: White Surface / Black Letters

(Continued on next page.)

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz

System Ampacity: 200A

10kA SYMS. SCCR

Fully Rated

MAIN: MAIN LUGS : 200A

Bottom FEED

INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:

Wire Bending Space:

Phase Lugs:1 - #6 - 350 kcmil

-----BRANCH SUMMATION-----


42 - 20A/1P QOB

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-A
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187033818-01



REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

PHYSICAL DATA CONTINUED
 SIZE: 3.50” Wide x 1.00” High (Std)
 TYPE: Plastic/Adhesive – Screw-on

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-A
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025	by Schneider Electric	
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187033818-01
		PG	2 OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

REQUIREMENTS FOR SEISMIC RATING

SQUARE D PANELBOARDS HAVE BEEN TESTED TO IBC/ASCE7/CBC/NBCC.

THE PANELBOARD TYPES LISTED BELOW MEET THE IBC/ASCE7/CBC/NBCC.

PANELBOARD TYPE	ENCLOSURE TYPE
NQ	TYPE 1, 3R, 5, 12, 4/4X (SS)
NQ COLUMN WIDTH	TYPE 1
NF (STANDARD OR COLUMN WIDTH)	TYPE 1, 3R, 5, 12, 4/4X (SS)
I-LINE	TYPE 1, 3R, 5, 12, 4/4X (SS)
QMB	TYPE 1, 3R, 5, 12, 4/4X (SS)

GUIDELINES:

- 1) BOLT-ON CIRCUIT BREAKERS ARE REQUIRED ON NQ AND NF PANELBOARDS.
- 2) ENCLOSURES MUST BE SECURED TO THE WALL OR STRUCTURE BY UTILIZING ALL MOUNTING HOLES PROVIDED IN THE ENCLOSURE AND SECURED WITH SAE GRADE 5 STEEL BOLTS SIZED PER THE MOUNTING HOLES.

ANCHORING CONDITIONS

TO MAINTAIN SEISMIC QUALIFICATIONS, EQUIPMENT MUST BE INSTALLED PER MANUAL (SEE GENERAL NOTES) IN ADDITION TO ANY SEISMIC ANCHORING DETAILS PROVIDED BY OTHERS. DO NOT INSTALL EQUIPMENT BEFORE APPROVED SEISMIC ANCHORING DETAILS HAVE BEEN OBTAINED AND SITE PREPARATIONS HAVE BEEN MADE IN ACCORDANCE WITH THE APPROVED SEISMIC ANCHORING DETAILS. ALL POST-INSTALLED ANCHORS SHALL BE APPROVED FOR SEISMIC LOADS.

CENTER OF GRAVITY:


THE CG INFORMATION PROVIDED BELOW SHOULD ONLY BE USED FOR SEISMIC ANCHORING CALCULATIONS.

ELEVATION CENTER OF GRAVITY: 19.0	"ABOVE BOTTOM OF ENCLOSURE
DEPTH CENTER OF GRAVITY: 5.75	"FROM BACK WALL OF ENCLOSURE
VERTICAL CENTER OF GRAVITY: 10.0	"FROM LEFT WALL OF ENCLOSURE

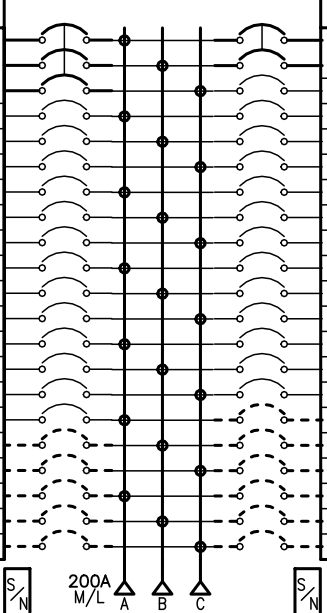
SECTION WEIGHT:

THE WEIGHTS GIVEN BELOW ARE THE MAXIMUM FOR EACH SECTION AND SHOULD BE USED FOR CALCULATING SEISMIC ANCHORING REQUIREMENTS

MAXIMUM PANEL WEIGHT: 95.0 LBS / 43.0KGS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-A
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	00-6144432-187033818-S1
		PG 1	OF 1
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P		RATING AMP/P	TYPE	ACCESSORIES	CKT NO
1		QOB	60/3		30/2	QOB		2
3					20/1	QOB		4
5					20/1	QOB		6
7		QOB	20/1		20/1	QOB		8
9		QOB	20/1		20/1	QOB		10
11		QOB	20/1		20/1	QOB		12
13		QOB	20/1		20/1	QOB		14
15		QOB	20/1		20/1	QOB		16
17		QOB	20/1		20/1	QOB		18
19		QOB	20/1		20/1	QOB		20
21		QOB	20/1		20/1	QOB		22
23		QOB	20/1		20/1	QOB		24
25		QOB	20/1		20/1	QOB		26
27		QOB	20/1		20/1	QOB		28
29		QOB	20/1		20/1	QOB		30
31		QOB	20/1		20/1	QOB	PREPARED SPACE	32
33	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	34
35	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	36
37	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	38
39	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	40
41	PREPARED SPACE	QOB	20/1		20/1	QOB	PREPARED SPACE	42

PHYSICAL DATA

ENCLOSURE Type 1

Flush with Door
FRONT CAT#: NC38F
BOX CAT#: MH38

DIMENSIONS:

38"(965mm)Hx20"(508mm)Wx5.75"(146mm)D

WIRE BENDING SPACE:

TOP - 5"(127)mm
BOTTOM - 9.26"(236)mm
SIDE - 6.13"(156)mm

PBA: 701A

BUSSING: 225A RATED ALUMINUM BUS

Tin Plated

OPTIONAL FEATURES:

BRANCH USER PLACEMENT
ALUMINUM SOLID NEUTRAL
ALUMINUM GROUND BAR

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz

System Ampacity: 200A

10kA SYMS. SCCR

Fully Rated

MAIN: MAIN LUGS : 200A

Bottom FEED

INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:

Wire Bending Space:

Phase Lugs:1 - #6 - 350 kcmil


-----BRANCH SUMMATION-----

1 - 60A/3P QOB

26 - 20A/1P QOB

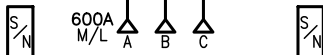
11 - 20A/1P-PS QOB

1 - 30A/2P QOB

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL CC-EM
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187035488-01
		PG 1	OF 1
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	---	---	---
-	----	--	---/---/---	-	----	---	---	---

CKT NO	ACCESSORIES	TYPE	RATING AMP/P		RATING AMP/P	TYPE	ACCESSORIES	CKT NO
1		EGB	40/2		40/2	EGB		2
3								4
5		EGB	40/2		40/2	EGB		6
7								8
9		EGB	40/2		40/2	EGB		10
11								12
13		EGB	40/2		40/2	EGB		14
15								16
17		EGB	40/2		40/2	EGB		18
19								20
21		EGB	40/2		40/2	EGB		22
23								24
25		EGB	40/2		20/1	EGB	PREPARED SPACE	26
27					20/1	EGB	PREPARED SPACE	28
29	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	30
31	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	32
33	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	34
35	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	36
37	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	38
39	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	40
41	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	42



PHYSICAL DATA

ENCLOSURE Type 1

Flush with Door
FRONT CAT#: NC56VF
BOX CAT#: MH56

DIMENSIONS:

56"(1422mm)Hx20"(508mm)Wx5.75"(146mm)D

WIRE BENDING SPACE:

TOP - 12.25"(312)mm
BOTTOM - 16"(407)mm
SIDE - 4.1"(105)mm

PBA: 551

BUSSING: 600A RATED COPPER BUS

Silver/Tin Plated

OPTIONAL FEATURES:

SEISMICALLY QUALIFIED : IBC/ASCE7/CBC/NBCC
BRANCH USER PLACEMENT
Copper GROUND BAR
COPPER SOLID NEUTRAL
Maximum Panel Weight 179.
Depth Center of Gravity 5.75
Elevation Center of Gravity 28.0
Vertical Center of Gravity 10.0

---STANDARD EQUIPMENT NAMEPLATE---

Engraved as Follows

LINE 1: PANL EV-2

(Continued on next page.)

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz

System Ampacity: 600A

65kA SYMS. SCCR

Fully Rated

MAIN: MAIN LUGS : 600A

Bottom FEED

INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:

Wire Bending Space:

Phase Lugs:1 - (2) 1/0 - 600 kcmil

-----BRANCH SUMMATION-----


13 - 40A/2P EGB

16 - 20A/1P-PS EGB

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL EV-2
JOB LOCATION:		EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187036927-01
		PG 1	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

PHYSICAL DATA CONTINUED
 COLOR: White Surface / Black Letters
 SIZE: 3.50" Wide x 1.00" High (Std)
 TYPE: Plastic/Adhesive – Screw-on

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL EV-2
JOB LOCATION:		EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025	by Schneider Electric	
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187036927-01
		PG 2	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

REQUIREMENTS FOR SEISMIC RATING

SQUARE D PANELBOARDS HAVE BEEN TESTED TO IBC/ASCE7/CBC/NBCC.

THE PANELBOARD TYPES LISTED BELOW MEET THE IBC/ASCE7/CBC/NBCC.

PANELBOARD TYPE	ENCLOSURE TYPE
NQ	TYPE 1, 3R, 5, 12, 4/4X (SS)
NQ COLUMN WIDTH	TYPE 1
NF (STANDARD OR COLUMN WIDTH)	TYPE 1, 3R, 5, 12, 4/4X (SS)
I-LINE	TYPE 1, 3R, 5, 12, 4/4X (SS)
QMB	TYPE 1, 3R, 5, 12, 4/4X (SS)

GUIDELINES:

- 1) BOLT-ON CIRCUIT BREAKERS ARE REQUIRED ON NQ AND NF PANELBOARDS.
- 2) ENCLOSURES MUST BE SECURED TO THE WALL OR STRUCTURE BY UTILIZING ALL MOUNTING HOLES PROVIDED IN THE ENCLOSURE AND SECURED WITH SAE GRADE 5 STEEL BOLTS SIZED PER THE MOUNTING HOLES.

ANCHORING CONDITIONS

TO MAINTAIN SEISMIC QUALIFICATIONS, EQUIPMENT MUST BE INSTALLED PER MANUAL (SEE GENERAL NOTES) IN ADDITION TO ANY SEISMIC ANCHORING DETAILS PROVIDED BY OTHERS. DO NOT INSTALL EQUIPMENT BEFORE APPROVED SEISMIC ANCHORING DETAILS HAVE BEEN OBTAINED AND SITE PREPARATIONS HAVE BEEN MADE IN ACCORDANCE WITH THE APPROVED SEISMIC ANCHORING DETAILS. ALL POST-INSTALLED ANCHORS SHALL BE APPROVED FOR SEISMIC LOADS.

CENTER OF GRAVITY:


THE CG INFORMATION PROVIDED BELOW SHOULD ONLY BE USED FOR SEISMIC ANCHORING CALCULATIONS.

ELEVATION CENTER OF GRAVITY:	28.0	"ABOVE BOTTOM OF ENCLOSURE
DEPTH CENTER OF GRAVITY:	5.75	"FROM BACK WALL OF ENCLOSURE
VERTICAL CENTER OF GRAVITY:	10.0	"FROM LEFT WALL OF ENCLOSURE

SECTION WEIGHT:

THE WEIGHTS GIVEN BELOW ARE THE MAXIMUM FOR EACH SECTION AND SHOULD BE USED FOR CALCULATING SEISMIC ANCHORING REQUIREMENTS

MAXIMUM PANEL WEIGHT: 179. LBS / 81.2KGS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL EV-2
JOB LOCATION:		EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	00-6144432-187036927-S1
		PG 1	OF 1
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	---	---/---/---
-	----	---	---/---/---	-	----	---	---/---/---

CKT NO	ACCESSORIES	TYPE	RATING AMP/P		RATING AMP/P	TYPE	ACCESSORIES	CKT NO
1		EGB	40/2		40/2	EGB		2
3								4
5		EGB	40/2		40/2	EGB		6
7								8
9		EGB	40/2		40/2	EGB		10
11								12
13		EGB	40/2		40/2	EGB		14
15								16
17		EGB	40/2		40/2	EGB		18
19								20
21		EGB	40/2		40/2	EGB		22
23								24
25	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	26
27	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	28
29	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	30
31	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	32
33	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	34
35	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	36
37	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	38
39	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	40
41	PREPARED SPACE	EGB	20/1		20/1	EGB	PREPARED SPACE	42

PHYSICAL DATA

ENCLOSURE Type 1
Flush with Door
FRONT CAT#: NC56VF
BOX CAT#: MH56

DIMENSIONS:
56''(1422mm)Hx20''(508mm)Wx5.75''(146mm)D

WIRE BENDING SPACE:
TOP - 12.25''(312)mm
BOTTOM - 16''(407)mm
SIDE - 4.1''(105)mm

PBA: 551

BUSSING: 600A RATED COPPER BUS
Silver/Tin Plated

OPTIONAL FEATURES:
SEISMICALLY QUALIFIED : IBC/ASCE7/CBC/NBCC
Copper GROUND BAR
COPPER SOLID NEUTRAL
Maximum Panel Weight 179.
Depth Center of Gravity 5.75
Elevation Center of Gravity 28.0
Vertical Center of Gravity 10.0
---STANDARD EQUIPMENT NAMEPLATE---
Engraved as Follows
LINE 1:
COLOR: White Surface / Black Letters
(Continued on next page.)

ELECTRICAL DATA


SYSTEM: 208Y/120V 3Ph 4W 60Hz
System Ampacity: 600A
65kA SYMS. SCCR
Fully Rated

MAIN: MAIN LUGS : 600A
Bottom FEED
INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:
Wire Bending Space:
Phase Lugs:1 - (2) 1/0 - 600 kcmil
-----BRANCH SUMMATION-----
12 - 40A/2P EGB 18 - 20A/1P-PS EGB

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL EV-1
JOB LOCATION:		EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187037595-01
		PG 1	OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

PHYSICAL DATA CONTINUED
 SIZE: 3.50” Wide x 1.00” High (Std)
 TYPE: Plastic/Adhesive – Screw-on

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL EV-1
JOB LOCATION:		EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025	by Schneider Electric	
DRAWING STATUS:	QUOTE	DWG#	0Q-6144432-187037595-01
		PG	2 OF 2
		REV	-

REV	DESCRIPTION	BY	DATE	-	----	--	--/--/--
-	----	--	--/--/--	-	----	--	--/--/--

REQUIREMENTS FOR SEISMIC RATING

SQUARE D PANELBOARDS HAVE BEEN TESTED TO IBC/ASCE7/CBC/NBCC.

THE PANELBOARD TYPES LISTED BELOW MEET THE IBC/ASCE7/CBC/NBCC.

PANELBOARD TYPE	ENCLOSURE TYPE
NQ	TYPE 1, 3R, 5, 12, 4/4X (SS)
NQ COLUMN WIDTH	TYPE 1
NF (STANDARD OR COLUMN WIDTH)	TYPE 1, 3R, 5, 12, 4/4X (SS)
I-LINE	TYPE 1, 3R, 5, 12, 4/4X (SS)
QMB	TYPE 1, 3R, 5, 12, 4/4X (SS)

GUIDELINES:

- 1) BOLT-ON CIRCUIT BREAKERS ARE REQUIRED ON NQ AND NF PANELBOARDS.
- 2) ENCLOSURES MUST BE SECURED TO THE WALL OR STRUCTURE BY UTILIZING ALL MOUNTING HOLES PROVIDED IN THE ENCLOSURE AND SECURED WITH SAE GRADE 5 STEEL BOLTS SIZED PER THE MOUNTING HOLES.

ANCHORING CONDITIONS

TO MAINTAIN SEISMIC QUALIFICATIONS, EQUIPMENT MUST BE INSTALLED PER MANUAL (SEE GENERAL NOTES) IN ADDITION TO ANY SEISMIC ANCHORING DETAILS PROVIDED BY OTHERS. DO NOT INSTALL EQUIPMENT BEFORE APPROVED SEISMIC ANCHORING DETAILS HAVE BEEN OBTAINED AND SITE PREPARATIONS HAVE BEEN MADE IN ACCORDANCE WITH THE APPROVED SEISMIC ANCHORING DETAILS. ALL POST-INSTALLED ANCHORS SHALL BE APPROVED FOR SEISMIC LOADS.

CENTER OF GRAVITY:


THE CG INFORMATION PROVIDED BELOW SHOULD ONLY BE USED FOR SEISMIC ANCHORING CALCULATIONS.

ELEVATION CENTER OF GRAVITY:	28.0	"ABOVE BOTTOM OF ENCLOSURE
DEPTH CENTER OF GRAVITY:	5.75	"FROM BACK WALL OF ENCLOSURE
VERTICAL CENTER OF GRAVITY:	10.0	"FROM LEFT WALL OF ENCLOSURE

SECTION WEIGHT:

THE WEIGHTS GIVEN BELOW ARE THE MAXIMUM FOR EACH SECTION AND SHOULD BE USED FOR CALCULATING SEISMIC ANCHORING REQUIREMENTS

MAXIMUM PANEL WEIGHT: 179. LBS / 81.2KGS

JOB NAME:	Phelan Pinon Hills CSD	EQUIPMENT DESIGNATION:	PANEL EV-1
JOB LOCATION:		EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	CAD	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	July 17 2025		
DRAWING STATUS:	QUOTE	DWG#	00-6144432-187037595-S1
		PG 1	OF 1
		REV	-

Square D QED-2 Low Voltage Switchboards

A tradition of distinction, with a mission to
innovate solutions for tomorrow



Life Is 

SQUARE D™

by Schneider Electric

A Tradition of Distinction

Square D QED-2 Low Voltage Custom Switchboards

Square D™ QED-2 Switchboards set the standard for system solutions of today and those of tomorrow by delivering on higher expectations and standards! Square D Switchboards have been setting the standards for electrical distribution systems due to their trusted durable construction and continuous innovative progression that keeps Square D one step ahead of all others. This progression includes integrating power metering and communications capabilities providing direct access to energy management at main and feeder level. This allows for flexibility in developing simple or complex monitoring solutions, as well as future expansion. Square D Low Voltage Custom Switchboards are designed to distribute electrical power and provide a reduced footprint without compromising performance or versatility.

A Solid Foundation

Square D Switchboard ratings offer a robust solution through 5,000 A and 200 kA. Higher feeder ampacities are available with individually mounted branch devices up to 4,000 A.



Innovative but Familiar

The Quick Connect capability allows for a simple and seamless connection when installing. Even though Square D Switchboards continue to become more innovative, the quality and familiarity of the equipment leads the industry.

Energy Reduction Maintenance

An ERMS switch helps meet the NEC 240.87 code for arc flash energy reduction, improving worker safety by modifying the trip curve. A "Maintenance Mode" switch is mounted on the switchboard.

Industry Leading Compact Footprint

Square D Switchboards were designed with the customer in mind. They provide front accessibility that aids in reducing footprint as well as provides convenient access for maintenance.



Smart Systems Communications

The Smart Systems solution provides Ethernet-networked metering and status data from Square D switchboards and electrical equipment. Masterpact™ and PowerPact™ circuit breakers with Micrologic™ trip units offer energy and power quality metering capabilities integrated into the trip units. Combined with Smart Systems communications, circuit breakers can be networked, monitored and controlled remotely, revealing opportunities to reduce downtime and monitor energy use for savings in electric system operating costs.

Accelerated Engineering

Meet tighter project schedules with AE Standard Switchboards. It's the faster, better way to order, and options such as the ERMS switch are added easily through Accelerated Engineering.

Designed with the Customer in Mind

Square D Switchboards allow for custom engineering for each line-up such as Main-Tie-Mains, Automatic Transfers, Commercial Multi-Metering, and reduced height configurations.



Efficient Distribution

The I-Line™ distribution section is unique — and popular — for its enhanced safety and ease of installation.

The I-Line offers jaw-type connections which provide a firmer, more secure grip on the bus bar under high-level fault conditions for improved uptime. Distribution sections are available in single or double row construction allowing an increased power density in a compact footprint.

A Mission of Innovative Solutions

QED-2 Accelerated Engineering Standard Switchboards

To better meet our customer's tight schedules, our Square D QED-2 Standard Switchboard is available with Accelerated Engineering, which brings together standard designs for the most frequently requested ratings and options. With Accelerated Engineered Switchboards, on-demand approval drawings and an auto release of the equipment will allow you to stay competitive by simplifying the order process and offering a reduction in ship time. This means the customer will receive their switchboard 2 weeks faster. This allows for a quicker project turnaround for all parties involved, providing a competitive advantage in the industry.

★ Faster Project Turnaround

Accelerated Engineering Standard Switchboards offer a more responsive, faster and more flexible solution.

- On-demand factory approval drawings
- Auto release of Equipment to manufacturing
- Select designs with premier 4-week lead time
- 24/7 services support
- Customer-focused order process
- Customizable options available

Enclosure Options

Switchboard enclosures are available as Indoor NEMA Type 1 or Outdoor NEMA Type 3R construction.

Standard Solution without the Compromise

Surge Protection

Internally mounted Surgelogic™ surge protective devices in mains section or I-Line interior.

Metering Options

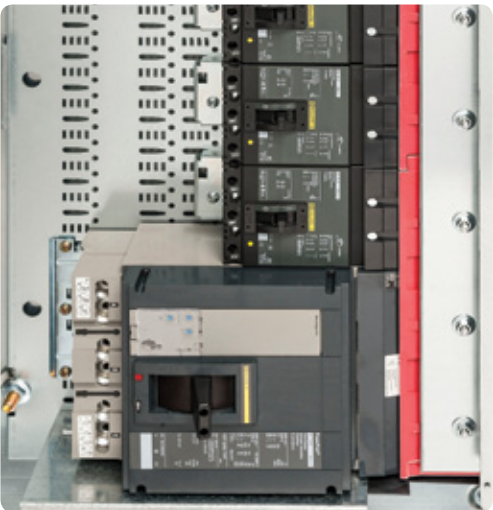
PowerLogic™ Power Meters are available to monitor at main or feeder level.



On-Demand Robust Solution

Accelerated Engineering Standard Switchboards provide expedited

manufacturing and delivery time without sacrificing the robustness of the solution needed. The maximum rating for these standard switchboards is through 4000 A and 100 kAIC.



Unrestricted Branch Mounting*

The unique design of the I-Line single or double row distribution section allows branch circuit breakers the flexibility to mount a 15 A circuit breaker next to a 1,200 A circuit breaker. This presents the opportunity for more effective use of space.

A screwdriver is the only tool you need to install these breakers, which saves valuable installation time.

** Space for high-level communications will need to be taken into account.*



Metering Down to 15 Amps

PowerPact™ with Micrologic trip units offer the capability to meter energy down to 15 A. Standard trip units provide convenient, local data access through a high visibility front display.



Whether it is a highly customizable switchboard or an expedited switchboard needed.

Your requirements and expectations **will not only be met but exceeded** with Square D QED-2 Low Voltage Switchboards.



Introduce Quality into Your Electrical Room

1 This section supplements Section 26.24.13 10 — Low Voltage Switchboards, unless otherwise noted.

2 Comply with requirements as follows:

Standards	
UL 50	Enclosures for Electrical Equipment
UL 98	Enclosed and Deadfront Switches
UL 489	Molded Case Circuit Breakers
UL 891	Deadfront Switchboards
UL 977	Fused Power Circuit Devices
UL 943	Ground Fault Circuit Interrupters
UL 1053	Ground Fault Sensing and Relaying Equipment
NEC Article 834	Switchboards
NFPA 70	National Electrical Code * (NEC *)
ANSI/IEEE C12.1	Code for Electricity Metering
ANSI C39.1	Electrical Analog Indicating Instruments
ANSI C57.13	Instrument Transformers
NEMA AB 1	Molded Case Circuit Breakers and Molded Case Switches
NEMA PB 2	Switchboards

3 QED-2 Switchboard Electrical Ratings:

- a. Nominal AC System Voltage: [600 Vac] [480 Vac] [240 Vac] [208 Vac]
- b. Maximum Design Voltage: 635 Vac
- c. Maximum Short-Circuit Current: 100 kAIR (@ 635 Vac)

4 QED-2 Switchboard General Construction:

- a. Indoor NEMA 1 Enclosure or Outdoor NEMA 3R Enclosure
- b. Fixed or drawout breakers
- c. Removable Rear Cover Panels Secured with Captive Screws [Hinged Doors]

For assistance or more information:



Ask your authorized Schneider Electric Distributor



Call at 888-SQUARED (888-778-2733)



Visit schneider-electric.us/switchboards

Schneider Electric USA

800 Federal Street
Andover, MA 01810
Tel: (978) 794-0800
www.schneider-electric.com/us

**Standard Terms and Conditions of Sale
Including Proposal Based Terms and
Field Services.**



1. Contract Terms

These Standard Terms and Conditions of Sale ("**Conditions of Sale**") shall apply to (i) any purchase or procurement of products (which may contain embedded software) ("**Products**"), (ii) providing any services ("**Services**"), and (iii) the grant of non-exclusive license rights to utilize certain software on a standalone basis ("**Software**") by the legal entity procuring such Products or Services or licensing such Software ("**Purchaser**") from the legal entity of the Schneider Electric division that provided the proposal or is selling the Products and Services or licensing the Software ("**SE**"). To the extent that there is a conflict between these Conditions of Sale and a valid signed master agreement between the Purchaser and SE, the specific conflicting terms of such master agreement shall prevail unless otherwise provided for in such master agreement. To the extent that there is a conflict between these Conditions of Sale and another set of SE terms and conditions issued to the Purchaser as part of the proposal or quotation process, the specific conflicting terms of such proposal or quotation document shall prevail. Any other variation from these Conditions of Sale shall require the signed written consent of an authorized SE representative. Any purchase order or statement of work (a "**Purchase Order**") or other communication or document from the Purchaser that contains terms and conditions in addition to or inconsistent with these Conditions of Sale shall not be binding upon SE unless SE expressly agrees to and accepts such terms and conditions in writing; and neither SE's acceptance of a Purchase Order nor SE's failure to object to such terms and conditions contained in any Purchase Order or other communication or document from the Purchaser shall be construed as a waiver of these Conditions of Sale or an acceptance by SE of any such terms and conditions. The Purchaser may issue to SE a Purchase Order for purchase or licensing of the Products, Services or Software, as applicable, in written or electronic form as directed by SE. The attached Exhibit 1 shall apply, in addition to these Conditions of Sale, to the Products, Services and Software. The attached Exhibit 2 shall apply, in addition to these Conditions of Sale, to Field Services Orders.

2. Prices

- a. Unless otherwise stated in an applicable quotation or proposal from SE or Exhibit 1 for Proposal based quotations, all prices are subject to change by SE without notice.
- b. Unless otherwise agreed to in writing by SE, prices for orders scheduled for immediate release shall be those in effect at time of order entry by SE.
- c. Prices for orders placed for future shipment without an agreed price and ship date will be billed at the pricing in effect as of the shipment date.
- d. All clerical errors by SE are subject to correction.
- e. Services Assumptions: SE's work estimates for Services are based on work performed during normal work hours (8 hours) between the hours of 06:00 and 18:00 local time, Monday to Friday, holidays excepted. Unless specified in writing the following are chargeable in addition to base rates: overtime or premium hours, travel costs, specialized tools and test goods, utility shutdowns, any delays or site issues not caused by SE, additional trips for postponement or delay. No on-site orientation, safety training, work required for site specific requirements is included in a quotation unless expressly specified by SE. Current rates are in SE's then current SE Field Services Demand Labor Rates document. Subject to the other applicable terms and conditions of these Conditions of Sale, field specialists bill a 4-hour minimum charge for travel where Services are performed in less than 4 hours, and an 8-hour minimum charge for Services otherwise.

3. Taxes

Unless otherwise expressly set out in SE's relevant proposal or quotation or in the relevant Purchase Order, prices do not include any tariffs, taxes, duties or any other governmental levies (including, but not limited to, all present or future gross receipts, sales, use, ad valorem, revenue, excise, value-added (VAT), withholding, harmonized sales, digital services taxes, goods and services taxes or any other similar taxes; all present or future import, export, or any other similar duties; and any other tariff or surcharge now existing or hereafter imposed by governmental authorities upon Product, Software and/or Services "Levies"). The Purchaser shall be responsible for all such Levies incurred by SE in connection with the sale of the Product, the provision of Services and/or the licensing of Software or component or part of each of the foregoing. Any such Levies shall be chargeable to the Purchaser on the applicable Product, Service, or Software invoice, unless the Purchaser furnishes SE at the time of order with a properly completed exemption certificate(s) acceptable to the authorities imposing such Levies.

4. Terms of payment

- a. Payments are due net 30 days from the date of invoice. Invoices for progress payments become due on the date of shipment
- b. Late payments will be subject to interest charges at the rate of two percent (2%) per month, or as otherwise required by law.
- c. If at the Purchaser's request, shipments are delayed beyond the scheduled date, payments for the Products and Services completed to date will be invoiced to the Purchaser and SE shall be entitled to invoice for all other amounts under the Purchase Order.
- d. Acceptance of all Purchase Orders is subject to the Purchaser meeting SE credit standards. Terms are subject to change for failure to meet such standards. For an authorized distributor or authorized reseller order, applicable terms of payment are stated in the quotation or applicable discount schedule. SE reserves the right at any time to

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demand full or partial payment before proceeding with Purchase Order if, in its sole judgment, as a result of changes in the financial condition of the Purchaser the terms of payment originally specified are no longer justified.

- e. The Products held for the Purchaser shall be at the risk and expense of the Purchaser.
- f. If completion of the Services or delivery of the Product is delayed more than 30 days after the originally scheduled delivery date and such delay is not caused by SE, SE reserves the right to take any of the following actions, as it may determine in its discretion: (i) ship all the Products to the Purchaser who will accept responsibility for such Products including payment; (ii) store all or a portion of such Products at its facility and charge the Purchaser rent in an amount to be determined by SE for such storage; (iii) sell all or a portion of such Products to a third-party without any liability to the Purchaser; and/or (iv) abandon or otherwise dispose of such Products without any liability to the Purchaser.
- g. Failure to pay any applicable payment on its due date shall automatically cause all installment amounts to become payable and in addition to SE's other lawful remedies, SE reserves the right to suspend or cancel the Purchase Order. If the Purchaser fails to pay SE for the Products and Services within thirty (30) days of when payment is due, SE reserves the right to file in its sole discretion any liens, charges, security interests, or similar encumbrances against the applicable property, building, land, or the Products and Services and the Purchaser consents to such filings and registrations.

5. Delivery, Schedule and Installments

Dates for delivery, schedule, or execution for the Services, Software or Products set out on a Purchase Order are subject to confirmation by SE and until such confirmation may change solely based on SE's circumstances. All confirmed dates are based on the prompt receipt by SE of all required information enabling achievement of such dates and SE reserves the right to change such dates in the event additional information is necessary or other information was not provided.

SE reserves the right to make shipments in installments, unless otherwise expressly stipulated in a specific Purchase Order; and all such installments when separately invoiced shall be paid for when due per invoice without regard to subsequent shipments. Delay in shipment of any installment shall not relieve the Purchaser of its obligations to pay for such shipment or to accept remaining shipments.

6. Title and Risk of loss

Unless otherwise specifically agreed by the Parties, the Products are delivered FCA (Incoterms 2020) SE's designated facility and the risk of loss or damage shall pass to the Purchaser upon collection of the Products by the first carrier at SE's premises, plants or warehouses. Delivery of the Products by SE will be deemed to be made to the Purchaser upon obtaining a signed receipt from the carrier showing receipt of the Products in good order. Unless otherwise agreed upon in a Purchase Order, title to all Products sold hereunder, except for Software (including software embedded in a Product) whose title remains at all times with SE or the third party licensor, shall pass to the Purchaser upon full payment of the Purchase Order.

7. Substitutions

SE may furnish suitable substitutes for the Products or components thereof that are unobtainable at prices or based on other terms and conditions (including delivery) acceptable to SE or because of priorities or regulations established by governmental authorities or non-availability of materials from suppliers, provided such substitutions do not adversely affect the technical soundness of the Products. SE assumes no liability for deviation from published dimensions and descriptive information not essential to proper performance of the Products.

8. Shortage

With respect to any Products, Services or Software, the Purchaser must submit to SE in writing all claims for shortages defects or errors in respect of such Products, Services or Software within 30 days after the invoice date for such Products, Services or Software, as applicable, and failure to give such notice shall constitute unqualified acceptance of such Products, Services and Software and a waiver of all such claims by the Purchaser.

9. Changes

- a. The Purchaser may request changes that affect the scope, duration, or delivery schedule (including the Purchaser's rescheduling of a shipment) of a Purchase Order, including changes in the specifications and Products, Software or Services to be delivered or licensed, that goes into effect after the date of the original Purchase Order. If the Purchaser requests any such change, SE shall provide a quotation as to revised price and schedule. Pricing of changes shall be based on the then current SE prices.
- b. Notwithstanding anything in these Conditions of Sale to the contrary, SE shall not be bound by or required to agree to any change requested by the Purchaser. In the event SE agrees to a change requested by the Purchaser, the parties will enter into an amendment to the Purchase Order in the form of a change order reflecting such agreement. A change order shall not modify any provisions of these Conditions of Sale unless the parties agree in writing to do so.

c. For additional requirements in Changes for Proposal Based Terms see Exhibit 1.

10. Force Majeure

SE shall be excused from and not be liable for any delay or non-performance of a Purchase Order if such delay or non-performance is due, in whole or in part, to any Force Majeure Event. A **"Force Majeure Event"** means any epidemic, pandemic, public health emergency, war, revolution, insurrection or hostilities (whether declared or not), riot, economic upheaval, civil commotion or uprising, acts of God, flood, earthquake, tempest, hurricane, lightning or other natural disaster; fire or explosion; strike, lockout, boycott or other industrial disturbance whether at SE or one of its suppliers; sabotage, accident, cyber-attack, embargo, car shortage, wrecks or delays in transportation, non-delivery, unavailability or shortages of materials, parts or components or order or action of government authority or any other event, circumstance or cause beyond the reasonable control of SE, or which SE could not reasonably foresee or reasonably provide against. Any delay resulting from a Force Majeure Event shall extend the date of delivery or performance accordingly and the price will be adjusted to compensate SE for the delay. SE reserves the right to cancel a Purchase Order without liability to the Purchaser, if in SE's opinion such circumstances threaten or cause extended delay in the performance thereof. In no event shall SE be subject to any contractual sanctions including without limitation, delay penalties, liquidated or other damages or termination for default as a result of Force Majeure Event under this Section.

11. Purchaser's Cybersecurity Obligations

Purchaser's Obligations for Its Systems: The Purchaser is solely responsible for the implementation and maintenance of a comprehensive security program ("**Security Program**") that contains reasonable and appropriate security measures and safeguards to protect its computer network, systems, machines, and data (collectively, "**Systems**"), including those Systems on which it runs the Products, Software or which it uses with the Services, against Cyber Threats. "**Cyber Threat**" means any circumstance or event with the potential to adversely impact, compromise, damage, or disrupt the Purchaser's Systems or that may result in any unauthorized access, acquisition, loss, misuse, destruction, disclosure, and/or modification of the Purchaser's Systems, including any data, including through malware, hacking, or similar attacks.

Without limiting the foregoing, the Purchaser shall at a minimum:

- (a) have qualified and experienced personnel with appropriate expertise in cybersecurity maintain the Purchaser's Security Program, and have such personnel regularly monitor cyber intelligence feeds and security advisories applicable to the Purchaser's Systems or the Purchaser's industry;
- (b) promptly update or patch its Systems or implement other appropriate measures based on any reported Cyber Threats and in compliance with any security notifications or bulletins, whether publicly disclosed on SE's security notification webpage at <https://www.se.com/ww/en/work/support/cybersecurity/security-notifications.jsp> or otherwise provided to the Purchaser;
- (c) regularly monitor its Systems for possible Cyber Threats;
- (d) regularly conduct vulnerability scanning, penetration testing, intrusion scanning, and other cybersecurity testing on its Systems; and
- (e) meet the recommendations of SE's Recommended Cybersecurity Best Practices, available at <https://www.se.com/us/en/download/document/7EN52-0390/>, as may be updated by SE from time to time, and then-current industry standards.

Purchaser's Use of the Products, Software, and Services: SE may release Updates and Patches for its Products, Software, and Services from time to time. The Purchaser shall promptly install any Updates and Patches for such Products, Software, or Services as soon as they are available in accordance with SE's installation instructions and using the latest version of the Products or Software, where applicable. An "**Update**" means any software that contains a correction of errors in a Product, Software, or Service and/or minor enhancements or improvements for a Product, Software, or Service, but does not contain significant new features. A "**Patch**" is an Update that fixes a vulnerability in a Product, Software, or Service. The Purchaser understands that failing to promptly and properly install Updates or Patches for the Products, Software, or Services may result in the Products, Software, or Services or the Purchaser's Systems becoming vulnerable to certain Cyber Threats or result in impaired functionality, and SE shall not be liable or responsible for any losses or damages that may result.

Identification of Cyber Threats: If the Purchaser identifies or otherwise becomes aware of any vulnerabilities or other Cyber Threats relating to the Products, Software, or Services for which SE has not released a Patch, the Purchaser shall promptly notify SE of such vulnerability or other Cyber Threat(s) via the SE Report a Vulnerability page (<https://www.se.com/ww/en/work/support/cybersecurity/report-a-vulnerability.jsp#Customers>) and further provide SE with any reasonably requested information relating to such vulnerability (collectively, "**Feedback**"). SE shall have a non-exclusive, royalty-free, perpetual and irrevocable right to use, display, reproduce, modify, and distribute the Feedback (including any confidential information or intellectual property contained therein) in whole or part, including to analyze and fix the vulnerability, to create Patches or Updates for its customers, and to otherwise modify its Products, Software, or Services, in any manner without restrictions, and without any obligation of attribution or compensation to the Purchaser; provided, however, SE shall not publicly disclose the Purchaser's name in connection with such use or the Feedback (unless the Purchaser consents otherwise). By submitting Feedback, the Purchaser represents and warrants to SE that the Purchaser

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has all necessary rights in and to such Feedback and all information it contains, including to grant the rights to SE described herein, and that such Feedback does not infringe any proprietary or other rights of third parties or contain any unlawful information.

12. Standard Warranty

- (a) Products. With respect to the Products manufactured by SE under its own brands and supplied by SE as part of the Purchase Order, if any, SE warrants such Products, for a period of 12 months from the date of commissioning or 18 months from the date of shipment from SE, whichever occurs first, against defects in material and workmanship of those Products under normal use of such Products in accordance with their intended purpose.
- (b) Services. With respect to Services performed by SE's personnel as part of the Purchase Order, if any, SE warrants such Services, for a period of 12 months from the date of invoice for such Services, will be performed by qualified personnel with care, skill and diligence, in accordance with the applicable generally accepted standards recognized by the industry.
- (c) Software Product Warranty. With respect to Software licensed by SE, SE warrants such Software to the original licensee that such Software will perform substantially in accordance with its specification for a period of ninety (90) days from the date it is delivered. SE further warrants that the media upon which such Software is provided is free from defects in materials and workmanship under normal use and service of such media for a period of ninety (90) days from the date it is delivered.

Exclusive Warranty Remedies: In the event of any warranty covered defects or deficiencies in the Products in subsection (a) above, or Services in subsections (b) above, or Software in subsection (c) above, the sole and exclusive obligation of SE for the warranty period specified in the applicable subsection of (a), (b) or (c) respectively shall be to re-perform the Services, or repair or replace the defective Products or part of the Products, or provide an update to the Software to correct the non-conformance or replace the Software with the latest available version containing a correction, at SE's sole discretion. SE shall have no other obligation to provide updates or revisions.

The foregoing warranty coverage is contingent on the Purchaser providing prompt notification to SE once such defect or deficiency is reasonably apparent to the Purchaser.

Exclusions & Limitations: Warranties under these Conditions of Sale shall not apply (a) to the Products or Software not manufactured by SE, (b) Services not provided directly by SE, (c) to Products, Software or Services that have been repaired or altered by anyone other than SE, (d) SE's conformance with the Purchaser's design of the Products, Software, or Services, or (f) to Products, Software or Services that appear to be subjected to negligence, accident, or damage by circumstances beyond SE's reasonable control, or any non-SE operation, maintenance or storage, or to other than normal use or service. The foregoing warranties in this Section 12 do not cover reimbursement for labor, transportation, removal, installation, temporary power, or any other expenses that may be incurred in connection with repair or replacement.

EXCEPT FOR THE EXPRESS WARRANTIES IN THIS SECTION 12, SE HEREBY DISCLAIMS ALL OTHER EXPRESS OR IMPLIED WARRANTIES, CONDITIONS, REPRESENTATIONS AND GUARANTEES (EXCEPT WARRANTIES OF TITLE), INCLUDING, BUT NOT LIMITED, TO WARRANTIES OF NON-INFRINGEMENT AND IMPLIED WARRANTIES OF MERCHANTABILITY, MERCHANTABLE QUALITY, FITNESS FOR A PARTICULAR PURPOSE OR USE. EXCEPT FOR THE EXPRESS WARRANTIES IN THIS SECTION 12, THE PURCHASER IS PURCHASING, AND SE IS SELLING OR LICENSING, AS APPLICABLE, THE PRODUCTS, SOFTWARE AND SERVICES ON AN "AS-IS, WHERE-IS", "WITH ALL FAULTS" BASIS.

SE MAKES NO WARRANTY THAT THE PRODUCTS, SOFTWARE OR SERVICES WILL MEET THE PURCHASER'S REQUIREMENTS, OR THAT THE PURCHASER'S USE OF THE PRODUCTS, SOFTWARE OR SERVICES WILL BE UNINTERRUPTED, SECURE, OR ERROR-FREE. SE DOES NOT REPRESENT, WARRANT, OR GUARANTEE THAT THE PRODUCTS, SOFTWARE OR SERVICES WILL BE SECURE OR FREE FROM VULNERABILITIES, CORRUPTION, ATTACK, VIRUSES, INTERFERENCE, HACKING, OR OTHER SECURITY INTRUSIONS OR CYBER THREATS OR THAT SOFTWARE OR PRODUCTS WILL OPERATE IN COMBINATIONS OTHER THAN AS SPECIFIED AND APPROVED BY SE, AND SE DISCLAIMS ANY LIABILITY IN RELATION THERETO. EXCEPT AS MAY BE PROVIDED IN WRITING BY SE, SE SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER THAN AS STATED ABOVE WITH REGARD TO PRODUCTS, SOFTWARE AND SERVICES SOLD BY SE TO THE PURCHASER. BY USING THE PRODUCTS, SOFTWARE OR SERVICES, THE PURCHASER UNDERSTANDS THESE LIMITATIONS AND AGREES THAT THE PURCHASER ACCESSES AND USES THE PRODUCTS, SOFTWARE AND SERVICES AT THE PURCHASER'S OWN DISCRETION AND RISK AND THAT THE PURCHASER WILL BE SOLELY RESPONSIBLE FOR ANY DAMAGES TO THE PURCHASER'S SYSTEMS OR ASSETS OR LOSSES THAT ARISE FROM OR RELATE TO SUCH ACCESS OR USE.

Non-SE Products, Software or Services: With respect to the Products or Software not manufactured or developed by SE, or Services provided by non-SE providers, the warranty obligations of SE shall in all respects conform and be limited to the warranty actually extended to SE by such non-SE supplier, if any.

13. Return of Products

- a. No Products may be returned without first obtaining SE's written permission and a returned material identification tag. Returns must originate from the original the Purchaser account number. Returned Products must be of current manufacture, in the original packaging, unused, undamaged and in saleable condition. Returned Products must be securely packed to reach SE without damage and labeled with the return authorization number. For any returns, SE will pay the carrier and deduct the freight charges from the credit unless the returns result from SE breach of warranty, freight charges will be paid by SE. Any cost incurred by SE to return Products to first class condition will be charged to the Purchaser.
- b. Returns will be credited at the original price paid as indicated on the invoice or Purchase Order associated to the Products being returned as provided by the Purchaser. If no invoice number or Purchase Order number is provided, then credit will be issued based on the into stock price in effect 12 months prior to date of return authorization and will also have an additional 25% processing fee applied. SE Products, and which are accepted for credit, not involving a SE error, shall be assessed a restocking fee of 25% of the invoice price.

14. Intellectual Property and Infringement

- a. SE retains ownership of all right, title and interest in and to the intellectual property (including copyright and patent rights) arising from or relating to any and all Products, Software and Services and any work product arising from or relating to such Products, Software and Services. Nothing in these Conditions of Sale constitutes a transfer or conveyance of any right, title or interest in such intellectual property, including without limitation any Software or embedded software contained in Products, except the limited right to use it as provided in the documentation.
- b. Subject to the other terms and conditions of these Conditions of Sale, as to Products designed and furnished by SE, SE shall defend, with counsel of its choice, any suit or proceeding brought against the Purchaser by a third party to the extent such suit or proceeding is based on a claim that such Products constitute an infringement of any copyright, trademark or patent in the United States or Canada. This obligation shall be effective only if the Purchaser shall have made all payments to SE then due hereunder and if SE is notified promptly in writing and given control, authority, information, and assistance for the defense of the same. In the event the use of such Products by the Purchaser is enjoined in such a suit or proceeding, SE shall, at its expense, and at its sole option, either (a) procure for the Purchaser the right to continue using such Products (b) modify such Products to render them non-infringing, or (c) replace such Products with non-infringing Products. SE will not be responsible for any compromise or settlement or such suit or proceeding made without its written consent. The foregoing states the entire liability of SE for infringement or misappropriation of any intellectual property. Notwithstanding anything in these Conditions of Sale to the contrary, in no event shall SE be liable if any infringement or misappropriation claim, charge, suit or proceeding that is based on the use of SE Products for a purpose other than that for which it was sold by SE or for a use in a design in which the SE product is incorporated. As to any Products or Services furnished by SE to the Purchaser and manufactured or provided in accordance with designs proposed by the Purchaser, the Purchaser shall indemnify and hold harmless SE against any liabilities, losses, taxes, damages, costs, fees and expenses (including reasonable attorneys' fees), including any award made against SE for any infringement or misappropriation of any intellectual property.

15. Software

Any Software or computer information, in whatever form, embedded software in a Product or provided as part of a Service is licensed to the Purchaser solely pursuant to standard licenses of SE or its supplier, which licenses are hereby incorporated by reference and are available upon request. The Purchaser shall not reverse engineer, decompile, disassemble or apply any process, technique, or procedure or make any attempt to ascertain or derive the source code of any Product, Software or Services.

16. LIMITATION OF LIABILITY

NOTWITHSTANDING ANY PROVISION OF THESE CONDITIONS OF SALE TO THE CONTRARY, IN NO EVENT SHALL SE, ITS OFFICERS, DIRECTORS, AFFILIATES OR EMPLOYEES BE LIABLE FOR ANY FORM OF INDIRECT, SPECIAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE, LOSS OF PRODUCTION, LOSS OF PRODUCT, LOSS OF REVENUE OR PROFITS, OR LOSS OF DATA OR BUSINESS INFORMATION, WHETHER SUCH DAMAGES ARISE IN CONTRACT OR TORT, IRRESPECTIVE OF FAULT, NEGLIGENCE OR STRICT LIABILITY OR WHETHER SUCH PARTY HAS BEEN ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES. NOTWITHSTANDING ANY OTHER PROVISION OF THESE CONDITIONS OF SALE TO THE CONTRARY, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, WITH RESPECT TO ANY CLAIM ARISING FROM OR RELATED TO ANY PRODUCT, SOFTWARE OR SERVICE PROVIDED OR LICENSED TO THE PURCHASER, THE MAXIMUM LIABILITY OF SE IN RESPECT OF SUCH CLAIM SHALL NOT EXCEED THE AMOUNTS ACTUALLY PAID BY THE PURCHASER TO SE UNDER THE PURCHASE ORDER FOR THE PRODUCT, SOFTWARE OR SERVICE GIVING RISE TO SUCH CLAIM.

17. Indemnification

The Purchaser agrees to indemnify, defend, and hold harmless SE from and against any and all claims, damages, liabilities, deficiencies, settlements, interests, awards, penalties, fines, costs, expenses, judgments, losses, lawsuits, demands, actions, or other proceedings of whatever kind, including reasonable attorneys' fees, the costs of enforcing any

right to indemnification under these Conditions of Sale and the cost of pursuing any insurance providers (collectively, "Losses"), due to, arising out of, or related to (a) the Purchaser's use of Products, Software or Services in a manner not permitted by these Conditions of Sale, the Purchase Order or the master agreement, as applicable, (b) the Purchaser's failure to comply with Section 11 of these Conditions of Sale, including the Purchaser's failure maintain a Security Program in compliance with Section 11 or the Purchaser's failure to promptly and properly install Updates and Patches for the Products, Software or Services in accordance with Section 11, (c) the Purchaser's violation of these Conditions of Sale, the Purchase Order or the master agreement, as applicable, (d) any information that the Purchaser submits, transmits, or makes available to SE, including but not limited to as part of the Feedback, or (e) the Purchaser's violation of any law, regulation, or third party rights. Without limiting the foregoing, the Purchaser shall pay any and all costs, damages, and expenses, including, without limitation, reasonable attorneys' fees and costs awarded against or otherwise incurred by SE in connection with or arising from any claim, lawsuit, action, demand, or other proceeding for which SE is indemnified by the Purchaser under these Conditions of Sale. SE may assume the exclusive defense and control of any matter subject to indemnification by the Purchaser, in which event the Purchaser agrees to cooperate with SE in asserting any available defenses. The Purchaser shall not enter into a settlement of any such claim, lawsuit, action, demand, or other proceeding that does not include a full release of SE or involves a remedy other than the payment of money, without SE's prior written consent.

18. Import and Export

SE is subject to the laws of, and the items provided by SE under this Agreement contain or may contain components and/or technologies from, the United States of America ("**US**"), the European Union ("**EU**") or other nations. The Purchaser acknowledges and agrees that the supply, assignment and/or usage of the Products, Software, Services, information, other items and/or the embedded technologies (hereinafter referred to as "**Deliverables**"), and all activities carried out under these Conditions of Sale, the Purchase Order and/or master agreement, as the case may be, shall fully comply with applicable trade, export control, economic and financial sanctions and anti-boycott requirements imposed, administered or enforced from time to time by the US, the United Kingdom, the EU, and other applicable jurisdictions (hereinafter referred to as "**International Trade Controls**").

Unless applicable International Trade Controls authorizations have been obtained from the relevant governmental authorities and SE has approved such actions in writing, the Purchaser shall not, directly or indirectly, (a) transact on SE's behalf with any party (which may include but shall not be limited to an individual, group and/or legal entity or entities) that is restricted by applicable International Trade Controls, or (b) export and/or re-export any Deliverables to any destination or party (which may include but shall not be limited to an individual, group and/or legal entity or entities) that is restricted by the applicable International Trade Controls; or (c) use any Deliverables for those purposes and fields that are restricted by the applicable International Trade Controls. The Purchaser also agrees that the Deliverables will not be used either directly or indirectly in any missiles; nor be used in any nuclear weapons delivery systems; and will not be used in any design, development, production or use for any weapons, which may include but are not limited to chemical, biological or nuclear weapons, or for any other prohibited end-use or end user unless authorized under International Trade Controls.

The Purchaser represents and warrants that it shall maintain reasonable compliance policies, procedures and controls designed to ensure compliance with International Trade Controls, and shall not otherwise undertake any action that violates or would cause SE to violate International Trade Controls.

The Purchaser agrees to fully cooperate and provide all documentation that SE identifies as necessary or advisable to support compliance with International Trade Controls. If any necessary or advisable licenses, authorizations or approvals are not obtained, whether arising from inaction by any relevant government authority or otherwise, or if any such licenses, authorizations or approvals are denied or revoked, or if the International Trade Controls would prohibit SE from fulfilling any order, or would in SE's judgment otherwise expose SE to a risk of liability under the applicable International Trade Controls if it fulfilled the order, SE shall be excused from all obligations under such order and/or these Conditions of Sale, the Purchase Order and/or the master agreement.

19. Health and Safety Compliance

SE employees shall not perform Services that, in their sole opinion, are not free of reasonably foreseeable harm. This includes, but is not limited to, working on any equipment, whether provided by SE, the Purchaser or otherwise, that in such SE employees' sole opinion has not been placed in an electrically safe working condition. The Purchaser warrants that site and working conditions shall meet or exceed those specified by applicable Occupational Health and Safety Act and Regulations.

The Purchaser shall inform SE of: (a) known hazards, or reasonably foreseeable hazards, that are related to SE's scope of Services and the site where the Services will be performed; and (b) information about the worksite necessary to identify hazards and assess risk for the protection of the health and safety of SE personnel. This information might include, but is not limited to: (i) providing an accurate up-to-date single line diagram of the electrical distribution system; (ii) providing relevant Workplace Hazardous Materials Information System (WHMIS) information such as Material Safety Data Sheets (MSDS) and floor plans indicating areas where hazardous materials are located and emergency exits for service rooms and other areas of operation; and (iii) other site specific information relative to the Purchaser's operation, process and safety systems. Any hazardous materials requiring remediation in SE's sole opinion will be separately

chargeable to the Purchaser and will be a condition precedent to SE's performance of such Services.

20. Witness of Tests & Factory Inspections

Normal production schedules do not provide the opportunity for the Purchaser to witness routine factory tests on the Products or make factory inspections. Witness testing and factory inspections must be requested at time of quotation, are subject to additional costs and must be confirmed by SE at the Purchase Order entry.

21. Patterns, Tools and Seller's Notices, warnings instructions and recommendations

SE will give notice if special patterns or tools are required to complete any Purchase Order. Charges paid by the Purchaser for such patterns or tools do not convey title thereto or the right to remove them from SE's plant.

The Purchaser shall promptly supply the user (including its employees) of the Products with all SE supplied Product notices, warnings, instructions, recommendations and similar materials.

22. Nuclear Applications

Unless otherwise agreed in writing by a duly authorized representative of SE, the Products sold hereunder are not intended for use in or in connection with any nuclear facility or activity.

23. Nature of Relationship

The Purchaser agrees that SE is an independent contractor and nothing in these Conditions of Sales creates between SE and the Purchaser a relationship of partners, joint venturers, or agents of each other, and no party may so represent itself in any of these manners with respect to the other party.

24. Cancellation

Except as set forth in Exhibit 1 for a Proposal Based Purchase Order, Exhibit 2 for a Field Service Purchase Order or in a negotiated quote or proposal for a Purchase Order between the parties, any Purchase Order may be cancelled by the Purchaser, except if such , only (a) upon 30 days' advanced written notice to SE and (b) upon (i) payment to SE of all reasonable and proper termination charges based on the aggregate price of all Products, Services and Software that are subject to such cancelled Purchase Order, which shall include a reasonable profit for SE, and (ii) reimbursement to SE of all costs and expenses associated with such terminated Purchase Order, including, but not limited to, all costs and expenses incurred by SE in respect of work performed or to be performed under such Purchase Order or arising from or related to such termination. Notwithstanding the previous sentence, special or custom ordered Products, Software or Services are not cancelable unless otherwise agreed by SE in writing.

25. Termination

SE shall have the right to terminate any Purchase Order at any time by written notice for any material breach of these Conditions of Sale by the Purchaser, including material delays by the Purchaser or its authorized representatives in releasing the Products for manufacture or approval drawings and excessive changes to specifications or drawings.

26. Amendments

No amendment, supplement, modification, waiver or termination of the Purchase Order or these Conditions of Sale is binding unless executed in writing by both SE and the Purchaser.

27. Compliance with Laws and Antibribery and Corruption

- a. The Purchaser shall at all times conduct itself in accordance with the highest standards of ethics and comply with all laws, rules, regulations, statutes, court decisions and guidance issued by any local, state, federal or foreign governmental authority or any political subdivision or instrumentality thereof.
 - b. The Purchaser shall, and shall cause its Affiliates and its and its Affiliates respective employees, officers, directors, managers, members, partners, shareholders, agents, attorneys or third-party advisors ("**Representatives**") to comply with the US Foreign Corrupt Practices Act of 1977, as amended (the "**FCPA**"), the U.K. Bribery Act and any other applicable anti-bribery or anti-corruption law. The Purchaser covenants and agrees that it shall not (and that it shall cause its Affiliates and its and its Affiliates' respective Representatives not to) promise, authorize or make any payment to, or otherwise contribute any item of value to, directly or indirectly, to any third person or entity, including any Non-US Official (as such term is defined in the FCPA), in each case, in violation of the FCPA, the U.K. Bribery Act and any other applicable anti-bribery or anti-corruption law. The Purchaser further covenants that it shall (and that it shall cause each of its Affiliates and its and its Affiliates' respective Representatives to) maintain systems of internal controls (including accounting systems, purchasing systems and billing systems) to ensure compliance with the FCPA, the U.K. Bribery Act and any other applicable anti-bribery or anti-corruption Law. Upon request by SE, the Purchaser shall provide to SE and its Affiliates responsive information and certifications (and/or allow SE to review books and records) concerning the Purchaser's, its Affiliates' and its and its Affiliates' respective Representatives' compliance with applicable anti-bribery or anti-corruption laws, rules, regulations and statutes. The Purchaser shall promptly notify SE if the Purchaser becomes aware of any violation of this Section 27 or any action, suit or proceeding brought against the Purchaser, its Affiliates or its or its Affiliates' respective Representatives in connection with any applicable anti-bribery or anti-corruption laws, rules, regulations and statutes. In the event the Purchaser has concerns related to ethics, compliance or SE's Principles of Responsibility, and/or any potential violations of these policies, the Purchaser is welcome to make use SE's TrustLine.
- Jan2925elecfs

**Standard Terms and Conditions of Sale
Including Proposal Based Terms and
Field Services.**



The TrustLine is SE's global helpline for external stakeholders. It is a confidential channel through which purchasers can ask questions and raise concerns. Reports can be made using this link: <https://secure.ethicspoint.eu/domain/media/en/gui/104677/index.html>.

28. Applicable Laws

The Purchase Order and these Conditions of Sale, as well as all matters arising out of or relating to the execution, construction, interpretation or breach of the Purchaser Order or these Conditions of Sale shall be governed by the laws of the state of Delaware, USA without regard to the conflict of law provisions thereof. The Parties agree that the United Nations Convention on Contracts for the International Sale of Goods does not apply to these Conditions of Sale.

**Exhibit 1
Additional Proposal Based Terms and Conditions**

The terms set forth in this Exhibit supplement the Conditions of Sale and apply to all transactions that exhibit some or all of the following attributes:

- Unique customer requirements that are typically negotiated and quoted,
- requires approval drawings and project management by SE, or
- for which there is a specific direct-ship address

The additions to the Conditions of Sale are as follows:

1. Quotations:

Quotations shall be valid for no more than thirty (30) days from the date quotation is communicated from SE to the Purchaser, unless otherwise stated in the quotation. All quotations are subject to change by SE at any time upon notice to the Purchaser. Quotations are made based on SE's interpretation of the plans and specifications submitted to SE by the Purchaser. It is the Purchaser's obligation to review the quotation carefully and to immediately advise SE of any differing interpretation the Purchaser has so any necessary change can be made prior to issuance of a Purchase Order by the Purchaser.

2. Order Entry

Considerable detail is involved in the manufacture of the Products. To facilitate timely shipment, complete details and information, including the Purchaser's requested on-site dates must be provided at the time of order entry. Shipment dates are approximate and are based upon timely receipt of all necessary information from the Purchaser. Lack of complete information may result in changes to the approximate shipment dates and may also include delays of drawings, delivery or manufacture. Such delays shall relieve SE from compliance with the quoted approximate delivery dates and may lead to a price increase. Failure to provide a complete signed Purchase Order within twenty (20) days of notification of award may result in renegotiation of price or shipment dates.

3. Approval Drawings

When required by a specific Purchase Order, drawings will be submitted for approval per agreed upon schedules, and price policy, below, to assure SE has designed the Products as described in the Purchaser's specifications, as modified by SE's quotation. If at time of drawing approval SE has not designed the Products to meet the specifications, as modified by SE's quotation, SE will make the appropriate changes at no charge to the Purchaser. Where the Purchaser's specification is not definitive, SE shall have the right to design the Products in line with good commercial practice, without further obligation to the Purchaser. If at drawing approval, the Purchaser makes changes outside the design as stated in the specifications, such changes shall be treated as a change order as provided below.

4. Price Policy

Prices cover a bill of material as described in SE's quotations to be designed and manufactured to SE's standard designs, unless otherwise agreed in writing between the parties and, in addition to all requirements in Section 2 of the Conditions of Sale, unless otherwise provided in a quote, proposal, Conditions of Sale or this Exhibit, Project prices are firm provided the Purchaser unconditionally releases to manufacturing (a) within 30 calendar days of order entry or (b) if at time of order entry approval drawings are requested, within 30 calendar days of SE delivering approval drawings. If the Purchaser does not meet the requirement set previously, then SE shall have the right to revise the price for the Products, Software and/or Services.

5. Changes and Pricing Revision

In addition to the requirements of Section 9 of the Conditions of Sale:

- (a) Changes to the Purchase Order cannot be processed until a formal signed change order is received from the Purchaser in accordance with this provision and Section 9 of the Conditions of Sale.

**Standard Terms and Conditions of Sale
Including Proposal Based Terms and
Field Services.**



- (b) Any Changes to the Purchase Order may result in an extension of time for shipment.
- (c) All changes as detailed below will be mutually agreed to by the parties, , prior to implementation of any change. SE will issue a proposal with a price increase for any change requested by the Purchaser that affects modification of Products, changes the bills of material, engineering or drawings or delivery schedule as follows:

- i) If the Purchaser makes a change to an order prior to being released to engineering, the net price will be adjusted by re-pricing the Products with prices in effect at the time of the change. A commensurate delay in the shipping date will be based on the changes involved.

- ii) For changes made after the order is released to engineering, the net price and ship date will be adjusted as described in paragraph A above. An additional charge based on SE's standard engineering billing charges and cost of parts (\$250 minimum) will be made to cover any extra engineering and drafting, scrap or rework of parts, or cost of modification.

- iii) If during the drawing approval process, the Purchaser makes changes outside the design covered by the specifications, SE will be reimbursed as described in paragraph A and B above, plus any additional charges for any extra cost incurred as a direct result of the changes and allowed a commensurate delay in shipping date based on the changes involved.

6. Terms of Payment and Progress Payments

On projects exceeding \$1,000,000 Net, unless otherwise noted on your quotation, payments are payable according to the following milestones:

- 30% Release to manufacturing
- 70% (balance) due at shipment

7. Optional Warranties: The following Optional Warranties may be purchased for certain Products as follows:

- a. **Optional Warranty 1**—Extended: 2 to 5 years from Shipment. If requested by the Purchaser, and specifically accepted in writing by SE, the standard warranty will be extended to two (2) years from date of invoice for a price addition of 1% of the net face value of the Purchase Order, will be extended to three (3) years from date of invoice for a price addition of 3% of the net face value of the Purchase Order, will be extended to four (4) years from date of invoice for a price addition of 5% of the net face value of the Purchase Order, or will be extended to five (5) years from date of invoice for a price addition of 7% of the net face value of the Purchase Order.
- b. **Optional Warranty 2**—Special Warranty: If requested by the Purchaser, and specifically accepted in writing by SE, the standard warranty will be extended, for a price addition of 3% of the net face value of the Purchase Order, to cover reimbursement of the direct costs of:
 - (i) Removal of non-conforming equipment or part thereof;
 - (ii) Transporting equipment or parts to and from the place of repair;
 - (iii) Off-loading of truck and reinstallation at the original site. Such special warranty, which may be chosen to cover a period not exceeding that of the standard or extended warranty (see above) selected, will not include the cost of providing temporary power or removing or replacing other apparatus or structures, or costs of transportation beyond a common carrier free delivery point in the continental United States. Further, the obligation of SE for expenses and costs arising under this special warranty coverage will not exceed 50% of the net invoice price on the equipment being repaired. This warranty does not change or affect the allocation of risk or loss during shipment.
- c. **Option 3**—Extended Warranty: Preventative Maintenance Agreements. If requested by the Purchaser, and **specifically** accepted by SE, a Preventative Maintenance Agreement is available to provide preventative maintenance on equipment covered by the agreement. Terms of the preventative maintenance agreement shall be as defined in a separate Services Agreement agreed to by the parties.

8. Cancellation

Notwithstanding Section 24 of the Conditions of Sale or unless otherwise agreed, any Purchase Order may be cancelled by the Purchaser only if SE agrees in writing, which shall at a minimum require payment by the Purchaser of reasonable and proper termination charges (including a reasonable profit and overhead) and reimbursement of all costs and expenses associated with the Purchase Order caused by the cancellation.

**Exhibit 2
Additional Field Services Based Terms and Conditions**

The terms set forth in this Exhibit supplement the Conditions of Sale and apply to all transactions that are for Field Services.

Cancellation

Notwithstanding Section 24 of the Conditions of Sale or unless otherwise agreed, payment for cancellation of a Field Services Purchase Order by Buyer is as follows:

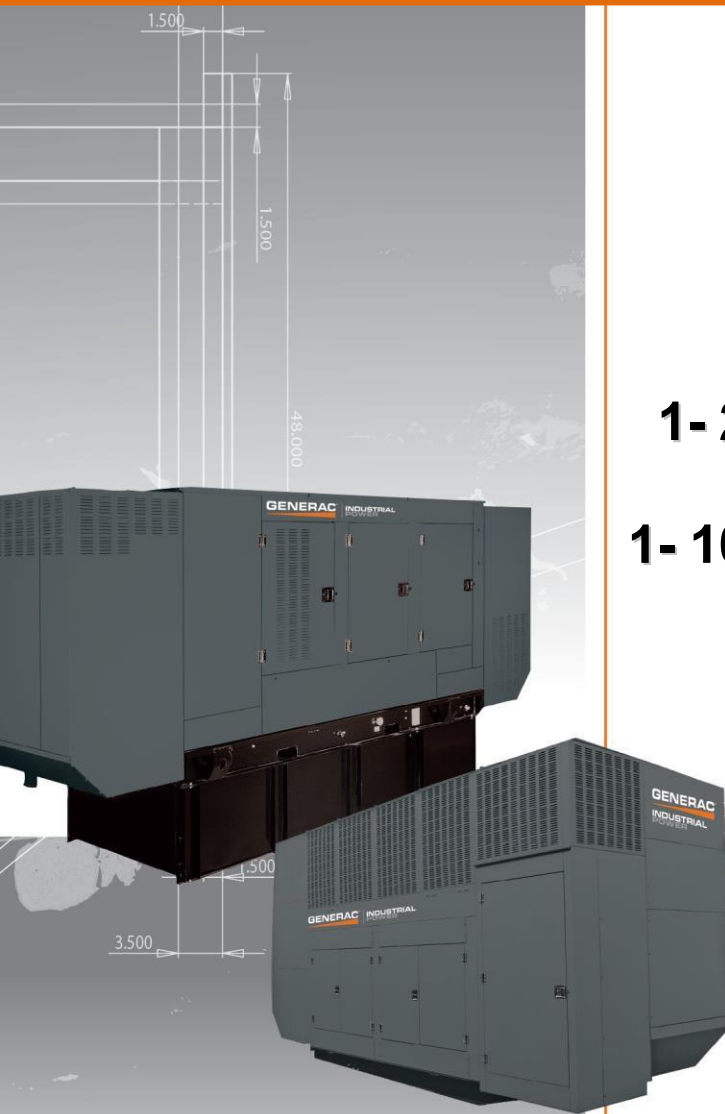
The following cancellation charges may apply:

- (a) within five (5) days of Purchase Order issuance, no cancellation charge applies;
- (b) after five (5) days of Purchase Order issuance, cancellation charges will be as follows:
 - (i) 10% of Purchase Order value is a minimum charge;
 - (ii) 20% of Purchase Order value once engineering has begun or after SE issuance of approval drawings;
 - (iii) 50% of Purchase Order value once SE orders material released for manufacturing or work scheduled;
and
 - (iv) 100% of Purchase Order value once material fabrication is initiated or on-site work has begun.



*Pinion Hills
Community Services Building
City of Phelan*

Generator Submittal Package



1- 200 kW Emergency Generator Set

1- 1000 Amp Automatic Transfer Switch

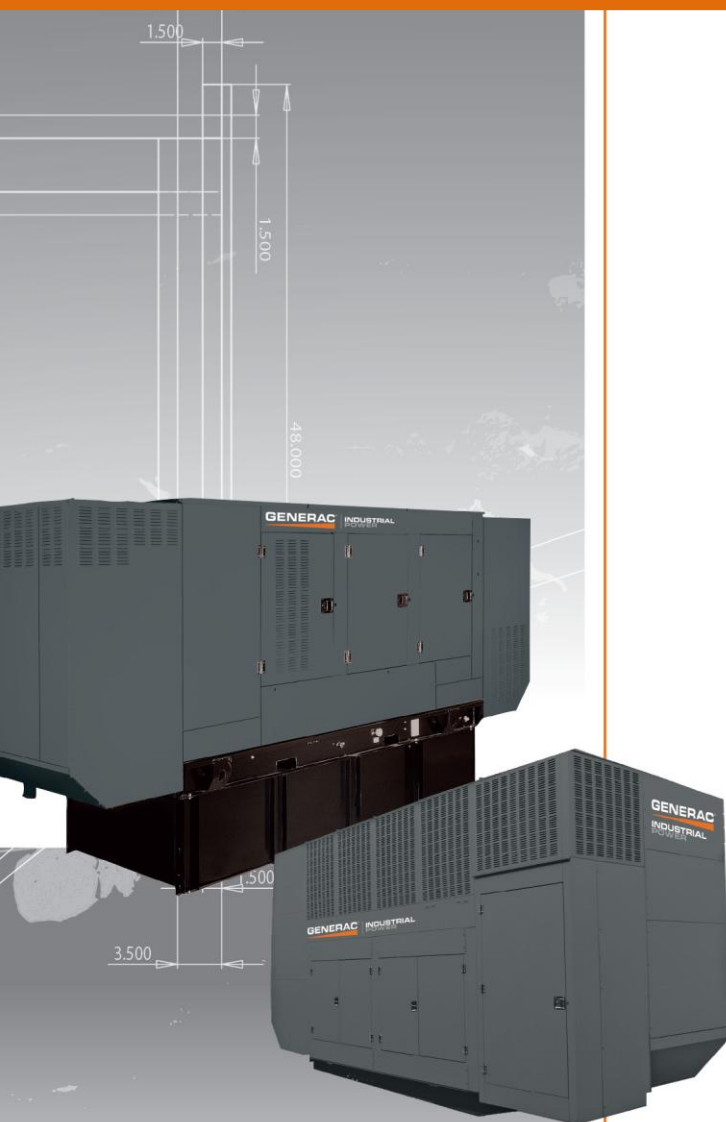


By Paul Crafts

Date: 7-11-2025

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And Warranty Statement**
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Certification of Quality

Generac Power Systems certifies that the products we manufacture have been built and tested in accordance with strict internal and external standards for quality. Our quality management system has been registered with the internationally recognized ISO 9001:2008 standard and our products comply with external standards that include, but are not limited to, CSA, NEMA, EGSA, ISO, and UL.

The Generac Quality Management System (GQMS) ensures the highest standards of quality at every level of production, from raw materials to the finished product. This includes receiving inspection, in-process checks, product and process audits, testing, final inspections, and shipping standards.

Tests of our products are performed in accordance with our internal procedures and controlled through the GQMS to ensure accuracy and effectiveness. The testing process and product designs comply with external standards which may include, but are not limited to: ISO 8528-5, ISO 3046, NFPA 99, NFPA 110, BS 5514, SAE J1349, and DIN 6271.

Generac Power Systems has over one million square feet of manufacturing space and over 2000 employees dedicated to designing and manufacturing power generation equipment in our multiple State of Wisconsin, USA factories. All of our installed and mobile generators are built with pride by our skilled American workforce to ensure our customers receive the quality that they expect from Generac.

We are committed to producing quality products for both our internal and external customers. We will continuously improve our processes and diligently measure all aspects of our business.

Daniel Waschow

Vice President of Quality
Generac Power Systems, Inc.
Waukesha, Wisconsin USA

Generac Power Systems 2 Year (2B) Limited Warranty for Industrial Standby Generators

For the period of warranty noted below, which begins upon the successful start-up and/or on-line activation of the unit, Generac Power Systems, Inc. "Generac" warrants that its generator will be free from defects in material and workmanship for the items and period set forth below. Generac will, at its discretion, repair or replace any part(s) which, upon evaluation, inspection, and testing by Generac or an Independent Authorized Service Dealer (IASD), is found to be defective. Any equipment that the purchaser/owner claims to be defective must be evaluated by the nearest IASD. Emissions components are excluded from coverage under this extended warranty. Emissions warranty coverage is detailed in a separate emissions warranty.

Warranty Coverage: Warranty coverage period is for two (2) years or two-thousand (2,000) hours, whichever occurs first.

Warranty Coverage in Year(s): 1	Warranty Coverage in Year(s): 2
Parts, Labor and Limited Travel	Limited Parts Only

Limited Gearbox Coverage:

Year(s): 1-5 Coverage	Year(s): 6-10 Coverage
Limited Parts and Labor	Limited Parts Only

Guidelines:

- Unit must be registered and proof of purchase available.
- Any and all warranty repairs and/or concerns must be performed and/or addressed by an IASD, or branch thereof. Repairs or diagnostics performed by individuals other than an IASD not authorized in writing by Generac will not be covered.
- This Warranty is transferable between ownership of original install site.
- Generac supplied engine coolant heaters (block-heaters), heater controls, and circulating pumps are only covered during the first year of the warranty provision.
- Generac may choose to repair, replace, or refund a piece of equipment at its sole discretion.
- Enclosures are warranted against rust for the first year of ownership only. Damage caused after receipt of generator is the responsibility of the owner and is not covered by this warranty. Nicks, scrapes, dents, or scratches to the painted enclosure should be repaired promptly by the owner.
- Warranty only applies to permanently wired and mounted units.
- Damage to any covered components or consequential damages caused by the use of a non-OEM part will not be covered by the warranty.
- Proof of performance of all required maintenance must be available.
- Travel allowance is limited to 300 miles maximum, and seven and one half (7.5) hours maximum (per occurrence, whichever is less) round trip from the nearest IASD. Any additional travel required will not be covered.
- Engines, driven components, remote cooling systems, and fuel tanks used in Generac's standby power products system can carry a separate manufacturer's (OEM) warranty (the "OEM Warranties"), unless otherwise expressly stated. OEM Warranties are in addition to this Warranty. All warranty claims for defects in material and/or workmanship on Generac product OEM components, may be directed through the OEM distributor/dealer network. OEM Warranties may vary and are subject to change. Generac shall have no liability under OEM warranties.

The following will NOT be covered by this warranty:

- Costs of normal maintenance (i.e. tune-ups, associated part(s), adjustments, loose/leaking clamps, installation, and start-up).
- Damage/failures to the generator and/or transfer switch system caused by accidents, shipping, handling, or incorrect storage.
- Damage/failures caused by operation with incorrect fuels, speeds, loads, or installations other than what's recommended or specified by Generac.
- Damage to the generator and/or transfer switch due to the use of non-Generac parts and/or equipment, remote cooling systems, contaminated fuels, oils, coolants/antifreeze, or lack of correct fuels, oils, or coolants/antifreeze.
- Failures due to normal wear and tear, accident, misuse, abuse, neglect, incorrect installation, incorrect sizing, or rodent, reptile, and/or insect infestation.
- Rental equipment used while warranty repairs are being performed and/or any extraordinary equipment used for removal and/or reinstallation of generator (i.e. cranes, hoists, lifts, et. al.).
- Planes, ferries, railroad, buses, helicopters, snowmobiles, snowcats, off-road vehicles, or any other mode of transport deemed not standard by Generac.
- Products that are modified or altered in a manner not authorized by Generac in writing.
- Starting batteries, fuses, light bulbs, engine fluids, and any related labor.
- Steel enclosures that rust as a result of incorrect installation, location in a harsh or salt water environment, or are scratched where the integrity of applied paint is compromised.
- Units sold, rated or used for "Prime Power", "Trailer Mounted", or "Rental Unit" applications as defined by Generac. Contact an IASD for definitions.
- Shipping costs associated with expedited shipping.
- Additional costs for overtime, holiday, or emergency labor costs for repairs outside of normal business hours.
- Any incidental, consequential, or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
- Failures caused by any act of God or external cause including without limitation, fire, theft, freezing, war, lightning, earthquake, windstorm, hail, water, tornado, hurricane, or any other matters which are reasonably beyond the manufacturer's control.

THIS WARRANTY SUPERSEDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. SPECIFICALLY, GENERAC MAKES NO OTHER WARRANTIES AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES WHICH ARE ALLOWED BY LAW, SHALL BE LIMITED IN DURATION TO THE TERMS OF THE EXPRESS WARRANTY PROVIDED HEREIN. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND GENERAC'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL GENERAC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC'S NEGLIGENCE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU ALSO HAVE OTHER RIGHTS UNDER APPLICABLE LAW.

FOR AUSTRALIA ONLY: Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

FOR NEW ZEALAND ONLY: Nothing in this warranty statement excludes, restricts, or modifies any condition, warranty right, or remedy which pursuant to the New Zealand Legislation (Commonwealth or State) including the Fair Trading Practices Act of 1986 or the Consumer Guarantees Act 1993 ("CGA") applies to this limited warranty and may not be so excluded, restricted, or modified. Nothing in this statement is intended to have the effect of contracting out of the provisions of the CGA, except to the extent permitted by that Act, and these terms are to be modified to the extent necessary to give effect to that intention. If you acquire goods from Generac Power Systems or any of its authorized resellers and distributors for the purposes of a business, then pursuant to section 43(2) of the CGA, it is agreed that the provisions of the CGA do not apply.

GENERAC POWER SYSTEMS, INC. • P.O. BOX 8 • Waukesha, WI, USA 53187

Ph: (888) GENERAC (436-3722) • Fax: (262) 544-4851

To locate the nearest Independent Authorized Service Dealer and to download schematics, exploded views and parts lists
visit our website: www.generac.com



CERTIFICATE



This is to certify that

Generac Power Systems, Inc.

S45 W29290 Hwy. 59
Waukesha, WI 53189
United States of America

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

Scope:

Design, Manufacture, and Distribution of Power Products and Solutions.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2015

Certificate registration no.	10012920 QM15
Date of original certification	2021-06-25
Date of certification	2024-06-06
Valid until	2027-07-15



DQS Inc.

David Tellez
Managing Director

DQS IS A MEMBER OF



Pinion Hills

Community Services Building

Bill of Materials

(Quantity: 1) GENERAC 200 kW Stand By Natural Gas Generator

1 - Generac Industrial gaseous engine-driven generator, turbocharged/aftercooled 6 cylinder 14.2L engine, consisting of the following features and accessories:

- **Stationary Emergency-Standby rated**
- **200kW Rating, wired for 120/208 VAC three phase, 60 Hz**
- **Natural Gas fuel system**
- **Permanent Magnet Excitation**
- **UL2200**
- **EPA Emergency Certified**
- **SCAQMD**
- **Standard Weather Protective Enclosure, Steel**
 - **Industrial Grey Baked-On Powder Coat Finish**
- **Power Zone Digital Control Panel for Single or MPS Generators**
 - **Meets NFPA 99 and 110 requirements**
 - **Temp Range -40 to 70 degrees C**
 - **Humidity 2 – 95% (Non Condensing)**
 - **CE**
 - **FCC**
 - **IEC801 (Radiated Emissions, Susceptibility, and Surge Immunity)**
 - **7” Resistive Color Touchscreen**
 - **Built-in Webserver**
 - **IP65 (front)**
 - **Auto/Manual/Off key switch, Alarm Indication, Not in Auto Indication, audible alarm, emergency stop switch**
 - **Dual Core Digital Microprocessor**
 - **RS485, Ethernet and CANbus ports**
 - **Sensors: Oil Pressure, optional Oil Temp, Coolant Temp and Level, Fuel Level/Pressure (where applicable), Engine Speed, DC Battery Voltage, Run-time Hours, Generator Voltages, Amps, Frequency, Power, Power Factor**
 - **Alarm Status: Low or High AC Voltage, Low or High Battery Voltage, Low or High Frequency, Pre-low or Low Oil Pressure, Pre-high or High Oil Temp (optional), Low Water Level and Temp, Pre-high or High Engine Temp, High, Low, and Critical-low Fuel Level/Pressure (where applicable), Overcrank, Over and Under Speed, Unit Not in Automatic**

- **Programmable I/O**
- **Built-in PLC for special applications**
- **Engine function monitoring and control:**
 - **Full range standby operation; programmable auto crank, Emergency Stop, Auto-Off-Manual switch**
 - **Isochronous Governor**
 - **0.25% digital frequency regulation with: soft-start ramping - adjustable, gain - adjustable, overshoot limit - adjustable**
 - **3 Phase RMS Voltage Sensing**
 - **+/-0.5% digital voltage regulation with: soft-start voltage ramping - adjustable, loss of sensing protection - adjustable, negative power limit - adjustable, Hi/Lo voltage limit - adjustable, V/F slope and gain - adjustable, fault protection**
- **Service reminders, trending, fault history (alarm log)**
- **I2T function for full generator protection**
- **Selectable low-speed exercise**
- **2 and 3-wire start controls for any industrial grade transfer switch**
- **Primary MLCB, 80% Rated LSI Electronic Trip**
 - **PDG43K0800B2N**
 - **800 Amp**
- **225 AH, 1155 CCA Group 8D Batteries, with rack, installed**
- **Battery Charger, 10 Amp, NFPA 110 compliant, installed**
- **Coolant Heater, 2000W, 240VAC**
- **Flex Fuel Line, shipped loose**
- **Industrial Connectivity Gateway Device**
- **Oil Temp Sender**
- **3 Owner's Manuals**
- **Standard 2-Year Limited Warranty**
- **SG0200GG20142S18PPYYE**

1 - ATS

Product Description : ASCO 7000 Series, Automatic Open Transition ByPass Switch

Catalog Number : H07ATBB31000C5XM

Switch Rating = 1000,

Bypass Isolation : YES

Service Voltage / Hz : 208V/60Hz

Optional Accessories : 31BG,40KY4,44G,125A

No. of Switched Poles: 4

Neutral Configuration : Switched

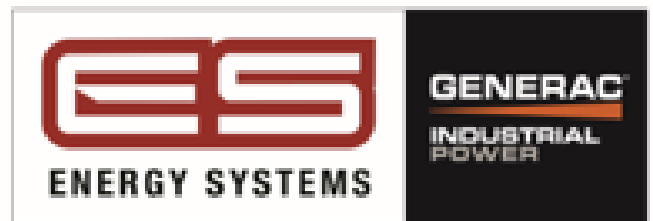
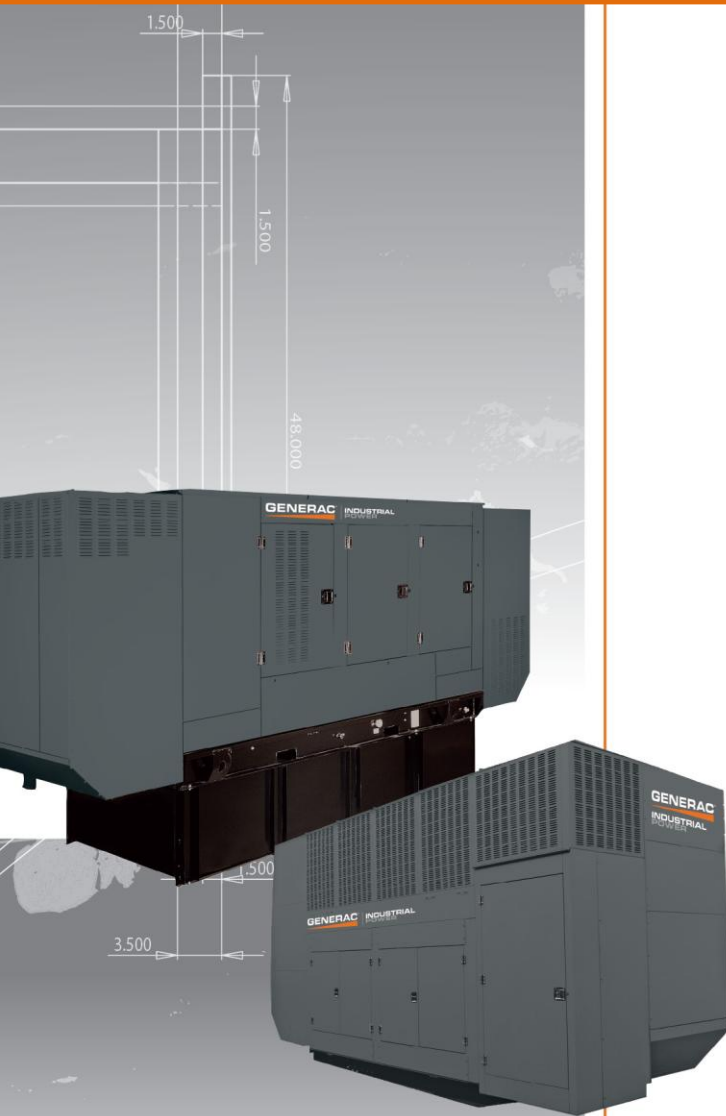
No. of Cables & Lug Size : 4, #1/0 AWG to 600 MCM

Frame = H,

Enclosure : Type 3R secure double door enclosure

GENERAC®
**INDUSTRIAL
POWER**

Engine / Generator



Emissions Warranty Statement (Spark-Ignition Engine Powered Generators)

Warranty Rights, Obligations, and Coverage

The Spark-Ignition Engine ("Engine") installed in your Generac Power Systems Inc. ("Generac") "Generator" is certified to Clean Air Act ("CAA") requirements including United States Environmental Protection Agency ("EPA") implementing regulations. Through this "Emissions Warranty," Generac warrants that your certified stationary Engine is designed and manufactured free from defects in material and workmanship which would cause a noncompliance to EPA regulations or damage due to premature failure of emission related engine components ("ERCs").

The Emission Control Information Label on your Engine presents the "EPA Family Name." The **fifth** character of the EPA Family Name indicates which EPA "Product Category" the Engine is certified to, and which regulations apply.

Fifth character of EPA Family Name:

- **B:** Generator Engine is certified to the "Large Nonroad Spark-Ignition Engine" or "NRLSI" regulations
- **L :** Generator Engine is certified to the "Nonroad Compression-Ignition Engine" or "NRCI" regulations
- **NOTE:** All NRCI Engines installed in Generac Generators are certified by the third-party Engine supplier. Please see separately provided third-party Engine Manufacturer manuals and warranty.
- **S:** Generator Engine is certified to the "Small Nonroad Spark-Ignition Engine" or "NRSSI" regulations

Warranty Duration

Generac considers the Generator Engine as placed into service upon sale to the first purchaser (the customer who will install and/or operate the Generator), thereby activating the warranty period from the time of sale to the first purchaser or for total engine hours for the periods below. For NRSSI Engines, the Emissions Control Information label on your Engine presents the Compliance Period, establishing the Emissions Warranty period in the table below. *Hour limitation for Engines equipped with hour meters.

Engine Category	Duration from Sale	
	Years	Hours*
NRLSI - Emissions Related Components	3	2500
NRLSI - High Cost Emissions Related Components (\$770 or greater replacement cost in isolation)	5	3500
NRSSI Exhaust Emissions Related Components [Compliance Period = 500 hours]	2	250
NRSSI Exhaust Emissions Related Components [Compliance Period = 1000 hours]	2	500

EMISSION RELATED PARTS MAY INCLUDE THE FOLLOWING (IF EQUIPPED):

- | | | |
|------------------------|------------------------------|-------------------------------------|
| 1. Fuel Metering | h. Liquid Gas Vaporizer | 8. Catalyst Assembly |
| a. Carburetor | i. Fuel Lines | 9. Muffler |
| b. Injection | 2. Intake (Manifold, Piping) | 10. Crankcase Breather Assembly |
| c. Pressure Regulators | 3. Ignition Module | 11. Sensors |
| d. Fuel Rail | 4. Ignition Coil | 12. Electronic Controls/Diagnostics |
| e. Fuel Pump | 5. Spark Plug | |
| f. Mixers | 6. Spark Plug Wires | |
| g. Regulators | 7. Exhaust Manifold | |

Purchasers'/Owner's Warranty Responsibilities and Limitations

The Engine purchaser/owner/operator ("You") is responsible for:

1. Engine installation, operation, adjustment, and maintenance per Generac's specifications, instructions, and Owner's Manual.
2. Presenting the Engine to an authorized Generac distribution center, servicing dealer, or equivalent entity ("Generac Service Center") as soon as a problem presents. Generac will complete Emissions Warranty repairs in a reasonable time.
 - a. You are responsible for transportation and delivery expenses incurred to/from the Generac Service Center.
 - b. You are responsible for damages or losses incurred in transport or shipment for inspection or Emissions Warranty repairs.

Generac warranty coverage and obligation:

1. Generac will repair or replace at no cost to you, including diagnosis, parts, and labor, defective or prematurely failed ERCs.
 - a. Generac will pay for inspection and diagnostic services determining a warrantable condition.
 - i. Customer may be responsible for inspection and diagnostic services fees if no warrantable condition is determined.

Generac will deny Emissions Warranty coverage and claims:

1. For evidence of abuse, misuse, neglect, improper maintenance, deficient maintenance, unapproved modifications, accidents, or acts of God.
2. For damage not caused by Generac Engines or Generac equipment.
3. For Engines on which add-on or non-equivalent parts are installed.

Limitation for ERCs subject to maintenance schedules:

1. ERCs not scheduled for maintenance repaired or replaced under this Emissions Warranty: the repaired/replaced component is warranted only for the remaining warranty period.
2. ERCs scheduled for maintenance having failed prior to first scheduled maintenance: the repaired/replaced ERC is warranted through the next scheduled maintenance event.

Part and Service Selection:

1. You may choose any qualified repair shop or person to maintain, replace, or repair your Engine with original or equivalent replacement components.
2. Generac recommends that you retain all receipts covering maintenance on your equipment, but Generac cannot deny Emissions Warranty service solely for lack of receipts.
3. Emissions Warranty, recall, and all other services paid for by Generac must be performed at an authorized Generac service provider.

Contacts: Emissions Warranty service can be initiated through your selling dealer or a Generac Service Center. Please call 1-800-333-1322 or visit www.generac.com or write to Generac Power Systems, Inc. P.O. Box 8, Waukesha, WI 53187.

Important Note: This Emissions Warranty does not apply to any incidental, consequential, or indirect damages caused by: defects in materials or workmanship, or any delay in repair or replacement of the defective part(s). Emissions Warranty is in place of all other warranties, expressed or implied. Specifically, Generac makes no other warranties as to the merchantability or fitness for a particular purpose. Any implied warranties required by law, shall be limited in duration to the terms of the express warranty provided herein.

Purchaser's/Owner's Recordkeeping Responsibilities (United States Environmental Protection Agency Requirements for STATIONARY EMERGENCY Generators [NRSSI and NRLSI Engines]

EPA regulations in 40 C.F.R. § 60 Subpart JJJJ require the Owner/Operator to maintain the certified emergency stationary SI internal combustion engine ("Emergency Engine") and emissions control system according to Generac's Owner's Manual instructions. The Owner/Operator ("You") may need to maintain and be able to present records including:

1. The Emergency Engine is certified to meet EPA emission standards.
2. Maintenance records.
3. Records to demonstrate that the engine was operated less than 100 hours per year on propane and only during emergency situations.
4. Records of operating hours, including emergency and non-emergency operation; Generac Emergency Engines are equipped with non-resettable hour meters to facilitate recordkeeping.
5. Compliance permits and records for State and local requirements.

You are responsible for compliance and potential liabilities for all Emergency Engine operation including requirements and limitations determined by Federal, State, local, and insurance agencies. Emergency Engines may be operated for maintenance checks and readiness testing provided that the tests are recommended by Federal, State, or local requirements; Generac, or the insurance company associated with the Engine.

Your certified Emergency Engine has a pre-set emission control system and does not require adjustment.

Maintenance checks and readiness testing is generally limited to 100 hours per year. Emergency Engines may be used without a time limit during qualifying emergency situations.

Emergency Engines may, depending on local regulations, operate up to 50 hours per year in non-emergency situations, including demand response without compensation, counted towards the 100 hours per year provided for maintenance and testing, but cannot be used for peak shaving or to generate income or as part of a financial arrangement.

Failing to follow the Generac Owner's Manual may cause EPA to treat your Emergency Engine as non-certified and subject to site permitting and / or performance testing.

Non-Compliance Liability

You may be subject to penalties for violations to Federal, State and local laws including those in 40 C.F.R. § 1068.101(b) for improper operation, maintenance, or compliance practices. California regulations may prohibit demand response operation for Emergency Engines not certified to California Air Resources Board regulations.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2025 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

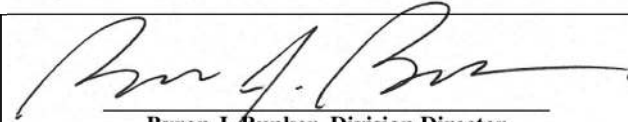
OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Generac Power Systems, Inc.
(U.S. Manufacturer or Importer)

Certificate Number: SGNXB14.22C1-017

Effective Date:
11/27/2024

Expiration Date:
12/31/2025


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
11/27/2024

Revision Date:
N/A

Manufacturer: Generac Power Systems, Inc.
Engine Family: SGNXB14.22C1
Mobile/Stationary Certification Type: Stationary
Fuel : Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJJ Table 1
VOC (g/Hp-hr) : 1.0
NOx (g/Hp-hr) : 2.0
CO (g/Hp-hr) : 4.0
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

SG200 | 14.2L | 200 kW
INDUSTRIAL SPARK-IGNITED GENERATOR SET
EPA Certified Stationary Emergency and Non-Emergency

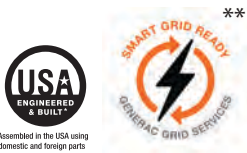
GENERAC® | INDUSTRIAL
POWER

DEMAND RESPONSE READY

Standby Power Rating
200 kW, 250 kVA, 60 Hz

Demand Response Rating
200 kW, 250 kVA, 60 Hz

Prime Power Rating
180 kW, 225 kVA, 60 Hz



** Offered on units sold in the U.S. and Canada



Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.



UL2200, UL6200, UL1236, UL489



CSA C22.2, B149



BS5514 and DIN 6271



SAE J1349



NFPA 37, 70, 99, 110



NEC700, 701, 702, 708



NEMA ICS10, MG1, 250, ICS6, AB1



ANSI C62.41



IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

Powering Ahead

Generac provides superior quality by designing and manufacturing most of its generator components, such as alternators, enclosures, control systems and communications software. Generac also makes its own spark-ignited engines, and they can be found on every Generac gaseous-fueled generator. We engineer and manufacture them from the block up — all at our facilities throughout Wisconsin. Applying natural gas and LP-fueled engines to generators requires advanced engineering expertise for reliability, durability and necessary performance. By designing specifically for these dry, hotter-burning fuels, the engines last longer and require less maintenance. Building our own engines also means we control every step of the supply chain and delivery process, so you benefit from single-source responsibility.

Plus, Generac Industrial Power's distribution network provides all parts and service so owners don't have to deal with third-party suppliers. It all leads to a positive owner experience and higher confidence level. Generac spark-ignited engines give more options in commercial and industrial generator applications as well as extended run time from utility-supplied natural gas.

SG200 | 14.2L | 200 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency and Non-Emergency

GENERAC | INDUSTRIAL
POWER

STANDARD FEATURES

DEMAND RESPONSE READY

ENGINE SYSTEM

- Oil Drain Extension
- Air Cleaner
- Fan Guard (Open Sets Only)
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil and Coolant
- Radiator Duct Adapter (Open Set Only)
- Critical Silencer (Enclosed Units Only)
- Oil Temperature Indication and Alarm

FUEL SYSTEM

- NPT Fuel Connection on Frame
- Primary and Secondary Fuel Shutoff

COOLING SYSTEM

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- 50/50 Ethylene Glycol Antifreeze
- Radiator Drain Extension

ELECTRICAL SYSTEM

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ENCLOSURE (If Selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (Sound Attenuated Enclosures)
- Gasketed Doors
- Upward Facing Discharge Hood (Radiator and Exhaust)
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- RhinoCoat™ - Textured Polyester Powder Coat Paint

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Limited Warranty (Standby and Demand Response Rated Units)
- 1 Year Limited Warranty (Prime Rated Units)
- Silencer Mounted in the Discharge Hood (Enclosed Units Only)
- Ready to Accept Full Load in <10 Seconds

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- Main Line Circuit Breaker
- Class H Insulation Material
- 2/3 Pitch
- Skewed Stator
- Permanent Magnet Excitation
- Sealed Bearing
- Amortisseur Winding
- Full Load Capacity Alternator

CONTROL SYSTEM



Power Zone® Pro Sync Controller

Program Functions

- NFPA 110 Level 1 Compliant
- Engine Protective Functions
- Alternator Protective Functions
- Digital Engine Governor Control
- Digital Voltage Regulator
- Multiple Programmable Inputs and Outputs
- Remote Display Capability
- Remote Communication via Modbus® RTU, Modbus TCP/IP, and Ethernet 10/100
- Alarm and Event Logging with Real Time Stamping
- Expandable Analog and Digital Inputs and Outputs

- Remote Wireless Software Update Capable
- BMS and Remote Telemetry
- Built-In Programmable Logic Eliminates the Need for External Controllers Under Most Conditions
- Ethernet Based Communications Between Generators
- Programmable I/O Channel Properties
- Built-In Diagnostics
- Arc Flash Maintenance Mode (When Correctly Equipped)

Alarms and Warnings

- Low Oil Pressure
- Low Coolant Level
- High/Low Coolant Temperature
- Sensor Failure
- Oil Temperature
- Over/Under Speed
- Over/Under Voltage
- Over/Under Frequency
- Over/Under Current
- Over Load
- High/Low Battery Voltage
- Battery Charger Current
- Phase to Phase and Phase to Neutral Short Circuits (I²T Algorithm)

7 Inch Color Touch Screen Display

- Resistive Color Touch Screen
- Sunlight Readable (1400 NITS)
- Easily Identifiable Icons
- Multi-Lingual
- On Screen Editable Parameters
- Key Function Monitoring
- Three Phase Voltage, Amperage, kW, kVA, and kVA_r
- Selectable Line to Line or Line to Neutral Measurements
- Frequency
- Engine Speed
- Engine Coolant Temperature
- Engine Oil Pressure
- Engine Oil Temperature
- Battery Voltage
- Hourmeter
- Warning and Alarm Indication
- Diagnostics
- Maintenance Events/Information

CONFIGURABLE OPTIONS

DEMAND RESPONSE READY

ENGINE SYSTEM

- Engine Coolant Heater
- Baseframe Cover/Rodent Guard
- 2 Stage Air Cleaner
- Oil Heater
- Air Filter Restriction Indicator
- Radiator Stone Guard (Open Set Only)
- Level 1 Fan and Belt Guards (Enclosed Units Only)

FUEL SYSTEM

- NPT Flexible Fuel Line

ELECTRICAL SYSTEM

- 10A UL Listed Battery Charger
- Battery Warmer

ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater
- Tropical Coating

CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- 3rd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

GENERATOR SET

- Demand Response Rating
- Extended Factory Testing (3-Phase Only)
- 12 Position Load Center
- Vapor Recovery Heater

ENCLOSURE

- Weather Protected Enclosure
- Level 1 Sound Attenuated
- Level 2 Sound Attenuated
- Level 2 Sound Attenuated with Motorized Dampers
- Level 3 Sound Attenuated (Steel Only)
- Steel Enclosure
- Aluminum Enclosure
- Up to 200 MPH Wind Load Rating (Contact Factory for Availability)
- AC/DC Enclosure Lighting Kit
- Enclosure Heaters (with Motorized Dampers Only)
- IBC Certification
- Door Open Alarm Switch

CONTROL SYSTEM

- NFPA 110 Level 1 Compliant 21-Light Remote Annunciator
- Remote Relay Assembly (8 or 16)
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- 10A Engine Run Relay
- Ground Fault Annunciator
- 100 dB Alarm Horn
- 120V GFCI and 240V Outlets
- Damper Alarm Contacts (with Motorized Dampers Only)

WARRANTY (Standby Gensets Only)

- 2 Year Extended Limited Warranty
- 5 Year Extended Limited Warranty
- 7 Year Extended Limited Warranty
- 10 Year Extended Limited Warranty

ENGINEERED OPTIONS

ENGINE SYSTEM

- Coolant Heater Ball Valves
- Fluid Containment Pans

CONTROL SYSTEM

- Battery Disconnect Switch

GENERATOR SET

- Special Testing
- Battery Box

CIRCUIT BREAKER OPTIONS

- 4th Main Line Circuit Breaker

APPLICATION AND ENGINEERING DATA

DEMAND RESPONSE READY

ENGINE SPECIFICATIONS

General

Make	Generac
Cylinder #	6
Type	In-line
Displacement - in³ (L)	864.71 (14.2)
Bore: in (mm)	5.31 (135)
Stroke: in (mm)	6.50 (165)
Compression Ratio	9.5:1
Intake Air Method	Turbocharged/Aftercooled
Number of Main Bearings	7
Connecting Rods	Steel Alloy
Cylinder Head	Cast Iron
Cylinder Liners	Ductile Iron
Ignition	Electronic
Piston Type	Aluminum
Crankshaft Type	Ductile Iron
Lifter Type	Solid
Intake Valve Material	Special Heat-Resistant Steel
Exhaust Valve Material	High Temperature Steel Alloy
Hardened Valve Seats	High Temperature Steel Alloy

Engine Governing

Governor	Electronic
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump	Gear
Oil Filter Type	Full-Flow Cartridge
Engine Oil Capacity: qt (L)	36.2 (34.3)

Cooling System

Cooling System Type	Pressurized Closed Recovery
Fan Type	Pusher
Fan Speed (RPM)	1,894
Fan Diameter - in (mm)	30 (762)

Fuel System

Fuel Type	Natural Gas
Carburetor	Down Draft
Secondary Fuel Regulator	Standard
Fuel Shut Off Solenoid	Standard
Operating Fuel Pressure- in H ₂ O (kPa)	7 - 11 (1.7 - 2.7)
*When designing the external fuel system, assume a 20% safety factor to the upper and lower limit of the specified fuel pressure range to account for site variation and measurement at the generator test port. Refer to Generac document 10000046207, latest rev. for proper gas supply design guidelines. (Contact Factory for Details)	

Engine Electrical System

System Voltage	24 VDC
Battery Charger Alternator	57.5 A
Battery Size	See Battery Index 0161970SBY
Battery Voltage	24 VDC
Ground Polarity	Negative (-)

ALTERNATOR SPECIFICATIONS

Standard Model	K0200124Y21
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5% (3-Phase)
Telephone Interference Factor (TIF)	<50

Standard Excitation	Permanent magnet
Bearings	Sealed Ball
Coupling	Direct via Flexible Disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

OPERATING DATA

DEMAND RESPONSE READY

POWER RATINGS - NATURAL GAS

	Standby/Demand Response		Prime	
Single-Phase 120/240 VAC @1.0pf	200 kW/200 kVA	Amps: 833	180 kW/180 kVA	Amps: 750
Three-Phase 120/208 VAC @0.8pf	200 kW/250 kVA	Amps: 695	180 kW/225 kVA	Amps: 625
Three-Phase 120/240 VAC @0.8pf	200 kW/250 kVA	Amps: 602	180 kW/225 kVA	Amps: 542
Three-Phase 277/480 VAC @0.8pf	200 kW/250 kVA	Amps: 301	180 kW/225 kVA	Amps: 271
Three-Phase 346/600 VAC @0.8pf	200 kW/250 kVA	Amps: 241	180 kW/225 kVA	Amps: 217

MOTOR STARTING CAPABILITIES (skVA)

skVA vs. Voltage Dip			
277/480 VAC	30%	208/240 VAC	30%
K0200124Y21	478	K0200124Y21	361
K0250124Y21	630	K0250124Y21	506
K0300124Y21	790	K0300124Y21	609

FUEL CONSUMPTION RATES*

	Natural Gas – scfh (m³/hr)	
Percent Load	Standby/Demand Response	Prime
25%	960 (27.2)	900 (25.5)
50%	1,440 (40.8)	1,320 (37.4)
75%	1,800 (51.0)	1,800 (51.0)
100%	2,460 (69.7)	2,280 (64.6)

*1.5X maximum site-rated fuel consumption should be used for gas supply design practices.
 Refer to Generac 10000046207, latest rev., for more information or contact factory for details.

COOLING

		Standby/Demand Response	Prime
Air Flow (Fan Air Flow Across Radiator)	cfm (m³/min)	9,162 (259.4)	9,162 (259.4)
Coolant Flow	gpm (Lpm)	90 (340.7)	90 (340.7)
Coolant System Capacity	gal (L)	11 (39.7)	11 (39.7)
Maximum Operating Ambient Temperature	°F (°C)	122 (50)	122 (50)
Maximum Operating Ambient Temperature (Before Derate)		See Bulletin No. 0199270SSD	See Bulletin No. 0199270SSD
Maximum Additional Radiator Backpressure	in H ₂ O (kPa)	0.5 (0.12)	0.5 (0.12)

COMBUSTION AIR REQUIREMENTS

	Standby/Demand Response	Prime
Flow at rated power cfm - (m³/min)	390 (11.0)	362 (10.3)

ENGINE

		Standby/ Demand Response	Prime
Rated Engine Speed	RPM	1,800	1,800
Horsepower at Rated kW**	hp	304	274
Piston Speed	ft/min (m/min)	1,950 (594)	1,950 (594)
BMEP	psi (kPa)	155 (1,065)	139 (959)

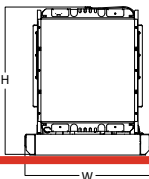
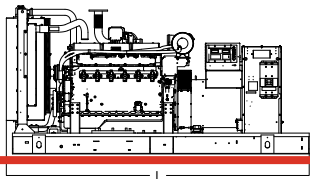
** See "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

EXHAUST

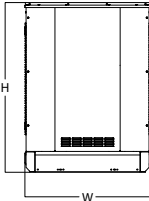
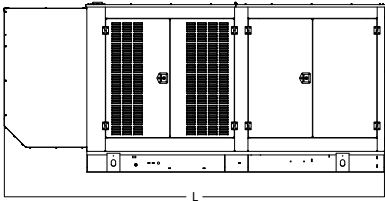
		Standby/ Demand Response	Prime
Exhaust Flow (Rated Output)	cfm (m³/min)	1,327 (38)	1,213 (34)
Max. Backpressure (Post Silencer)	inHg (kPa)	0.75 (2.54)	0.75 (2.54)
Exhaust Temp (Rated Output - Post Silencer)	°F (°C)	1,378 (748)	1,350 (732)

DIMENSIONS AND WEIGHTS*

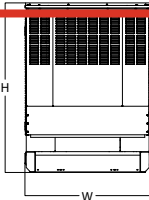
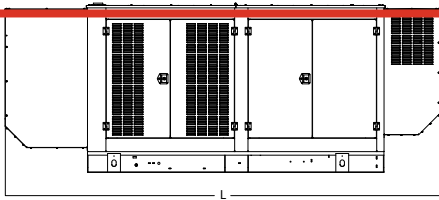
DEMAND RESPONSE READY



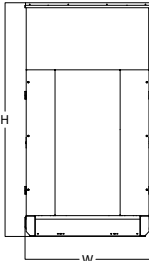
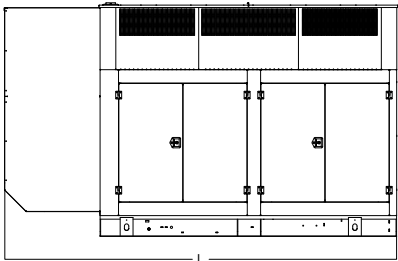
OPEN SET (Includes Exhaust Flex)	
L x W x H - in (mm)	128.0 (3,251) x 52.9 (1,344) x 62.3 (1,582)
Weight lbs (kg)	5,281 - 6,031 (2,395 - 2,735)



WEATHER PROTECTED ENCLOSURE	
L x W x H - in (mm)	154.4 (3,922) x 54.0 (1,372) x 69.8 (1,773)
Weight lbs (kg)	Steel: 6,261 - 7,596 (2,839 - 3,445) Aluminum: 5,795 - 6,786 (2,628 - 3,078)



LEVEL 1 SOUND ATTENUATED ENCLOSURE	
L x W x H - in (mm)	179.9 (4,569) x 54.0 (1,372) x 69.8 (1,773)
Weight lbs (kg)	Steel 6,566 - 8,059 (2,978 - 3,655) Aluminum: 5,926 - 7,000 (2,688 - 3,175)



LEVEL 2 SOUND ATTENUATED ENCLOSURE	
L x W x H - in (mm)	154.4 (3,922) x 54.0 (1,372) x 93.3 (2,370)
Weight lbs (kg)	Steel: 6,801 - 8,632 (3,084 - 3,915) Aluminum: 6,027 - 7,247 (2,733 - 3,287)

* All measurements are approximate and for estimation purposes only.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings

ALTERNATOR DATA SHEET

K0200124Y21

General Characteristics

Voltages (V)	208/240 and 480	Number of Leads	12
Frequency (Hz)	60	Winding Type	Reconnectable
Phases	3	Air Flow (CFM)	1,660
Speed (RPM)	1,800	Total Harmonic Distortion (%)	<5
Excitation System	PMG	Largest Single Harmonic Value (%)	<3.5
Insulation Class	H	Telephone Interference Factor (TIF)	<50
Winding Pitch	2/3	Reference Part Number	0L3717E01R

Ratings at 0.8 pf based on 40°C Ambient

Voltage (V)	80°C Rise		105°C Rise		120°C Rise		150°C Rise	
	kW	kVA	kW	kVA	kW	kVA	kW	kVA
208/240	152	190	182	227	200	250	214	267
480	152	190	182	227	200	250	214	267

Base Data at 480V, 250 kVA, 1,800 RPM, 60 Hz, 3Ø

Description	Value
Stator Resistance, Line to Line, High Wye Connection (Ω)	0.0151
Rotor Resistance (Ω)	1.0800
Exciter Stator Resistance - PMG (Ω)	6.4250
Exciter Rotor Resistance - PMG (Ω)	0.2060
Excitation Winding Resistance -PMG (Ω)	1.2824
Xd, Direct Axis Synchronous Reactance (p.u.)	3.360
X2, Negative Sequence Reactance (p.u.)	0.230
X0, Zero Sequence Reactance (p.u.)	0.080
X'd, Direct Axis Transient Reactance (p.u.)	0.190
X''d, Direct Axis Subtransient Reactance (p.u.)	0.170
Xq, Quadrature Axis Synchronous Reactance (p.u.)	1.610
T'd, Direct Axis Transient Short Circuit Time Constant (s)	0.103

Description	Value
T''d, Direct Axis Subtransient Short Circuit Time Constant (s)	0.016
T'do, Direct Axis Transient Open Circuit Time Constant (s)	2.245
Ta, Short Circuit Time Constant of Armature Winding (s)	0.028
Phase Sequence CCW-NDE	T1, T2, T3
Voltage Balance, L-L or L-N (%)	2.5
Deviation Factor (%)	<7
High Wye Connection, Sustained 3Ø Short Circuit Current (%) - PMG	300
X/R	11
Short Circuit Ratio	0.53
Heat Rejection (BTU/hr) - 100% Rated Load, 480V, 0.8pf, 120°C Temperature Rise	87,807

Reference: Mil-STD-705B
All Ratings are Nominal

ALTERNATOR DATA SHEET

K0200124Y21

skVA

	10%	15%	20%	25%	30%	35%
480V @ 0.3PF	116	175	246	324	428	552
480V @ 0.6PF	134	200	286	367	478	589
208/240V @ 0.3PF	89	132	185	244	325	396
208/240V @ 0.6PF	99	151	212	275	361	437

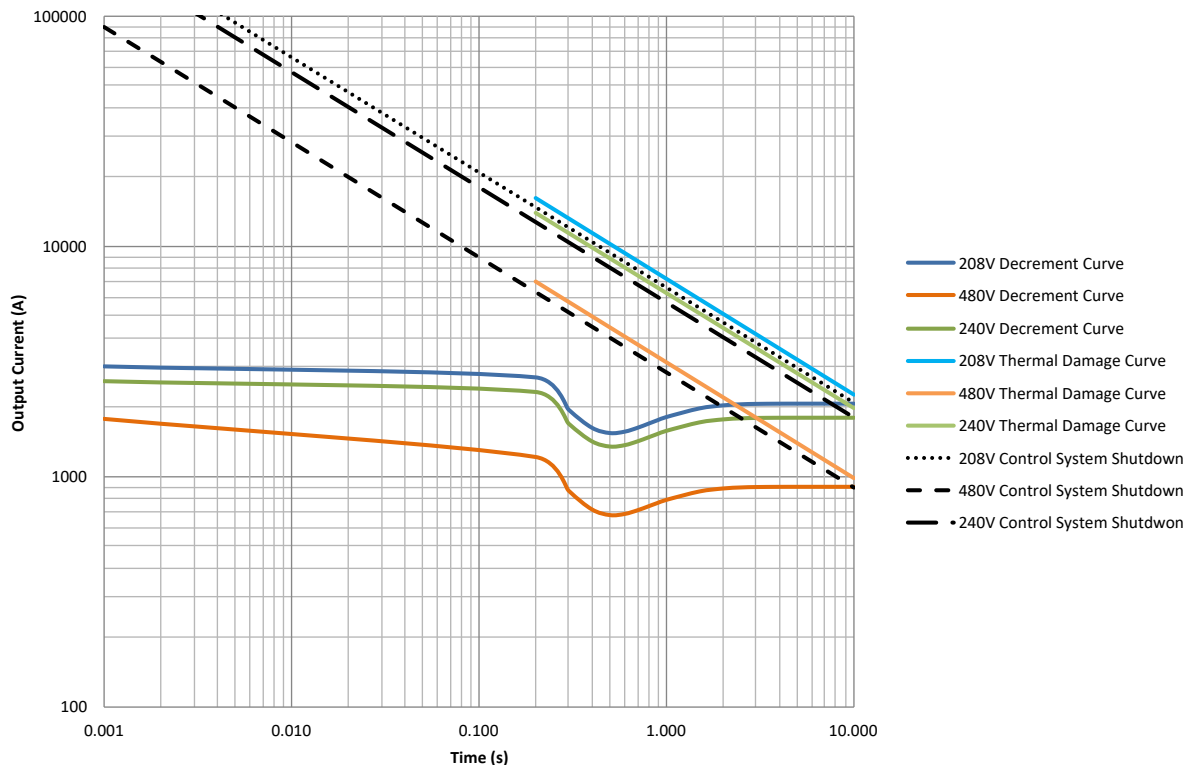
Efficiencies

*Rated Power	480V @ 0.8 PF	480V @ 1.0 PF	208/240V @ 0.8PF	208/240V @ 1.0 PF
20%	79.2	80.3	81.7	82.5
40%	85.5	87.1	86.7	88.2
60%	88.2	90.4	88.6	90.6
80%	88.8	91.6	88.7	91.2
100%	88.6	92.1	88.1	91.2

*Rated Power value is rating kW at 120°C Winding Temperature Rise and 0.8pf

LOG LOG Decrement Curve

Balanced 3-Phase Short Circuit Decrement & Thermal Damage Current Limit Curves



GENprotect™

Seamless Protection for Industrial Power Generators

GENprotect Operation

The design choice of an onsite power system using a Generac Industrial Power Generator assures your emergency power source is protected from unexpected power distribution faults. Typically, a generator will include some type of over-current device, such as a circuit breaker, or be protected by inherent design with the controller protecting the alternator through a protection algorithm. Generac's GENprotect generator protection system monitors the system current output and protects the alternator with extended security against fault scenarios that could occur within the site's downstream distribution system.

It is a common misconception that the alternator's main circuit breaker protects the alternator from a short circuit event. The main output breaker protects the cabling and provides a convenient disconnect. The characteristic trip curve for the industry standard thermal magnetic breaker (MCCB, molded case thermal magnetic or solid state) does not coordinate with the thermal damage limitation for an on-site generator. If circuit breakers are used for generator protection, a solid-state circuit breaker with full adjustments (Long Time, Short Time and Instantaneous, LSI) is required to coordinate the breaker protection curve within the generator thermal damage curve. Historically, this limitation was often accepted in system design since failures of the main generator feeder are extremely rare. Most short circuit events happen at a branch circuit, equipment level, where the fault is easily cleared by the smaller down stream breakers.

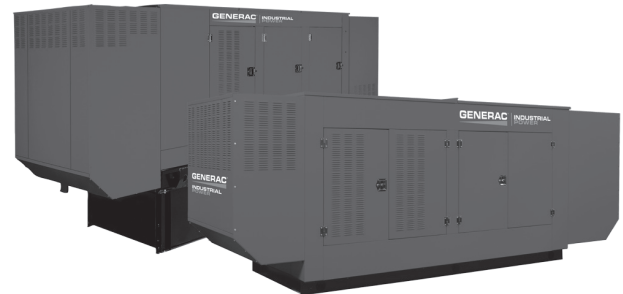
Given the mission critical nature of today's back-up power applications, it is more desirable to protect the system against even relatively rare failure modes. As generator controllers have become more powerful it is feasible for manufactures to supply coordinated short circuit protection integral to the generator control system, negating the need for a main-line circuit breaker.

Generac's GENprotect alternator protection algorithm monitors the generator output. If this monitoring senses short circuit current in excess of rated amps, GENprotect steps in to provide a controlled and safe approach to breaker coordination and alternator protection. GENprotect first limits the alternator short circuit current level to 300%. By limiting the available fault current, GENprotect extends the time the alternator can maintain fault current resulting in consistent breaker coordination. Without this functionality a

line to neutral fault may be at 800% of rated current and need to be cleared within 1.4 seconds. The second function GENprotect performs is I²T thermal protection for the alternator. Since a short circuit event can heat the alternator so rapidly, it is not possible to protect the alternator by monitoring temperature. Instead GENprotect calculates the heat energy of the fault current. When this energy reaches the limits of NEMA MG1, GENprotect trips the generator off-line. This configuration ensures the alternator is protected and the power system is ensured 10 seconds of 300% fault current for breaker coordination.

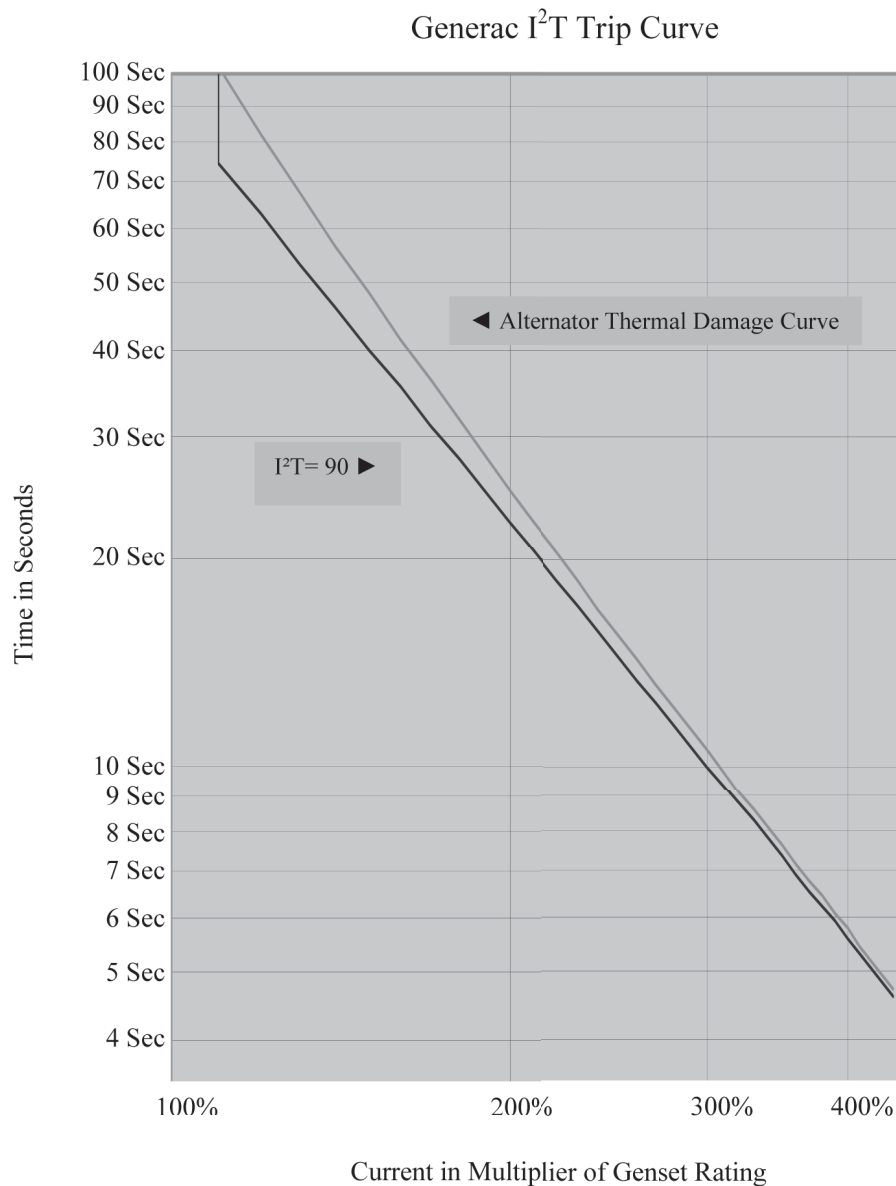
DESCRIPTION

- GENprotect is an alternator protection algorithm approved by UL.
- Protects alternator from damage due to shorts and electrical faults.
- Provides breaker coordination and alternator protection.
- Allows for use of multiple circuit breaker choices, including "no" breaker.



GENprotect™

Seamless Protection for Industrial Power Generators



The above Figure shows the Generac GENprotect thermal protection curve for use in protection and coordination studies. The alternator Thermal Damage Curve is shown just to the right of the GENprotect protection curve. If the alternator load is greater than the thermal damage protection curve for the alternator, the generator set will trip off-line. For example, an overload current of 110% for 75 seconds causes an overload alarm and will trip the generator off-line, shutting down the engine. GENprotect will provide generator protection over a full range of time and current, from instantaneous faults to overloads lasting several minutes. An advantage of GENprotect over a MCCB is that GENprotect allows for downstream breakers to clear faults without tripping the generator off-line, providing selective coordination with the first level of downstream breakers.

EATON POWER DEFENSE™ CIRCUIT BREAKER DATA

PD4 FRAME

DESCRIPTION

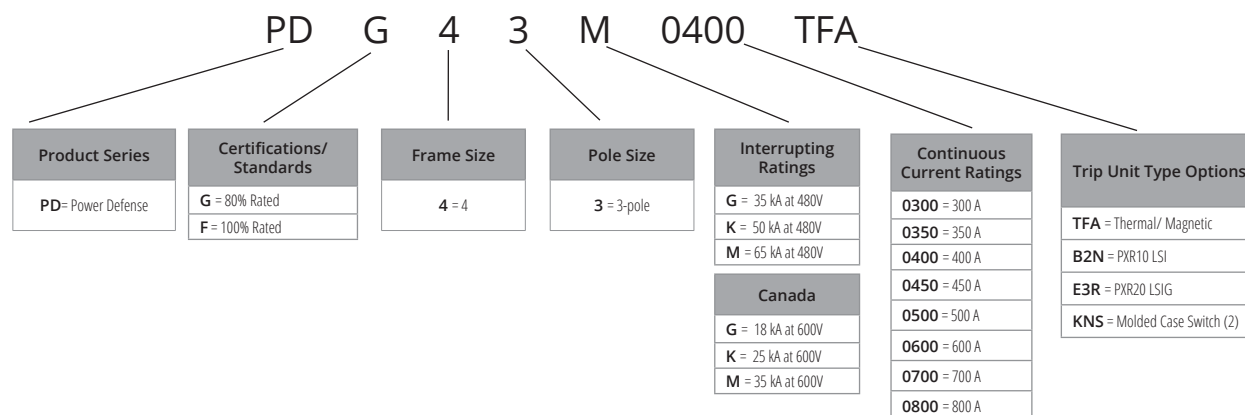
- Globally accepted molded case circuit breakers
- Covers a range of 300A through 800A
- Available in standard 80% rating or optional 100% UL rating (1)

AVAILABLE FEATURES AND ACCESSORIES

- Thermal/Magnetic trip units (fixed thermal, adjustable magnetic)
- PXR 10 Electronic Trip Units (LSI)
- PXR 20 Electronic Trip Units (LSIG)
- Modular field-installable accessories
 - Shunt Trip
 - Auxiliary Contacts
 - Alarm Contacts

STANDARDS AND CERTIFICATIONS

- UL
- CSA
- IEC (CE)
- CB (CCC)



- (1) 100% rating available on LSI and LSIG trip only
 (2) Magnetic-only Molded Case Switch available at 800A

All breakers are rated 600V
 All breakers are 3-Pole

EATON POWER DEFENSE™ CIRCUIT BREAKER DATA

PD4 FRAME

THERMAL/MAGNETIC TRIP UNITS, PD4 FRAME

*Fixed Thermal, Adjustable Magnetic

*Modular, field-installable

EATON#	Continuous Current Rating
PDG4XTFA30300	0300
PDG4XTFA30350	0350
PDG4XTFA30400	0400
PDG4XTFA30450	0450
PDG4XTFA30500	0500
PDG4XTFA30600	0600
PDG4XTFA30700	0700
PDG4XTFA30800	0800



All breakers are rated 600V
All breakers are 3-Pole

EATON POWER DEFENSE™ CIRCUIT BREAKER DATA

PD4 FRAME

ELECTRONIC TRIP UNITS, PD4 FRAME

- *PXR 10 - LSI Trip
- *Modular, field-installable



PXR10 - LSI Trip



PXR20 - LSIG Trip

EATON#	Continuous Current Rating	
PDG4XPXR30800B2N	0800	LSI
PDG4XPXR30800E3R	0800	LSIG

Available Continuous Current (I_r) Settings on PXR Electronic Trip Units

Catalog Number Selection and Maximum Setting (I_n)

Option	Setting	800 A
PXR 10, PXR 20	1	320 A
	2	350 A
	3	400 A
	4	450 A
	5	500 A
	6	550 A
	7	600 A
	8	630 A
	9	700 A
	10 = I _n	800 A

THERMAL/MAGNETIC TRIP UNITS, PD4 FRAME

BREAKER-FRAME	CIRCUIT BREAKER RANGE (A)	WIRE TYPE	WIRE TEMPERATURE RATING	CIRCUIT BREAKER LUGAWGWIRE RANGE/(NUMBER OF CONDUCTORS)	TORQUETO WIRE	GENERAC #	EATON#
Power Defense - 4	300-700	Cu/Al	--	1-500 (2)	375 in-lb (42.37 Nm)	A0002200438	PDG4X3TA700
Power Defense - 4	800	Cu/Al	194°F (90°C)	3/0-400 (3)	375 in-lb (42.37 Nm)	A0002200439	PDG4X3TA800

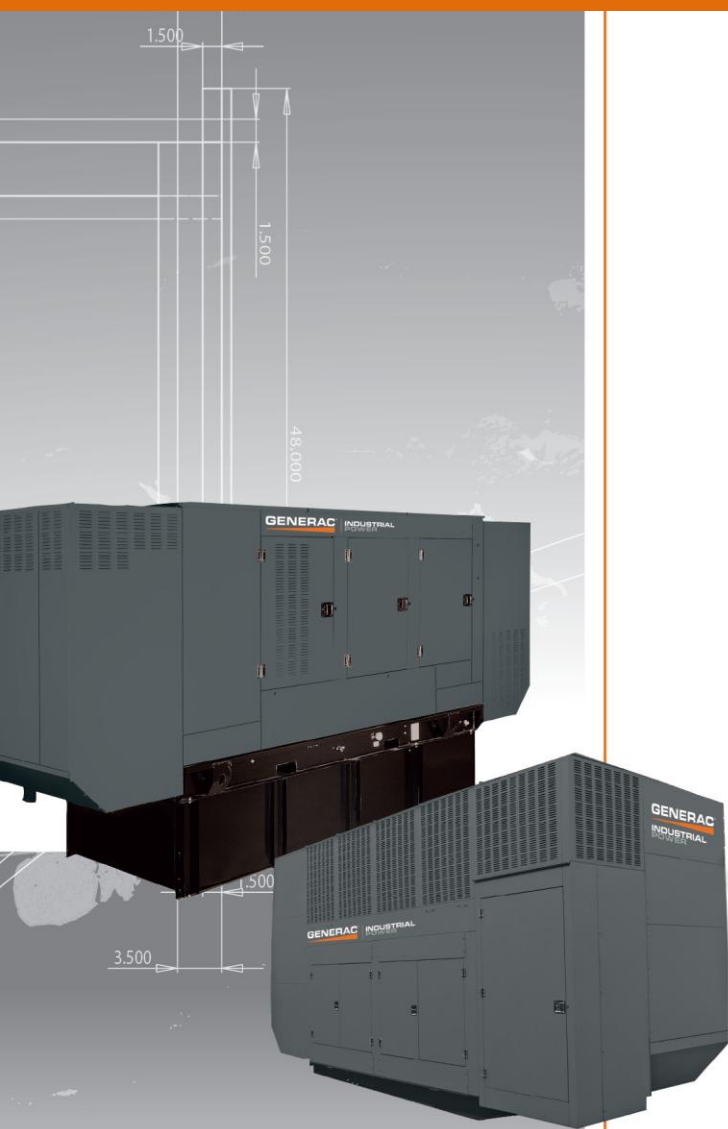
ELECTRONIC TRIP UNITS, PD4 FRAME

BREAKER-FRAME	CIRCUIT BREAKER RANGE (A)	WIRE TYPE	WIRE TEMPERATURE RATING	CIRCUIT BREAKER LUGAWGWIRE RANGE/(NUMBER OF CONDUCTORS)	TORQUETO WIRE	GENERAC #	EATON#
Power Defense - 4	300-800	Cu/Al	194°F (90°C)	3/0-400 (3)	375 in-lb (42.37 Nm)	A0002200439	PDG4X3TA800

All breakers are rated 600V
All breakers are 3-Pole

GENERAC®
**INDUSTRIAL
POWER**

Transfer Switch



ES
ENERGY SYSTEMS

GENERAC®
**INDUSTRIAL
POWER**

ASCO Bypass-Isolation Automatic Transfer Switches are available in open transition, closed transition, and delayed transition designs. The bypass-isolation features allow the primary automatic transfer switch to be inspected, tested, and maintained without interrupting power to the load. They also provide redundant power transfer if the ATS is disabled or removed from service.



J-Frame
150-600 amps



H-Frame
600-1200 amps



G-Frame
1000-3000 amps

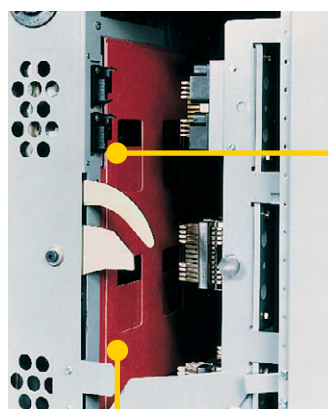


G-Frame
4000 amps

- Available 150 to 4000 amps
- Bypass switch and transfer switch have identical electrical ratings
- Mechanical interlocks prevent unintended operation
- Bypass contacts carry current only during bypass operation
- Draw-out design eases transfer switch maintenance
- The bypass switch has dead-front quick-make, quick-break operation for transferring loads between live sources
- Bypass switch is rated for use as a 3-position manual transfer switch
- Bypass and isolation functions are simple, requiring only two operating handles
- Bypass-Isolation Handles are permanently mounted
- No toggle switches, push buttons, selector switches, or levers are required for bypass-isolation operation
- Mechanical indicators show bypass and transfer switch positions
- 800 to 1200 amp models available in shallow depth, front-connected, or rear-connected designs

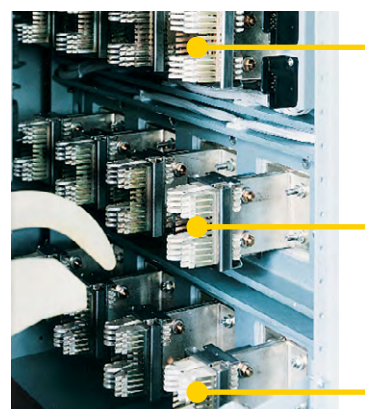
Transfer Switch Draw-out Features

- Automatic secondary disconnects remove control power as switch is withdrawn
- Draw-out carriage eases switch mechanism maintenance and removal via commercially available breaker hoists
- Optional transfer switch lifting yoke kit
- Optional automatic shutters isolate bus when the transfer switch is withdrawn, 1600-3000 Amp only



Optional Automatic Shutters
(1600-3000 amps)

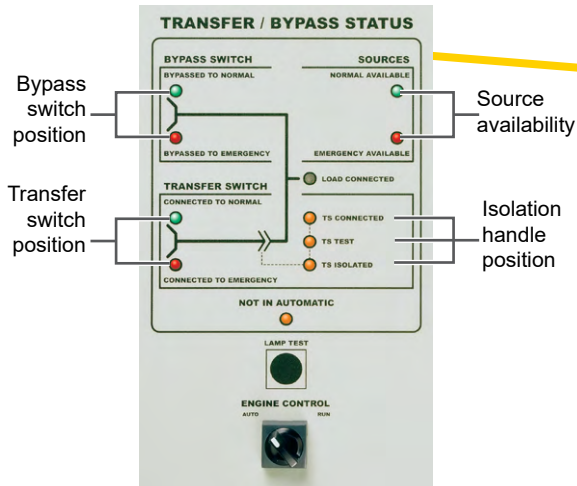
Automatic
Secondary
Disconnects



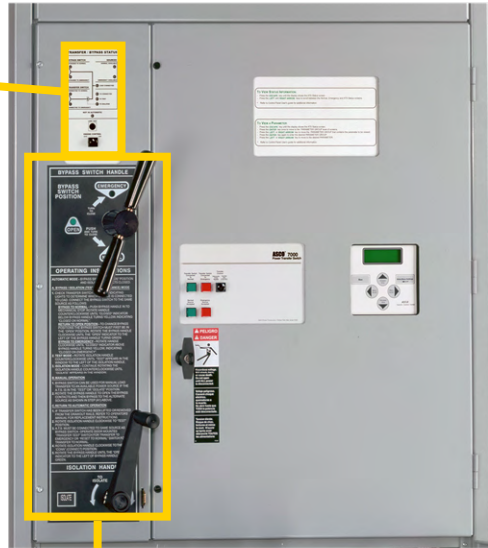
Self-Aligning Jaws

ASCO 7000 SERIES Bypass-Isolation Transfer Switches

Transfer / Bypass Status Panel



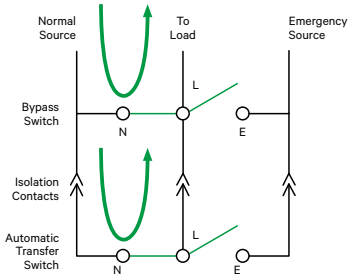
Instantly see the status of power availability and switch positions.



Bypass and Isolation - Simple as 1, 2, 3

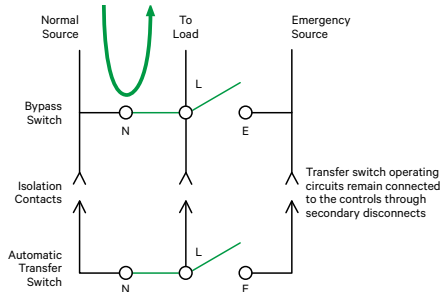
1 Bypass

Push in the transfer switch bypass handle and turn it counter clockwise



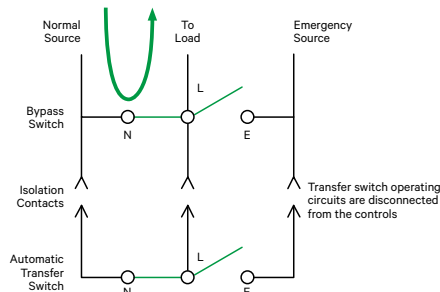
2 Set in Test Position

Turn isolation handle counter clockwise until window shows "Test"



3 Isolation Position

Turn isolation handle counter clockwise until window shows "isolate"



Power Knowledge

Application and Design Factors for Automatic Transfer and Bypass-Isolation Switches

[Part 1](#)

[Part 2](#)

[3D Bypass Switch Animation](#)

ASCO 7000 Series Microprocessor Controller

The 7000 Series Microprocessor Based Controller is used with all sizes of Automatic Transfer Switches from 30 through 4000 amperes. It represents the most advanced digital based microprocessor control panel in the industry and includes, as standard, all of the voltage, frequency, control, timing and diagnostic functions required for most emergency and standby power applications.

Because of severe voltage transients frequently encountered with industrial distribution systems, the microprocessor logic board is separated and isolated from the power board as shown below. This improves electrical noise immunity performance and helps assure compliance with the rigorous transient suppression standards highlighted below.

- Emission Standard - Group 1, Class A (EN 55011:1991)
- Generic Immunity Standard, for which: (EN 50082-2:1995)
- Electrostatic Discharge (ESD) Immunity (EN 61000-4-2:1995)
- Radiated Electromagnetic Field Immunity (ENV 50140:1993)
- Electrical Fast Transient (EFT) Immunity (EN 61000-4-4:1995)
- Surge Transient Immunity (EN 61000-4-5:1995)
- Conducted Radio-Frequency Field Immunity (EN 61000-4-6:1996)
- Voltage Dips, Interruptions and Variations Immunity (EN 61000-4-11:1994)

Features

- Digital microprocessor.
- Touch pad programming of features and settings without the need for meters or variable power supplies.
- Sixteen (16) selectable operating voltages available in a single Controller.
- Onboard diagnostics provide control panel and ATS status information to analyze system performance.
- Displays and counts down active timing functions.
- Selectable multi-language display (English, German, Spanish, French. For others contact ASCO).
- Password protection to prevent unauthorized tampering of settings.
- Serial communications board (RS-485 protocol) for remote monitoring and control with ASCO PowerQuest(r) Vpi and SiteWebTM communications products. Specify optional accessory 72A.
- Load shed option for SYNCHROPOWER(r) bus optimization applications. Specify optional accessory 30B.

Voltage and Frequency Sensing

- 3-Phase under and over voltage settings on normal and emergency sources.
- Under and over frequency settings on normal and emergency. True RMS Voltage Sensing with +/- 1% accuracy; Frequency Sensing Accuracy is +/- 0.2%.
- Selectable settings: single or three phase voltage sensing on normal and emergency; 50 or 60Hz.
- Phase sequence sensing for phase sensitive loads. Voltage unbalance detection between phases.

Status and Control Features

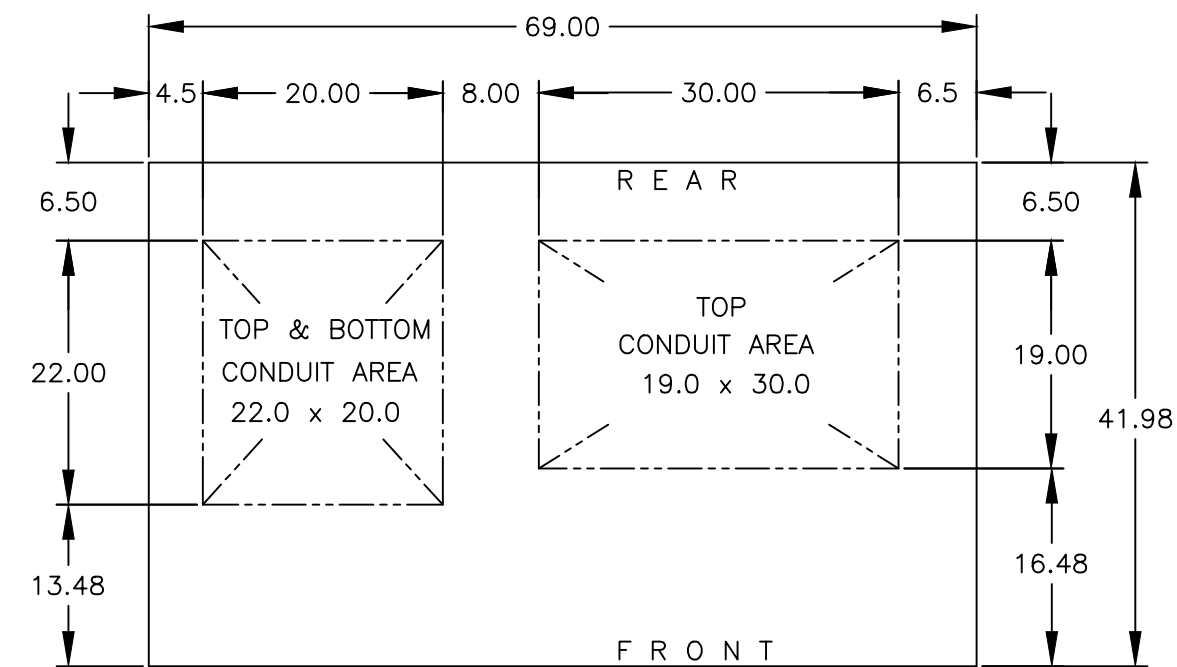
- Output contacts for engine-start signals.
- Selection between commit/no-commit on transfer to emergency after engine start and normal restores before transfer.

- Advanced inphase algorithm which automatically measures the frequency difference between the two sources and initiates transfer at appropriate phase angles to minimize disturbances from transferring motor loads.
- Event log displays 99 logged events with the time and date of the event, event type and event reason.
- Output signals for remote indication of normal and emergency source acceptability.
- Statistical ATS/System monitoring data screens which provide:
 - Total number of ATS transfers.
 - Number of ATS transfers caused by power source failure.
 - Total number of days ATS has been in operation.
 - Total number of hours that the normal and emergency sources have been available.

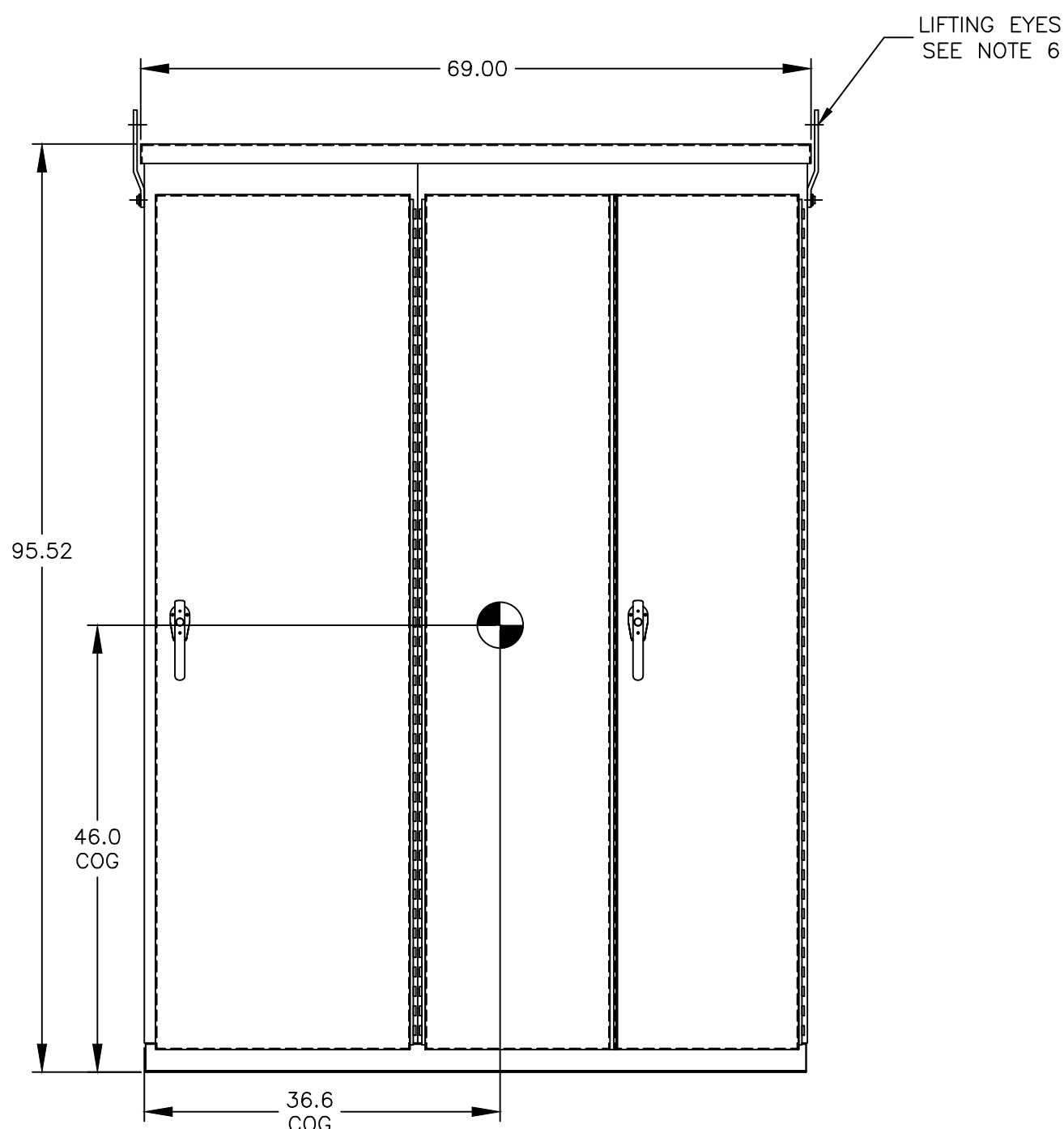
Time Delays

- Engine start time delay - delays engine starting signal to override momentary normal source outages - adjustable 0 to 6 seconds (can be extended to 60 minutes with external 24 volt DC source).
- Transfer to emergency time delay - adjustable 0 to 60 minutes.
- Emergency source failure time delay to ignore momentary transients during initial generator set loading - adjustable 0 to 6 seconds.
- Retransfer to normal time delay with two settings:
 - Power failure mode - 0 to 60 minutes.
 - Test mode - 0 to 60 minutes.
- Unloaded running time delay for engine cooldown - adjustable 0 to 60 minutes.
- Pre and post transfer signal time delay for selective load disconnect with a programmable bypass on source failures - adjustable 0 to 5 minutes. This signal can be used to drive a customer furnished relay, or for (2) sets of double throw contacts rated 3 amps at 480 volts AC, specify ASCO optional accessory 31Z.
- Fully programmable engine exerciser with (7) seven independent routines to exercise the engine generator, with or without loads, on a daily, weekly, biweekly or monthly basis.
- Contains all alarm signals, logic and time delays for use with closed transition switches.
- Insynch time delay - 0 to 3 seconds.
- Failure to synchronize - 1 to 5 minutes.
- Extended parallel - 0.1 to 1.0 seconds.
- Delayed transition load disconnect time delay - adjustable 0 to 5 minutes.

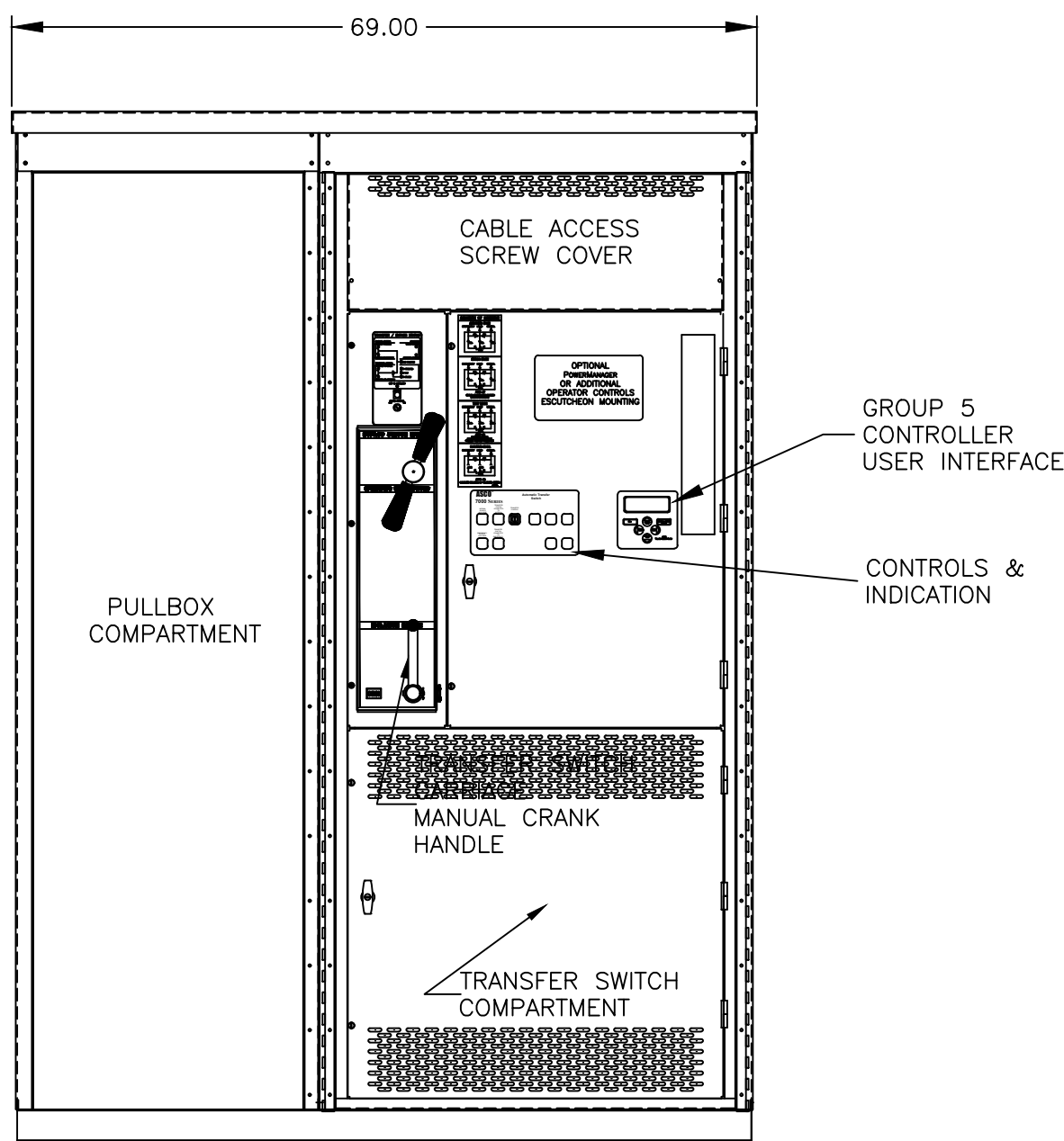
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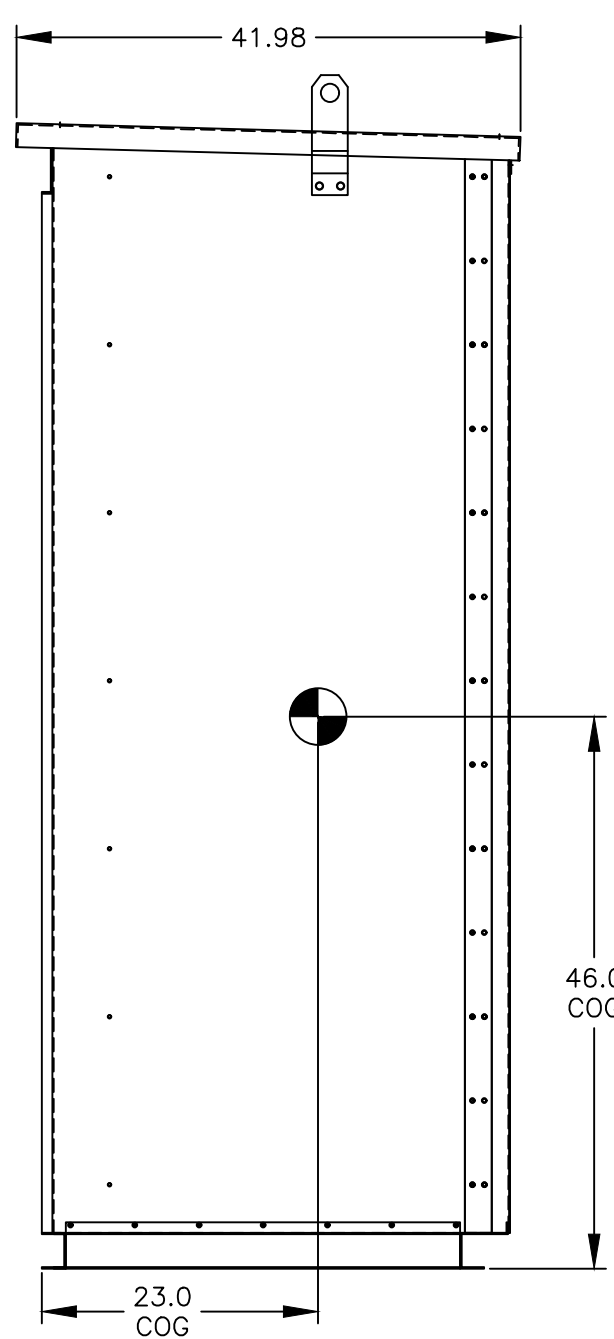
TOP VIEW



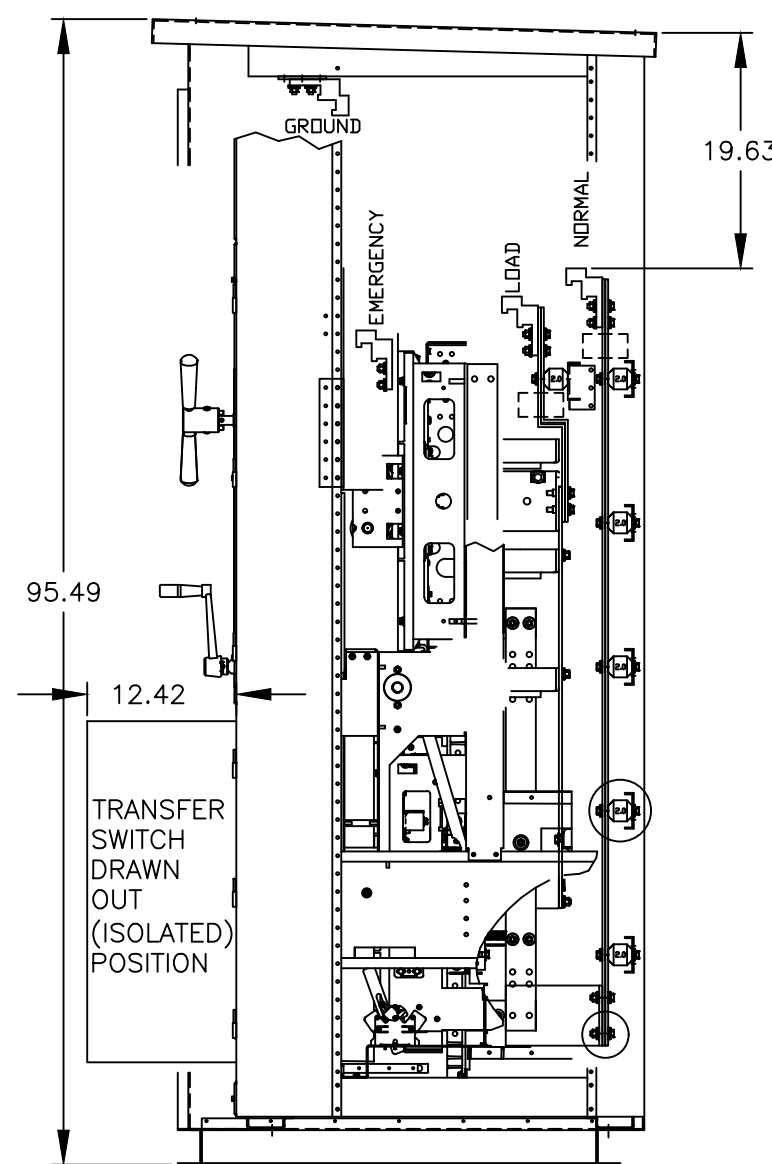
FRONT VIEW



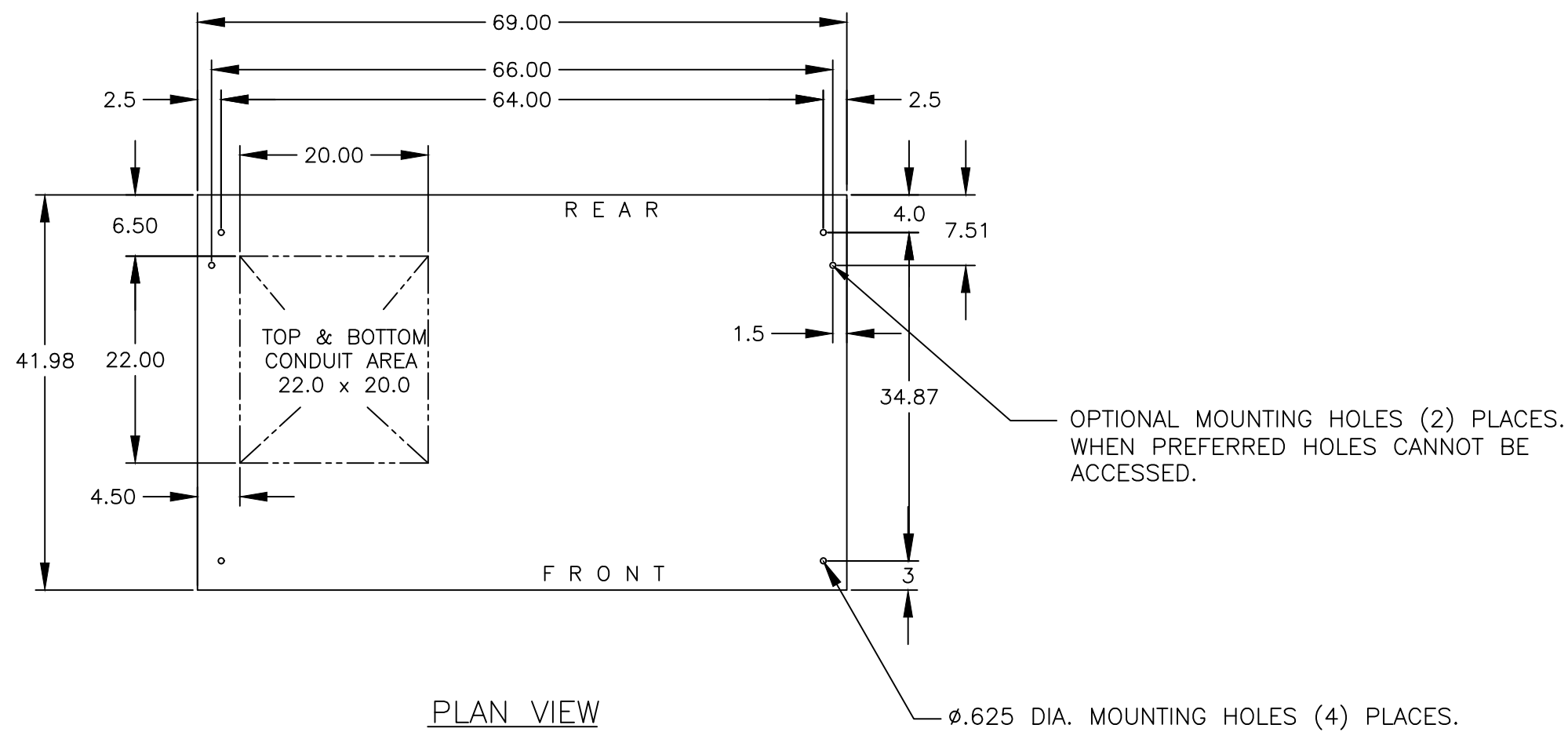
FRONT VIEW
WITHOUT EXTERIOR DOOR



SIDE VIEW



SIDE VIEW



PLAN VIEW

GENERAL NOTES

- FLOOR MOUNTED ENCLOSURE.
TYPE 3R CONSTRUCTED FROM CODE GAUGE STEEL.
FINISH: TYPE 3R, ANSI 61 GRAY POLYESTER SEMI GLOSS ELECTROSTATIC POWDER.
TYPE 3RX EXTERIOR CONSTRUCTED FROM CODE GAUGE STAINLESS STEEL.
(R) EXTERIOR CONSTRUCTED FROM TYPE 304 STAINLESS STEEL.
(S) EXTERIOR CONSTRUCTED FROM TYPE 316 STAINLESS STEEL.
- EXTERIOR DOORS HAVE PADLOCKABLE HANDLES WITH 3-POINT LATCH
- DESIGNED FOR FRONT ACCESS.
- RECOMMENDED CLEARANCES: FRONT: 49" REAR: NONE
- SHIPS AS 1 UNIT (NO SHIPING SPLIT)
- LIFTING PLATES: SECTIONS ARE SUPPLIED WITH LIFTING PLATES. INSPECT PLATES FOR DAMAGE AND TORQUE BOLTS TO 45 FT LBS BEFORE USE. REFER TO ANSI/NEMA PB 2.1 FOR PROPER HANDLING OF EQUIPMENT. AFTER INSTALLATION OF SECTION, REMOVE LIFTING PLATES. REINSTALL BOLTS INTO EXTERIOR HOLES AND TORQUE TO APPROXIMATELY 20 FT LBS.
- CENTER OF GRAVITY LOCATION
- APPROXIMATE WEIGHT: 2700 LBS

TRANSFER SWITCH

- H FRAME ISOLATION-BYPASS TRANSFER SWITCH 1000A-1200A.
- TRANSFER SWITCH RATING: 1000 AMPS, 1200 AMPS
SHORT CIRCUIT RATING WHEN PROTECTED BY A CIRCUIT BREAKER
TIME RESPONSE, MAXIMUM 0.05 SECONDS: 50,000 RMS SYM @ 480V.
SPECIFIC BREAKER RATING: 65,000 RMS SYM @ 480V.
- A FULL RATED NEUTRAL CONNECTION FOR EACH SOURCE AND THE LOAD IS OPTIONAL.
WHEN PROVIDED IT IS IN ONE OF THE FOLLOWING FORMATS.
A. SOLID NEUTRAL
B. SWITCHED NEUTRAL POLE
C. OVERLAPPING NEUTRAL POLE
- UL 1008

TERMINATIONS 1000A-1200A

- SUPPLIED WITH MECHANICAL (SCREW TYPE) LUGS FOR CU/AL CABLE.
NORMAL: (4) 1/0 - 600MCM PER PHASE & NEUTRAL
LOAD: (4) 1/0 - 600MCM PER PHASE & NEUTRAL
EMERGENCY: (4) 1/0 - 600MCM PER PHASE & NEUTRAL
GROUND: (12) 1/0 - 600MCM
A. SUITABLE WIRE BENDING SPACE IS PROVIDED AS PER NEC.
- OPTIONAL LUGS MAY BE SUPPLIED.

B

B

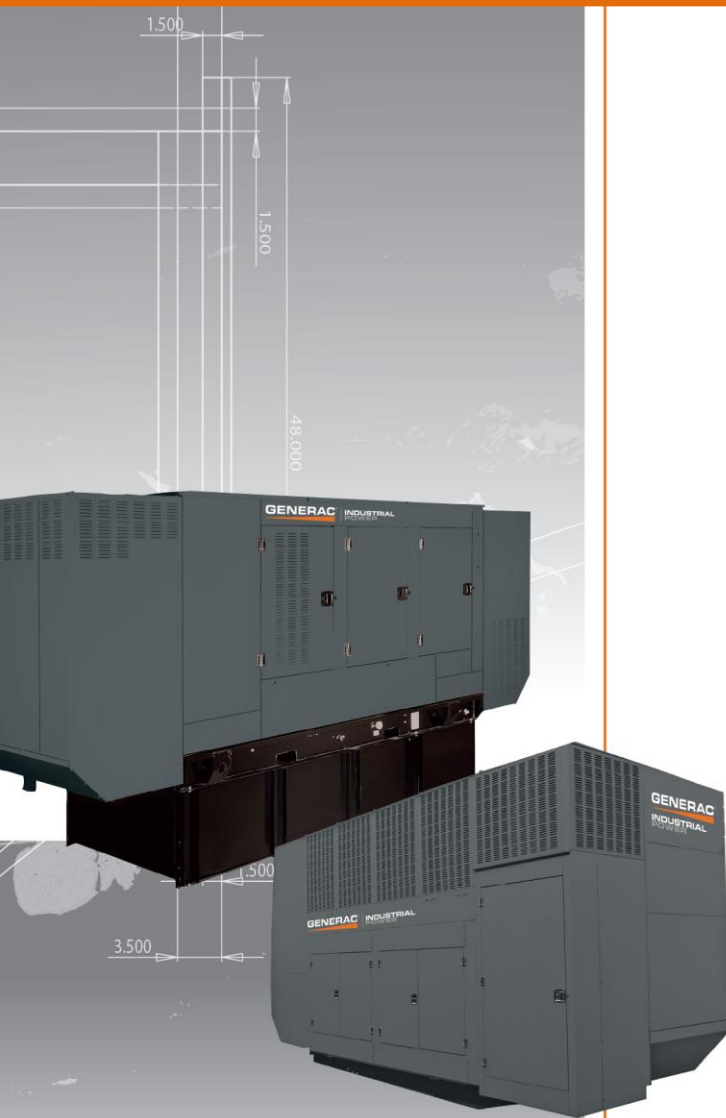
A

A

PROJECT NAME:		302474		BOG	LY	3/09/23
OUTLINE		MOUNTING		THIRD ANGLE PROJECTION		
HATB 1000A - 1200A, FRONT CONNECTED, PULLBOX ON LEFT		TYPE 3R/3RX, 96 X 69 X 42		COMPUTER GENERATED DRAWING		
DRAWN BY		BY	DATE	MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-I-003. FOR PLASTIC PARTS SEE MP-I-055		
CHECKED		NC	8/27/18	ASSEM. REF. NO.		
PROJECT APPROVAL				PROPERTY OF ASCO POWER TECHNOLOGIES. USE PERMITTED FOR OUR WORK ONLY. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.		
FINAL APPROVAL				SCALE 1/16" = 1" SIZE DS		
				DWG. NO. 736939-107		
				REV. A		
				ECN NO. 302474		
				SHEET 1 OF 1		

GENERAC®
**INDUSTRIAL
POWER**

Control Panel and Accessories



ES
ENERGY SYSTEMS

GENERAC®
**INDUSTRIAL
POWER**

POWER ZONE® CONTROL PLATFORM

Power Zone® Pro Sync Controller



Features

The Generac Power Zone® Digital Control Platform is a fully integrated and multipurpose family of controllers for Generac's single and Modular Power Systems (MPS).

Standard Single Unit Control Features*

- Engine Protective Functions
- Alternator Protective Functions
- Digital Engine Governor Control
- Digital Voltage Regulator
- 7" Color Touch Screen
- Multi-Lingual
- Multiple Programmable Inputs and Outputs
- Remote Display Capability
- Remote Communication via Modbus® RTU, Modbus TCP/IP, Ethernet 10/100, SNMP
- Alarm and Event Logging with Real Time Stamping
- Expandable Analog and Digital Inputs and Outputs
- Wireless Software Update via Remote Computer
- BMS and Remote Telemetry
- USB Port for Easy Log Data Downloads and Firmware Updates
- Analog Input Bias for Speed and Voltage°
- E-mail Notifications for Alarm Conditions and Log Data†

Additional Standard Parallel Control Features**

- Paralleling Control (Synchronizing)
- Reverse Power
- Loss of Synchronization Between Gensets
- Load and VAR Sharing

Standard System Control Features

- Built-In PLC Logic Eliminates the Need for External Controllers Under Most Conditions
- Ethernet Based Communications Between Gensets
- Programmable I/O Channel Properties
- Built-In Diagnostics

Customer Ports

- 1 - RS-485 - Modbus RTU (Main Controller)
- 1 - RJ45 - Remote Annunciator Panel/Remote Relay Panel (Main Controller)
- 1 - CANBus - Power Zone® Accessories (Main Controller)
- 1 - RJ45 - Modbus TCP/IP or Ethernet 10/100 (Display)
- 2 - Type A USB (Display)

PLC (Built-In Programmable Logic Controller)

- Boolean Logic Programming (Ladder)
- 16 Timers
- 16 Counters
- Counter Reset
- Configurable Through Software Tool

Protections

- Low Oil Pressure
- Low Coolant Level
- High/Low Coolant Temperature
- Sender Failure
- Oil Temperature
- Over/Under Speed
- Over/Under Voltage
- Over/Under Frequency
- Over/Under Current
- Over Load
- Battery Voltage
- Battery Charger Current
- Phase to Phase and Phase to Neutral Short Circuits (I²T Algorithm)

* For SG and SD Models

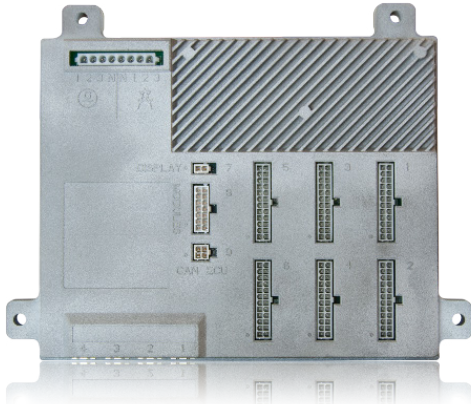
** For MG and MD Models

° Not Available in Parallel Controller

† Requires Use of a Network Accessible Authenticated or Open SMTP Server

POWER ZONE® CONTROL PLATFORM

Power Zone® Pro Sync Controller



Voltage Regulation (Single or Three Phase Module Options)

- Digital Control
- Three Phase Sensing^{††}
- Variable V/F Slope Settings and Adjustable Gains
- Negative Power Limit
- Soft Start Ramping
- Loss of Sensing Protection
- Components Encapsulated for Total Protection
- Paralleling Function for Power Zone®-DSP and Power Zone®-GSP ‡
- Fault Protection (I²T Function)[‡]
- High Voltage Limit
- Low Voltage Limit
- Maximum Power Limit
- ±0.5% Voltage Regulation
- ±0.1% Stability

Display (Touch Screen)

- Resistive Color Touch Screen
- Hi-Brite (1400 NITS)
- Easy Identifiable Icons
- Multi-Lingual
- IP65 Rated
- On Screen Editable Parameters
- Key Function Monitoring
 - Three Phase Voltage, Amperage, kW, kVa, and kVAR
 - Selectable Line to Line or Line to Neutral Measurements
 - Frequency
 - RPM
 - Engine Coolant Temperature
 - Engine Oil Pressure
 - Engine Oil Temperature
 - Battery Voltage
 - Warning and Alarm Indication
 - Diagnostics
 - Maintenance Events/Information
 - Hourmeter

Governor Module

- Soft Start Ramping (Multiple Steps)
- Synchronizing Function for Power Zone®-DSP and Power Zone®-GSP Only ‡
- Fully Adjustable Gain (PID)

Qualification Testing

- Life Test in Environmental Chamber
- Temperature Rating -40° C to +60° C
- Humidity 2% to 95% (Non Condensing)
- Vibration Tested and Protected

Connections[§]

- 27 - Digital Outputs (Open Drain, 35 VDC, 1.7A)
 - 6 Fast PWM Capable
 - 1 High Current
- 20 - Digital Inputs Maximum
 - 6 Fast PWM Capable
- 12 - General Purpose Analog Inputs
- 4 - Fast Analog Inputs
- 4 - Analog Outputs (0-10 VDC)
- 1 - E-Stop Relay Output
- 7 - Current Sense Inputs
- 2 - High Voltage Sense Inputs (Three Phase + Neutral)
- 2 - Magnetic Pickup Inputs
- 1 - Coolant Sensor Input
- 4 - Ethernet Ports
- 3 - CANBus Channels
- 1 - RS-485 Ports
- 2 - Switchable +12V Power Outputs

Codes And Standards

- UL 6200
- C-ETL-US
- CE
- FCC
- NFPA 110 (Software Programmable for Level 1 or 2)^{§§}

Control Panel And Touch Screen

- Auto/Off/Manual
 - Operation Through Key Switch
 - Indication Through Touchscreen
- Alarm Acknowledge Button
- Audible Alarm and Silence
- Emergency Stop
- Not in Auto Indication

^{††} With Select Voltage Regulators
[‡] Configurable Option

[§] Actual I/O May Vary Due to Configuration
^{§§} With Additional Optional Remote Annunciator

Certification

- CE
- FCC
- PTCRB
- RoHS
- UL62368-1
- AT&T
- Verizon



Image used for illustration purposes only

Front Panel



Interface	Description
PWR	Power Status LED
WARN	Warning LED
Status	Device Status LED
NET	Cellular Network Connection LED
Programmable 1	RS-232 TX/RX Status
Programmable 2	RS-485 TX/RX Status
Programmable 3	CAN Bus TX/RX Status
Programmable 4	Future Use
USER Button	Button to enable diagnostic features
USB	USB Port
ETH1	Ethernet Connection vis Static IP
EHT2	Ethernet Connection via DHCP
SD Card	Unused
Reset	Tech Support use only

Left Panel



Interface	Description
DC9-48V +	DC Power Positive
DC9-48V -	DC Power Negative
Ant2	4G/5G Diversity Antenna
Ant1	4G/5G Primary Antenna
A1	Unused
B1	Unused
RX1	Serial RS-232 Receive
TX1	Serial RS-232 Transmit
GND	Serial RS-232 Ground
A2	Serial RS-485+
B2	Serial RS-485 -
GND	Serial RS-485 Ground
SIM 1/2	SIM Card slot (x2)

Right Panel



Extended Module Pins are only available on the Extended model of the Advanced Gateway.

Interface	Description
GPS	GPS Antenna
Wi-Fi	Wi-Fi Antenna
LoRa	Unused
Pin 1	AIN1+
Pin 2	Unused
Pin 3	AIN-
Pin 4	GND
Pin 5	CAN_H
Pin 6	CAN_L
Pin 7	Unused
Pin 8	GND
Pin 9	Unused
Pin 10	Unused
Pin 11	DO 0
Pin 12	D0 1
Pin 13	DO 2
Pin 14	DO 3
Pin 15	DI 0
Pin 16	DI 1
Pin 17	DI 2
Pin 18	DI 3
Pin 19	DI_COM
Pin 20	GND

HARDWARE SPECIFICATIONS

HARDWARE PLATFORM

CPU	ARM Cortex-A5@1.4GHz
RAM	1GB DDR4
FLASH	8GB eMMC

INTERFACES

Ethernet Port	2*10/100/1000Mbps fast Ethernet ports
Industrial Serial Port	1*RS-232, 1*RS-485
	Expandable up to 4 serial ports, isolation
I/O	4-20mA/CAN FD, isolation
	Up to 4 x DI+ 4 x DO, isolation
Console Port	1*RS-232, RJ-45 interface
USB	1*USB 2.0 port
SIM Card Slot	Nano Sim x2
GPS	Satellite location GPS, 1*SMA
Reset Button	Pinhole button
MicroSD Expansion	Up to 32GB
User Button	Programmable button used for device diagnostics

MECHANICAL FEATURES

Installation	Panel, rail
Housing	Metal + Plastic
Protection Rating	IP30
Cooling	Fan-less cooling
Dimensions	145x106x33mm
Weight	339g

POWER SUPPLY

Power Input	9-48V DC
Power Terminal	Unpluggable industrial terminal connection
Polarity Reverse and Overcurrent Protection	Supported

AMBIENT TEMPERATURE AND HUMIDITY

Storage Temperature	-40~85 °C
Ambient Humidity	5~95% (non-condensing)
Working Temperature	-25~70 °C

OTHER

Real-time Clock (Optional)	Embedded real-time clock (RTC), button battery backup
----------------------------	---

INDICATORS

LED	POWER, STATUS, WARN, NET, USER * 4
-----	------------------------------------

EMC INDEX

Static	EN61000-4-2, level 3
Radiation Electric Field	EN61000-4-3, level 3
Pulse Electric Field	EN61000-4-4, level 3
Surge	EN61000-4-5, level 3
Conducted Disturbance	EN61000-4-6, level 3
Power Frequency Magnetic Field	EN61000-4-8, horizontal/vertical 400A/m (>level 2)
Shock Wave Resistance	EN6100-4-12, level 3

PHYSICAL FEATURES

Shock	IEC60068-2-27
Free Fall	IEC60068-2-32
Vibration	IEC600-68-2-6

SOFTWARE SPECIFICATIONS

NETWORK INTERCONNECTION

Network Type	5G SA/NSA, LTECat1
LAN Protocol	APR, EtherNet
WAN Protocol	Static IP, DHCP

NETWORK PROTOCOLS

IP Application	ICMP, DNS, TCP/ UDP, TCPServer, DHCP
IP Routing	Static Routing

NETWORK SECURITY

Firewalls	Stateful packet inspection (SPI), anti-DoS attack Multi-cast/Ping filter, Access Control List (ACL) NAT, PAT, DMZ, port mapping, virtual server
User Levels	Multi-level user authorization
AAA	Local authentication, Radius, Tacacas+, LDAP
Data Security	Firewall
	Secure Boot, TrustZone

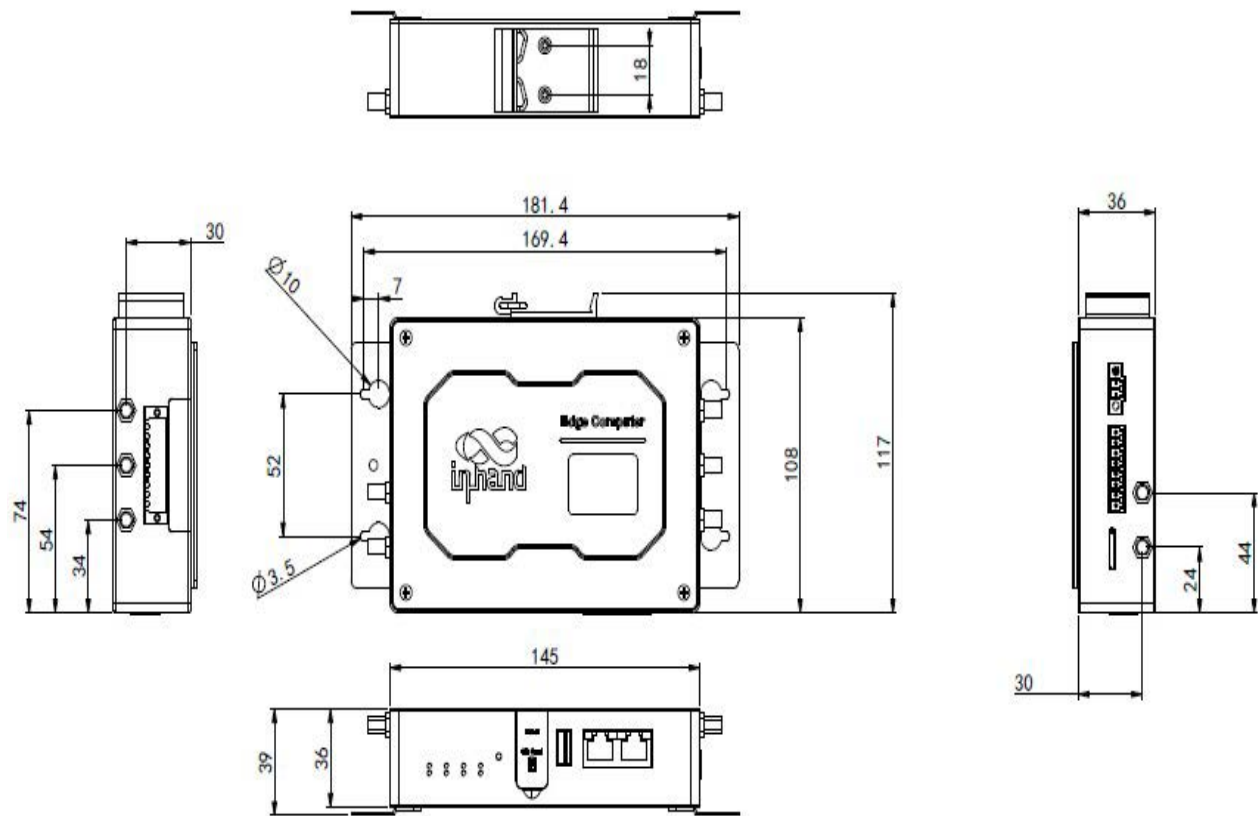
RELIABILITY

Backup	VRRP, interface backup
Link Detection	Heartbeat packet detection, auto-recovery of disconnection
Embedded Watchdog	Device self-diagnosis, auto-recovery from operation faults

INDUSTRIAL PROTOCOLS

Protocols	ModbusRTU Master, ModbusTCP Master
-----------	------------------------------------

DIMENSIONS*



* All measurements are approximate and for estimation purposes only.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

INDUSTRIAL GENSET - BATTERY INDEX

• Warranty by Exide Corp. • Exide e-mail: tbгна@exide.com • 800-782-7848 National Hot line

INDUSTRIAL SPARK-IGNITED GENSETS - AVAILABLE BATTERIES

Engine	System Voltage	Battery Quantity	GENERAC PART #					
			058208 (Group 24F)	077483 (Group 26)	058665 (Group 27F)	061119 (Group 31)	061104 (Group 8D)	BT0015A02 (Group 8D)
G2.4	12	1		X				
G4.5	12	1			X	X		
G9.0	12	1			X	X		
G14.2	24	2					X	
G21.9	24	2					X	
G25.8	24	2					X	
G33.9	24	4					X	
G49.0	24	4					X	X

INDUSTRIAL DIESEL GENSETS - AVAILABLE BATTERIES

Engine	System Voltage	Battery Quantity	GENERAC PART #			
			058665 (Group 27F)	061119 (Group 31)	061104/ BT0015A00 (Group 8D)	BT0015A02 (Group 8D)
D2.2 Perkins	12	1	X	X		
D3.3 MHI	12	1		X		
D4.5 FPT	12	1		X		
D6.7 FPT 100, 130kW	12	1		X		
D6.7 FPT 150, 175kW	12	2		X		
D8.7 FPT	24	2		X		
D10.3 FPT	24	2		X	X	
D12.9 FPT	24	2		X	X	
D12.5 Perkins	24	2			X	
D15.2 Perkins	24	2			X	
D16.0 Volvo	24	2		X	X	
D18.1 Perkins	24	2			X	
D30.6 Perkins	24	2			X	X
D33.9 MHI	24	2			X	X
D37.1 MHI	24	4			X	X
D49.0 MHI	24	4			X	X
D65.4 MHI	24	4			X	X

DIMENSIONS (in) NOMINAL

Part Number	Group Number*	Nominal CCA @ 0° F	L	W	H
058208	24F	525	6.75	10.63	9.00
077483	26	525	6.75	8.25	7.75
058665	27F	700	6.75	12.50	9.00
061119	31	925	6.75	13.00	9.40
061104/ BT0015A00	8D	1,200	11.00	20.80	10.00
BT0015A02	8D	1,400	11.00	20.80	10.00

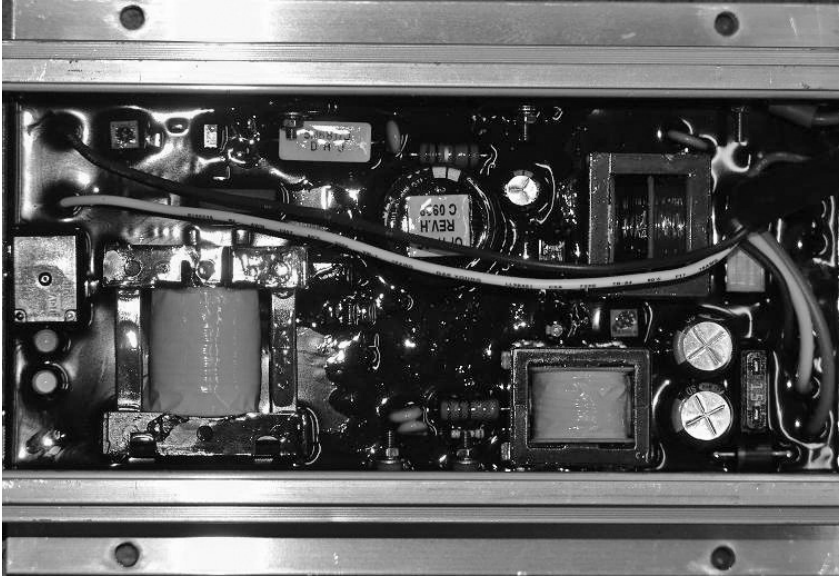
All batteries are 12V, 6 cell construction, lead calcium type.
For 24V systems, batteries are wired in series.

X Battery available with electrolyte and installed in genset.

* BCI Group Size reference.

BATTERY CHARGER

10 amp



Battery charger shown from inside of control panel enclosure.
Connections are made via an attached harness.

The Generac 10 amp 12/24 volt battery charger is designed to work with Generac Industrial Controls and the G8601 to provide the ultimate in automatic battery voltage maintenance.

The 10 amp charger has automatic float and equalize control. It precisely monitors the battery's voltage and automatically activates the correct charging mode. The charge rate is limited and controlled to efficiently and safely maintain ideal battery levels under varying conditions.

The equalize system uses a control circuit to limit charging current to 10 amps. When battery voltage drops below a preset level, charging current increases to 5 amps and then to the 10 amp charge rate if needed. When the battery reaches maximum charge, the charger switches to float mode to supply just enough current to maintain the battery at or above 13/26 volts. Battery voltage and charging current are read at the control panel digital display.

Specifications	10A
Nominal Input	120 VAC
Operating AC Line Voltage Range	108 to 132 VAC
Input AC Line Frequency	50/60 Hz
Battery Fuse	15 A
Nominal Charge Rate	10 A
Equalize Voltage	13.8/27.6 V
Float Voltage	13.0/26.0 V
Current @ Equalize to Float Transition	5 A
Battery Under-voltage shutdown	11/22 V
LED Indicators	Yes
AC Line Voltage	Green LED
Battery Connected and Charging	Yellow LED
Battery Current Drain	30 mA
AC Line Connection	Connector Plug
Battery Connection	Connector Plug
Control Connection	AC Power Fail Form Relay Form C 2 A Rating
CUL Recognized	Yes
NFPA 110 Compliant	Yes
AGM Compatible	Yes
UL1236	Yes
CSA 22.2 No. 107	Yes

COOLANT HEATER OPTION 2000 WATT, 240VAC

SPECIFICATIONS:

VOLTAGE: 240VAC

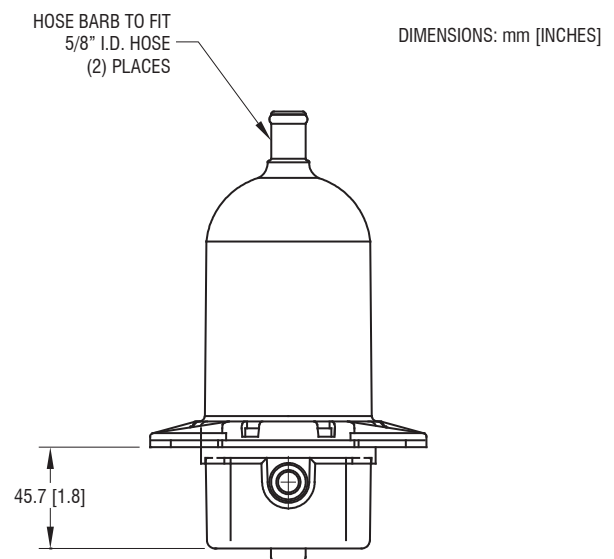
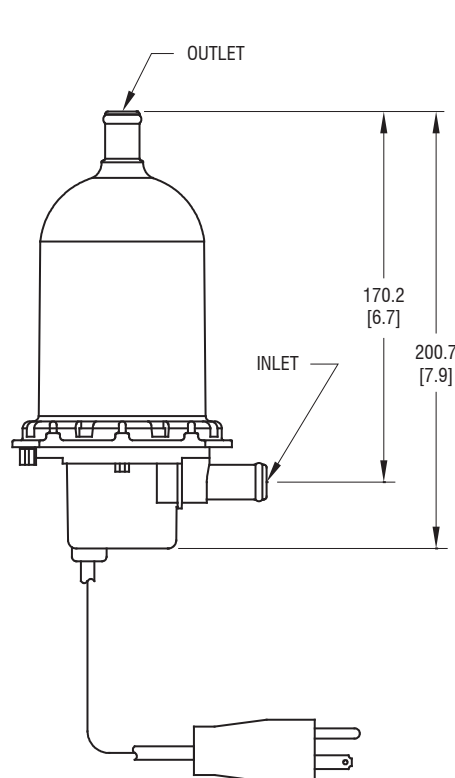
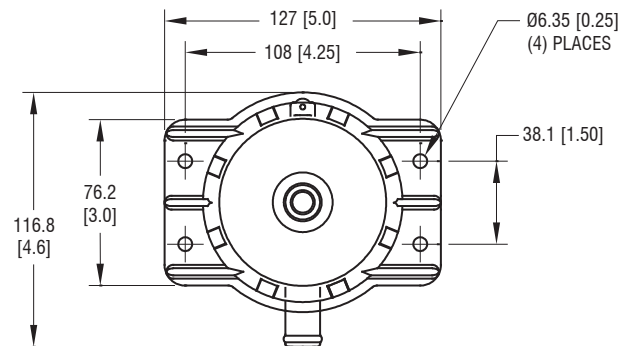
HEAT POWER: 2000W

FIXED THERMOSTAT: 80°-100°F

HEATING ELEMENT: INCOLOY 800

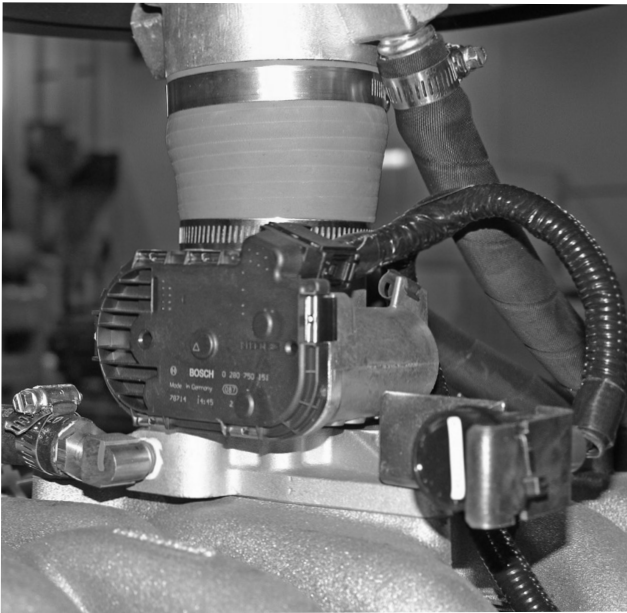
MAXIMUM PRESSURE: 90 PSI (620 kPa)

PLUG NEMA STD: 6-15P



ELECTRONIC GOVERNOR

Spark-Ignited Engines



Generac’s electronic isochronous governor systems are standard on all Spark-Ignited gensets utilizing Generac’s Digital Control Platforms.

- Isochronous Speed Regulation
- ±0.25% Steady State Regulation
- Factory Installed and Adjusted
- Fully Adjustable
- Quiet-Test™ Low-Speed Exercise Capability
- Fast Response
- High Reliability
- Environmentally Sealed

Actuator

Die cast enclosure housing the throttle plate and the gear-driven rotary actuator with the interior components sealed against dust, dirt and moisture. The gear drive is directly connected to the throttle plate for fast and precise control. Safety spring-return to a closed position upon loss of power.

Design	Bosch
Type	Electronically Actuated Throttle Valve
Operating Voltage.....	12/24VDC
Response Time	<100 ms
Operating Temperature Range	-40 ° F to 284 ° F
Output.....	Rotary (internal - no linkage)

Controller

The governor driver module is located in the generator control panel. A sealed unit with waterproof connections and a feedback circuit from the actuator for throttle plate position. Generac software controls speed governing, and is fully adjustable.

The Generac electronic governor system applies to all spark-ignited gensets with Generac’s Digital Control Platforms.

GENERATOR ENCLOSURES



DESCRIPTION

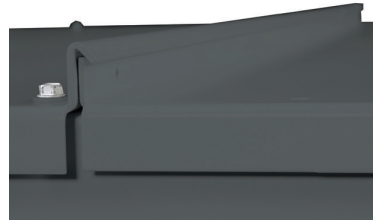
GENERAC POWER SYSTEMS' generator enclosures provide year-round weather protection for your power equipment. Engineered with functionality and value in mind, the enclosure design benefits are unique in that the enclosures utilize dimensionally matched components for either a weather protective configuration or a sound attenuated/acoustic configuration. With common components used between design, modification and on-site upgrades can be accomplished with ease.

The enclosure design offers several benefits over the "standard enclosures" of other manufacturers. Generac's enclosures have been created with the goal of maximizing the customer's product performance satisfaction while maintaining the functionality of reducing exterior noise levels and discouraging product tampering.

Although others may require a "premium" for a self-enclosed exhaust system, rugged steel panel construction or protective polyethylene washers under all exterior panel fasteners, Generac includes these and several other features on every enclosure configuration. Be sure to compare. Generac Enclosures offer additional design enhancement extras that other "standard enclosures" do not.

GENERATOR ENCLOSURES

Post-Free Twin Doors
Provide Large, Unobstructed
Service Access



**Gasket-Free, Interconnected Roof
Panel Joint**
Drip-Free, Maintenance-Free

**Heavy Gauge, Stainless
Steel, Partial Pin Hinges with
Nylon Spacers**
Durable, Corrosion-Free,
Removable Doors



**Two-Point Door Latch
System**
Ensures Proper Seal
Preventing Water Ingress
and Sound Egress



**Dense, Closed-Cell Foam Insulation with
Reflective Silver Mylar Layer**
Improved Sound Attenuation Without Damaging
Effects From Radiant Heat Exposure



**Lockable Turn and Tuck
Stainless Steel Latch
Handle**
Corrosion-Free, Non-
Protruding and Secure



GENERATOR ENCLOSURES

FEATURES:

Dimensional matching of acoustic and non-acoustic enclosure designs

Standardized enclosure components *

Enclosure mounted directly to unit baseframe

Electrostatically painted panels

12 or 14 gauge steel based on kW rating

Aluminum Enclosure optional

Stainless steel door latch and hinge hardware

Stainless steel door latch strike plate

Door hinges utilize slip-pin design

Polyethylene gasketing under door hinges

Keyed door latches

Large removable access doors

Relocation of access doors

Redesigned door gasketing

Weather resistant aluminum roof design with drip ledge

Cabled and gasketed radiator access cover

Acoustic roof panels manufactured with mechanical retention pins

Polyethylene washers under all panel fasteners

Internally fastened enclosure panels (where possible)

Additional roof panel stiffener

Self-enclosed exhaust system

Discharge air duct has been designed with minimal fasteners

Stainless steel exhaust band clamps

Drain holes within air ducts

Rodent-proof, tamper proof enclosure design

Redesigned baseframe lifting lugs

Up to 200 MPH wind kit options (Contact Factory for Availability)

BENEFITS:

Reduces variation in fuel tank pricing, inventory; removes need to change out fuel tank or retrofit

Ease of retrofit or upgrade to acoustic system; reduced parts inventory, costs

Simplified delivery and installation with enclosure and unit in single component design

Maximum protection from weather elements

Maximum sound attenuation, protection and product life

Prevents corrosion in coastal regions

Provides extended component life; maximum protection against rusting

Maximum protection against enclosure paint damage from door latch pin

Provides quick door removal for full-unit access

Additional protection for enclosure paint finish

Protection for equipment and personnel

Ease of maintenance

Provides improved access to MLCB on all units

Improved sealing quality from sound and weather elements

Provides optimum moisture/rain runoff from unit

Provides improved radiator access and additional protection from weather elements

Increased acoustic foam retention within unit

Additional paint finish protection from stainless steel fastener

Provides streamlined unit appearance

Added overall compartment rigidity and acoustic foam panel retention

Provides safe unit operation; no enclosure hot spots; streamlined unit appearance

Ease of removal and access to exhaust system

Provides extended component life; ensures proper exhaust seal

Enables maximum water run-off

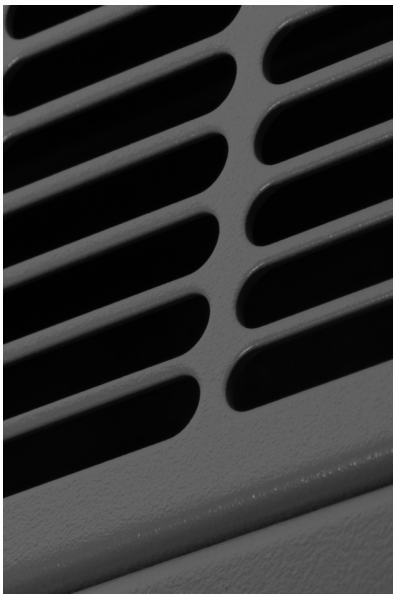
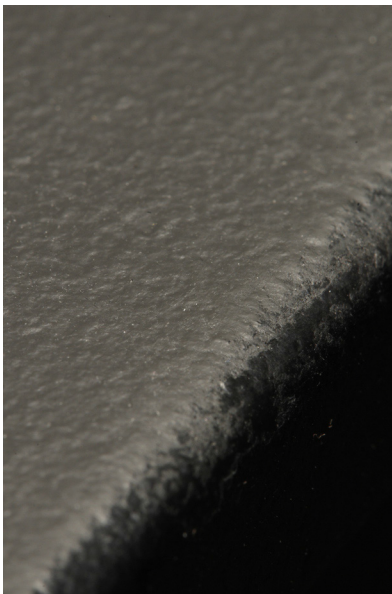
Safety and security for personnel and equipment

Ease of unit relocation; prevents compartment damage from lifting straps

Meets locally enforced wind requirements

* Consult Generac Power Systems, Inc. for installation drawings for specific configurations and dimensions.

RhinoCoat™



Generac's RhinoCoat™ finish system provides superior durability as a standard for all Generac Industrial enclosures, tanks and frames.*

Testing Standards

Generac's RhinoCoat™ finished surfaces are subjected to numerous tests. These include:

- ASTM D - 1186 - 87.....2.5+ MIL Paint Thickness
- ASTM D - 3363 - 92a.....Adequate Material Hardness
- ASTM D 522 - B.....Resistant to Cracking
- ASTM D 3359 - B.....Exceptional Adhesion
- ASTM B117 D 1654.....Resistant to Salt Water Corrosion
- ASTM D1735 D 1654.....Resistant to Humidity
- ASTM 2794 93 (2004).....Exceptional Impact Resistance
- SAEJ1690 - UV Specifications.....UV Protection

In addition to the testing standards above, Generac adds the following test requirements more specific to generator applications:

- Resistant to Typical Oils
- Resistant to Typical Fuels
- Resistant to Typical Antifreeze
- Resistant to Distilled Water

Primary Codes and Standards



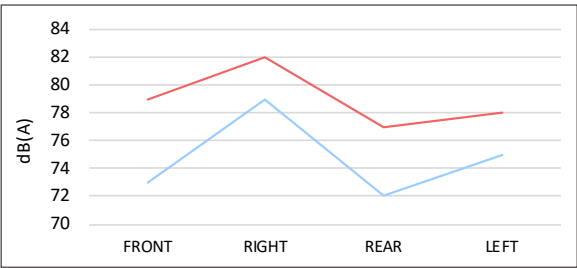
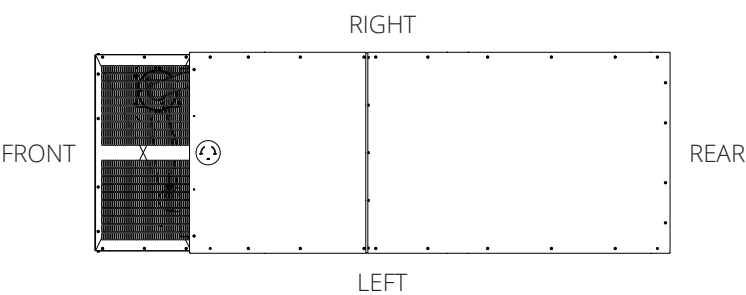
*RhinoCoat™ powder coat paint is durable and corrosion resistant however it is not a rust preventative. Generac pretreats all powder coated parts to assist with resistance to corrosion.

LEVEL 0 SOUND ATTENUATED ENCLOSURE

G14.2L Generac, SG/MG200

60Hz NO-LOAD, dB(A)										DISTANCE: 7 METERS
MICROPHONE LOCATION	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	35	54	67	66	68	66	61	57	48	73
RIGHT	36	57	67	72	75	72	69	67	59	79
REAR	34	56	65	67	67	66	60	57	48	72
LEFT	33	58	66	63	69	71	69	65	58	75
AVERAGE	34	56	66	67	70	69	65	62	53	75

60Hz FULL-LOAD, dB(A)										DISTANCE: 7 METERS
MICROPHONE LOCATION	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	39	62	75	74	71	70	65	59	53	79
RIGHT	35	63	77	75	77	73	72	69	66	82
REAR	35	62	75	72	66	66	63	59	53	77
LEFT	36	62	74	68	70	72	70	67	62	78
AVERAGE	36	62	75	72	71	70	67	64	59	79



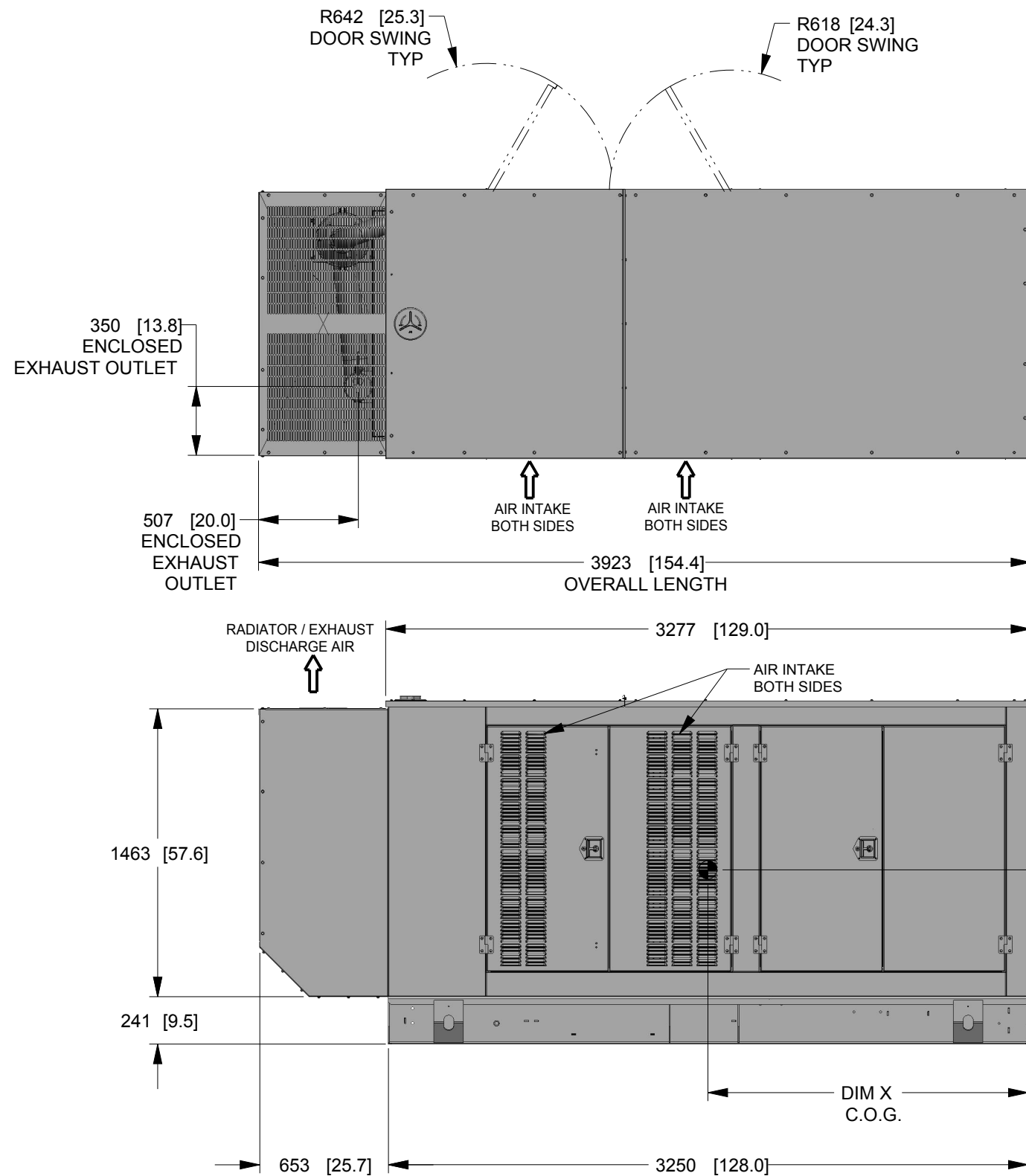
- All positions at 23 feet (7 meters) from side faces of generator set.
- Test conducted on a 100 foot diameter asphalt surface.
- Sound pressure levels are subject to instrumentation, installation and testing conditions.
- Sound levels are ±2 dB(A).

B

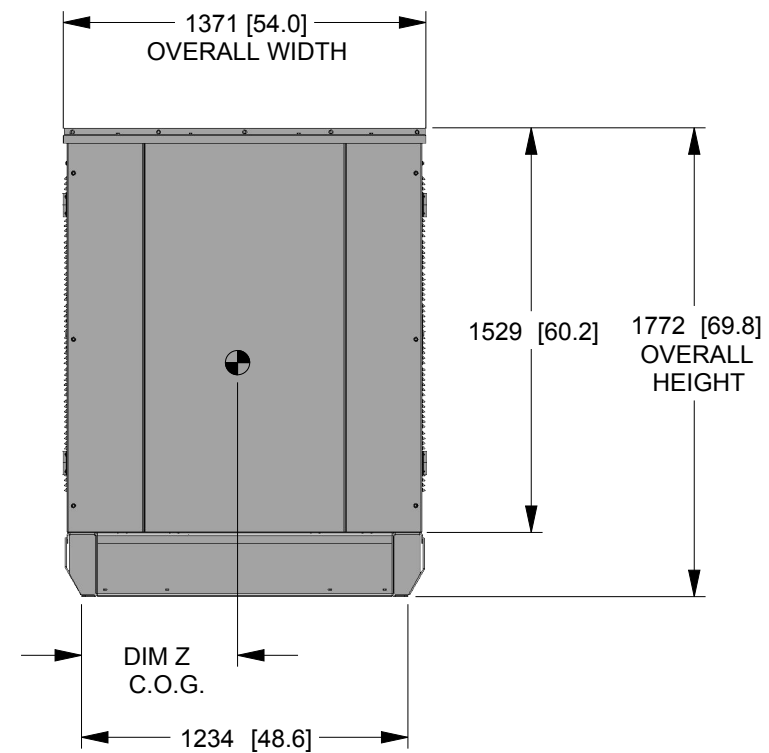
B

A

A



FOR ALL STUB-UP, WEIGHT, AND C.O.G. DETAILS, SEE
CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION.



DRAWING CREATED FROM PRO/ENGINEER
3D FILE. ECO MODIFICATION TO BE
APPLIED TO SOLID MODEL ONLY.

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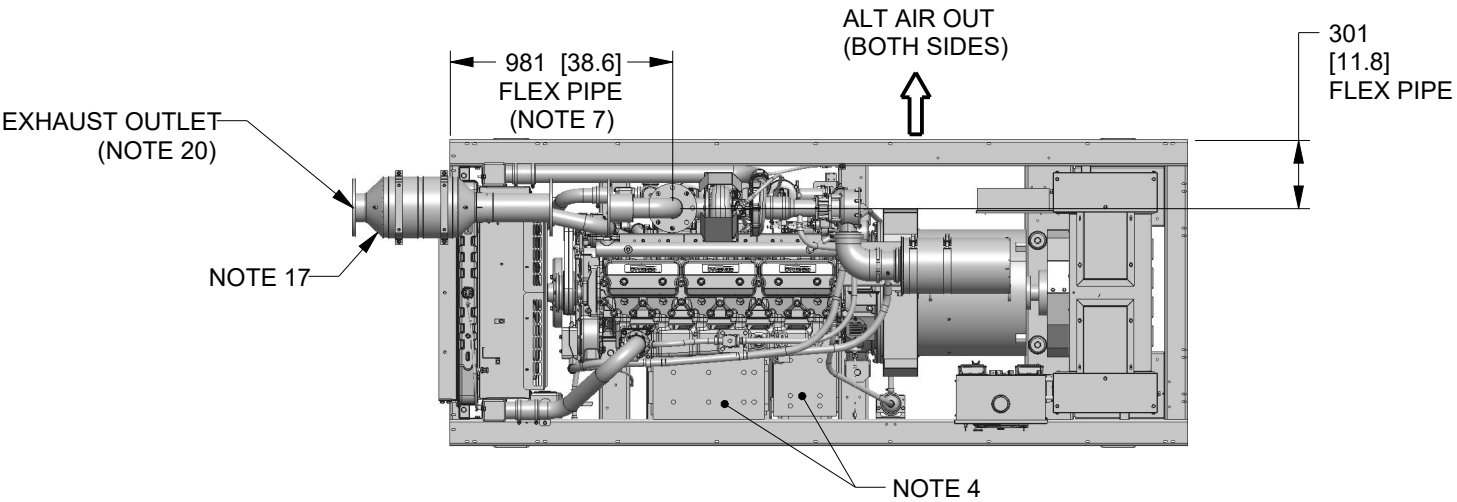
GENERAC

TITLE
STD ENCLOSURE
G14.2L
60HZ: SG150/PG135, SG175/PG158, SG200/PG180
50HZ: SG120/PG108, SG140/PG126, SG160/PG144

ISSUE DATE:		11/26/14	
SIZE	CAGE NO	DWG NO	REV
B	N/A	0L0467A	A
SCALE	0.035	WT-KG	SHEET 1 of 1

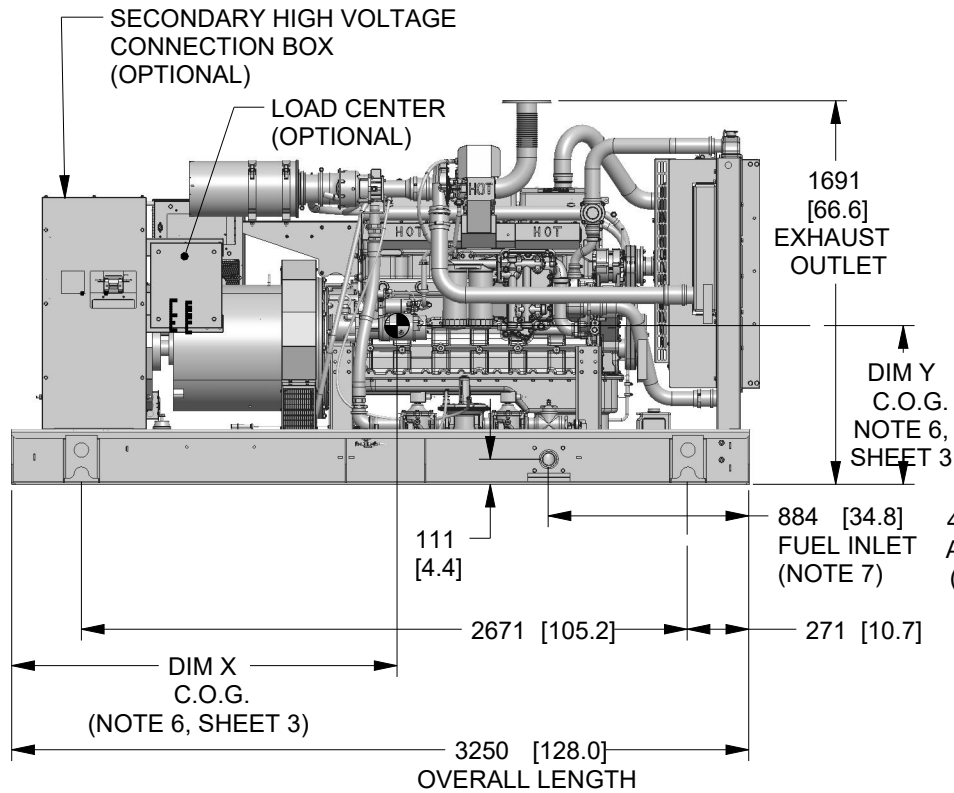
INSTALLATION DRAWING

- Notes:
1. CONTROL PANEL, (OPTIONAL BATTERY CHARGER INSIDE).
 2. 120V, 20A GFCI & 250V, 15A OUTLET (OPTIONAL).
 3. CONNECTION POINTS FOR CONTROL WIRES PROVIDED IN THE LOW VOLTAGE CONNECTION BOX (USE LOW VOLTAGE STUB-UP AREA).
 4. BATTERIES (24 VOLT NEGATIVE GROUND SYSTEM).
 5. MAIN LINE CIRCUIT BREAKER (MLCB), AC LOAD LEADS & NEUTRAL CONNECTIONS (DIMENSIONS MAY VARY DUE TO UNIT CONFIGURATION)
 6. CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS. FOR WEIGHT AND CENTER OF GRAVITY DATA SEE SHEET 3.
 7. ENGINE SERVICE CONNECTIONS:
 - INLET NATURAL GAS = 2" NPT FEMALE COUPLING
 - OIL DRAIN = 1/2" NPT FEMALE COUPLING
 - EXHAUST CONNECTIONS = SEE NOTE 19 & 20
 - MAX:2241MM 9 (88.2"). MIN: 1631MM (64.2"). EXHAUST FLANGETO CATALYST BRICK
 - ***** SEE GENERATOR SIZING GUIDE FOR FUEL PIPE SIZING TO SUIT APPLICATION *****
 8. AUXILIARY AC CONNECTION FOR UNIT OPTIONS ARE LOCATED IN HIGH VOLTAGE CONNECTION BOX, UNLESS AN OPTIONAL LOAD CENTER IS INSTALLED.
 9. EXHAUST MAY BE ROTATED TO ALLOW CATALYST SILENCER TO POINT OUT TO THE RIGHT OR LEFT SIDE OF GENERATOR.
 10. GENERATOR SET MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED. SEE SPEC SHEET FOR MIN AIR FLOW AND MAX RESTRICTION REQUIREMENTS.
 11. BOTTOM OF GENERATOR SET MUST BE ENCLOSED TO PREVENT PEST INTRUSION AND RECIRCULATION OF DISCHARGE AIR AND/OR IMPROPER COOLING AIR FLOW.
 12. EXHAUST SYSTEM MAXIMUM BACK PRESSUE = 10" H2O POST SILENCER.
 13. INSTALL EXHAUST BLANKETS ALONG THIS LINE. (BLANKETS NOT PROVIDED BY GENERAC)
 14. CONNECT THE OPEN SET EXHAUST PER NFPA 37.
 15. BLANKETS SHOULD NOT COVER OXYGEN SENSOR.
 16. OXYGEN SENSOR MUST BE MOUNTED BETWEEN TURBO CHARGER AND CATALYST SILENCER INLET UPRIGHT AS SHOWN. IF ELBOW IS REQUIRED, ONLY SINGLE ELBOW MAY BE USED.
 17. CATALYST SILENCER (FOR EPA UNITS) MUST BE MOUNTED IN DESCRIBED POSITION. FAILING TO FOLLOW THESE INSTRUCTIONS WHEN INSTALLING A CERTIFIED ENGINE IN A PIECE OF STATIONARY EQUIPMENT VIOLATES FEDERAL LAW 40 CFR 1068.105(b), SUBJECT TO FINES OR PENALTIES AS DESCRIBED IN THE CLEAN AIR ACT.
 18. BOLTS OR STUDS USED TO MOUNT UNIT TO PAD SHALL BE 5/8 - 11 GRADE 5.
 19. 3.5" EXHAUST FLANGE WITH MOUNTING HOLES AS PER ANSI/ASME B16.5 CLASS 150.
 20. 5"FLANGE WITH MOUNING HOLES AS PER ANSI/ASME B16.5 CLASS 150.
 21. IT IS THE RESPONSIBILITY OF THE INSTALLATION TECHNICIAN TO ENSURE THAT THE GENERATOR INSTALLATION COMPLIES WITH ALL APPLICABLE CODES, STANDARDS AND REGULATIONS.



B

B



A

A

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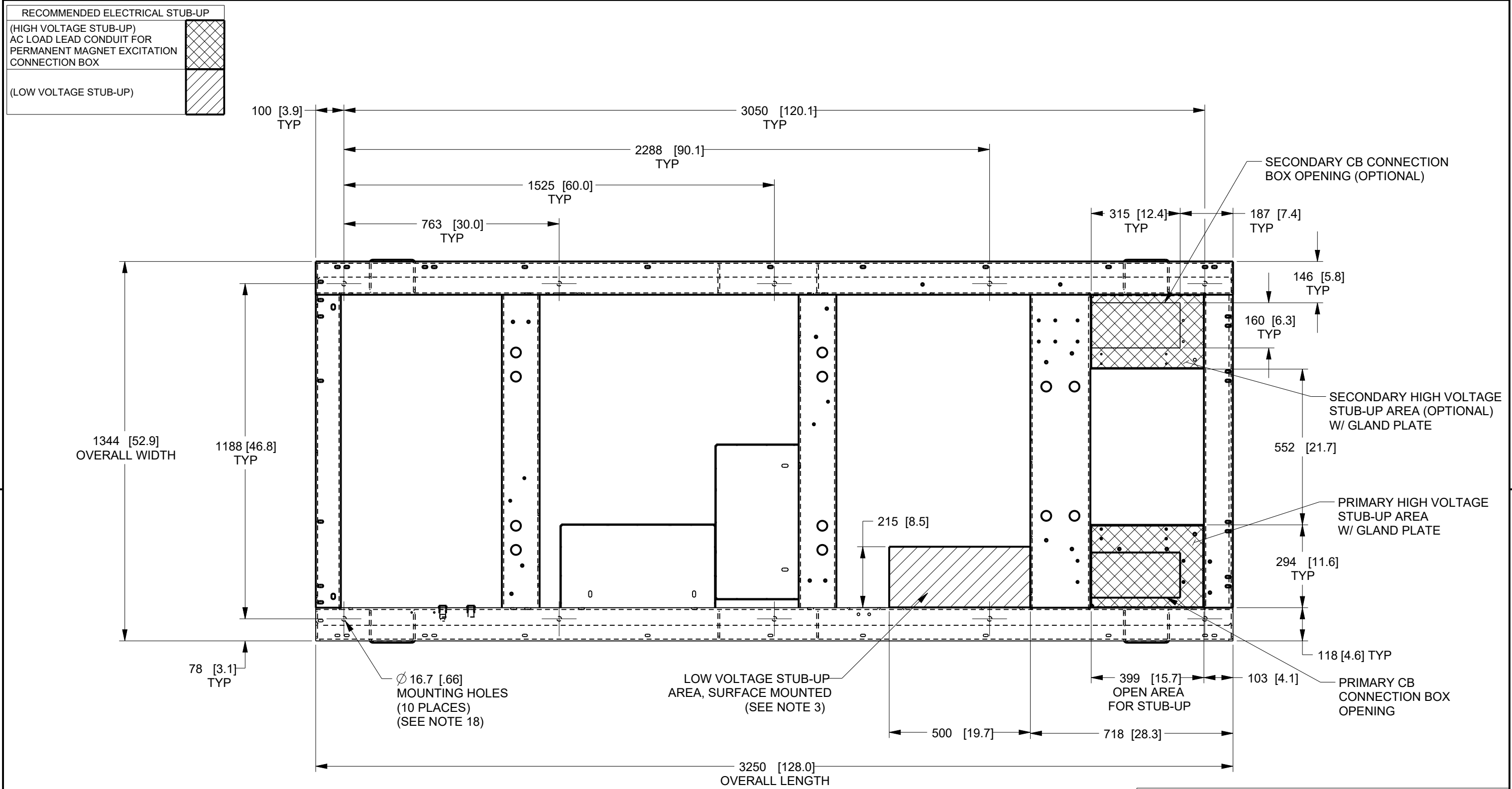
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INSTALLATION DRAWING

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GENERAC				
TITLE				
OPEN SET G14.2L				
60HZ: SG150/PG135, SG175/PG158, SG200/PG180 50HZ: SG120/PG108, SG140/PG126, SG160/PG144				
ISSUE DATE: 11/26/14				
SIZE B	CAGE NO N/A	DWG NO 10000039585	REV C	
SCALE 0.030	WT-KG	SHEET 1 of 3		



DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

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ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE

STUB-UP VIEW
G14.2L
60HZ: SG150/PG135, SG175/PG158, SG200/PG180
50HZ: SG120/PG108, SG140/PG126, SG160/PG144

ISSUE DATE: 11/26/14

SIZE B	CAGE NO N/A	DWG NO 10000039585	REV C
SCALE 0.075	WT-KG	SHEET 2 of 3	

OPEN SET

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG 120, 150, PG/WG 108, 135	240V, Ø	2,396 kg [5,281 lbs]	1748 [68.8]	706 [27.8]	615 [24.2]
SG/MG 120, 150, PG/WG 108, 135	600V	2,439 kg [5,376 lbs]	1732 [68.2]	704 [27.7]	
SG/MG 120, 150, PG/WG 108, 135	208V, 240V, 480V	2,445 kg [5,389 lbs]	1730 [68.1]	704 [27.7]	
SG/MG 140, 175, PG/WG 126, 158	240V, Ø	2,463 kg [5,429 lbs]	1721 [67.8]	703 [27.7]	
SG/MG 140, 175, PG/WG 126, 158	600V	2,469 kg [5,442 lbs]	1719 [67.7]	703 [27.7]	
SG/MG 160, 200, PG/WG 144, 180	208V, 240V, 480V	2,477 kg [5,460 lbs]	1716 [67.6]	702 [27.6]	

NOTE:
CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS

STD ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG 120, 150, PG/WG 108, 135	240V, Ø	2,840 kg [6,261 lbs]	1843 [72.6]	777 [30.6]	577 [22.7]
SG/MG 120, 150, PG/WG 108, 135	600V	2,883 kg [6,356 lbs]	1828 [72.0]	774 [30.5]	
SG/MG 120, 150, PG/WG 108, 135	208V, 240V, 480V	2,889 kg [6,369 lbs]	1826 [71.9]	773 [30.4]	
SG/MG 140, 175, PG/WG 126, 158	240V, Ø	2,907 kg [6,409 lbs]	1818 [71.6]	772 [30.4]	
SG/MG 140, 175, PG/WG 126, 158	600V	2,913 kg [6,422 lbs]	1816 [71.5]	772 [30.4]	
SG/MG 160, 200, PG/WG 144, 180	208V, 240V, 480V	2,921 kg [6,440 lbs]	1814 [71.4]	771 [30.4]	

STD ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
2,629 kg [5,795 lbs]	1837 [72.3]	757 [29.8]	577 [22.7]
2,672 kg [5,890 lbs]	1821 [71.7]	754 [29.7]	
2,678 kg [5,903 lbs]	1819 [71.6]	754 [29.7]	
2,696 kg [5,943 lbs]	1810 [71.3]	753 [29.6]	
2,702 kg [5,956 lbs]	1808 [71.2]	752 [29.6]	
2,710 kg [5,974 lbs]	1805 [71.1]	752 [29.6]	

L1A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG 120, 150, PG/WG 108, 135	240V, Ø	2,978 kg [6,566 lbs]	1771 [69.7]	790 [31.1]	578 [22.8]
SG/MG 120, 150, PG/WG 108, 135	600V	3,021 kg [6,660 lbs]	1758 [69.2]	787 [31.0]	
SG/MG 120, 150, PG/WG 108, 135	208V, 240V, 480V	3,027 kg [6,674 lbs]	1757 [69.2]	786 [31.0]	
SG/MG 140, 175, PG/WG 126, 158	240V, Ø	3,045 kg [6,713 lbs]	1749 [68.9]	785 [30.9]	
SG/MG 140, 175, PG/WG 126, 158	600V	3,051 kg [6,726 lbs]	1748 [68.8]	785 [30.9]	
SG/MG 160, 200, PG/WG 144, 180	208V, 240V, 480V	3,059 kg [6,744 lbs]	1745 [68.7]	784 [30.9]	

L1A ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
2,688 kg [5,926 lbs]	1808 [71.2]	768 [30.2]	579 [22.8]
2,731 kg [6,021 lbs]	1792 [70.6]	765 [30.1]	
2,737 kg [6,034 lbs]	1791 [70.5]	764 [30.1]	
2,755 kg [6,074 lbs]	1782 [70.2]	763 [30.0]	
2,761 kg [6,087 lbs]	1780 [70.1]	763 [30.0]	
2,769 kg [6,104 lbs]	1777 [70.0]	762 [30.0]	

L2A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG/MG 120, 150, PG/WG 108, 135	240V, Ø	3,085 kg [6,801 lbs]	1859 [73.2]	886 [34.9]	580 [22.8]
SG/MG 120, 150, PG/WG 108, 135	600V	3,128 kg [6,896 lbs]	1845 [72.6]	881 [34.7]	
SG/MG 120, 150, PG/WG 108, 135	208V, 240V, 480V	3,134 kg [6,909 lbs]	1843 [72.6]	881 [34.7]	
SG/MG 140, 175, PG/WG 126, 158	240V, Ø	3,152 kg [6,949 lbs]	1836 [72.3]	879 [34.6]	
SG/MG 140, 175, PG/WG 126, 158	600V	3,158 kg [6,962 lbs]	1834 [72.2]	878 [34.6]	
SG/MG 160, 200, PG/WG 144, 180	208V, 240V, 480V	3,166 kg [6,980 lbs]	1831 [72.1]	877 [34.5]	

L2A ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
2,734 kg [6,027 lbs]	1855 [73.0]	827 [32.6]	581 [22.9]
2,777 kg [6,122 lbs]	1839 [72.4]	823 [32.4]	
2,783 kg [6,135 lbs]	1837 [72.3]	823 [32.4]	
2,801 kg [6,175 lbs]	1829 [72.0]	821 [32.3]	
2,807 kg [6,188 lbs]	1829 [71.9]	820 [32.3]	
2,815 kg [6,206 lbs]	1824 [71.8]	820 [32.3]	

DRAWING CREATED FROM PRO/ENGINEER
3D FILE. ECO MODIFICATION TO BE
APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

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ELECTRONICALLY APPROVED
INSIDE WINDCHILL



TITLE

WEIGHT AND CENTER OF GRAVITY
G14.2L

60HZ: SG150/PG135, SG175/PG158, SG200/PG180
50HZ: SG120/PG108, SG140/PG126, SG160/PG144

ISSUE DATE: 11/26/14

SIZE
B

CAGE NO
N/A

DWG NO

10000039585

REV
C

SCALE

0.016

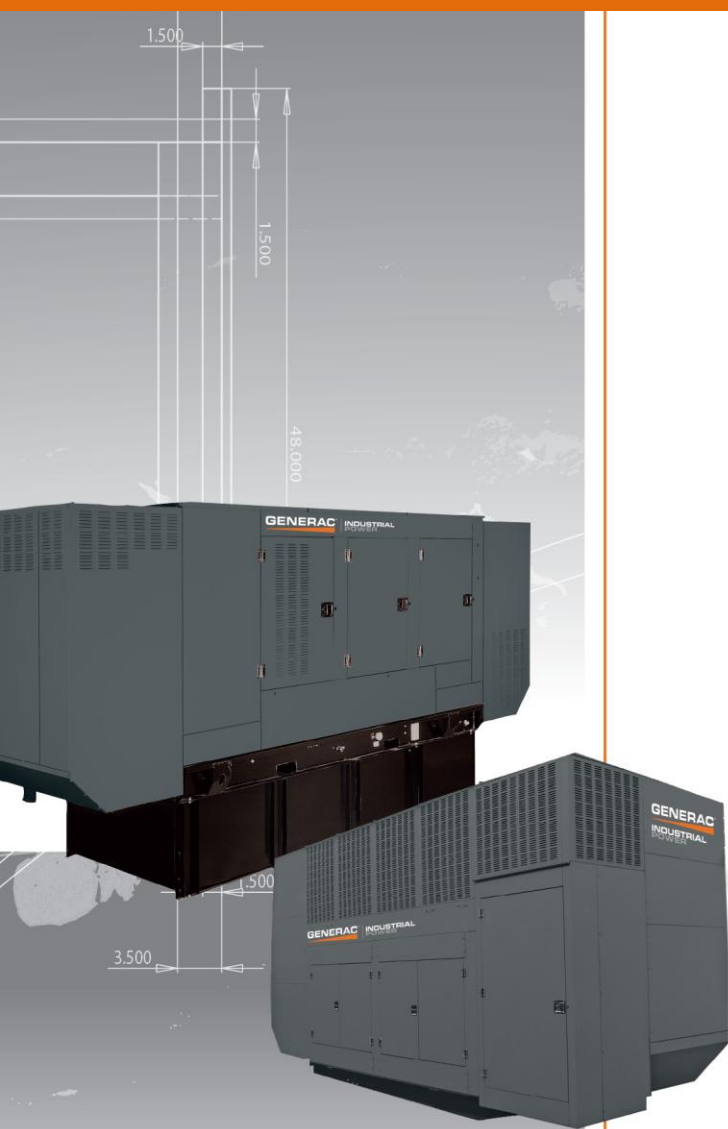
WT-KG

SHEET

3 of 3

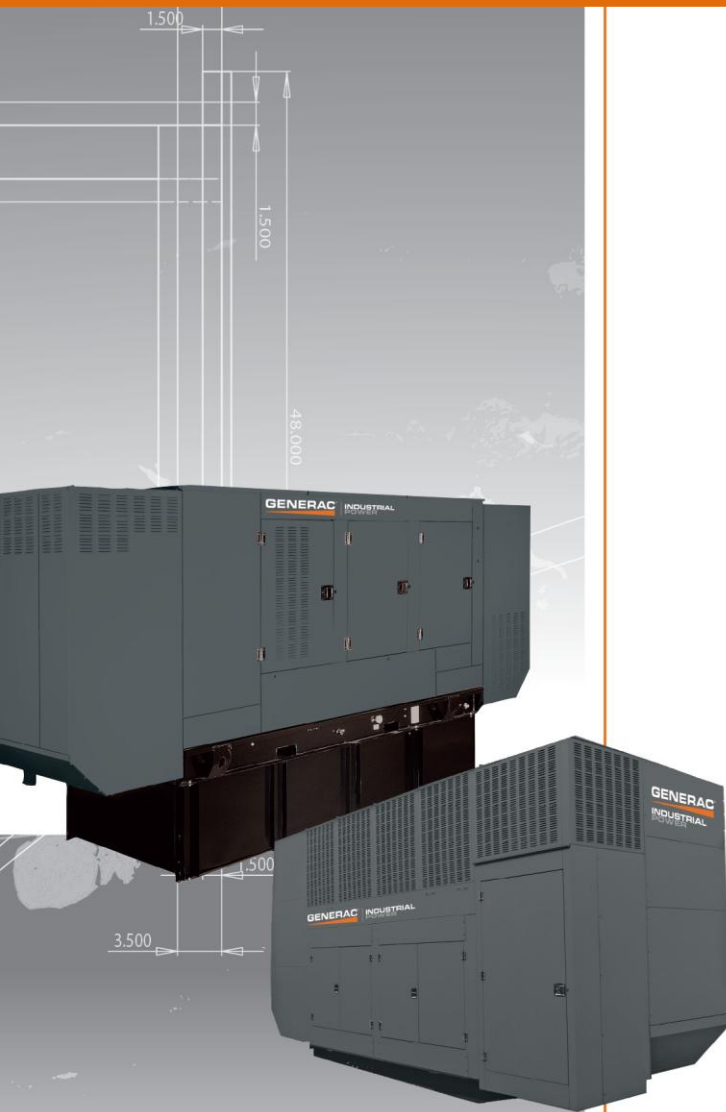
GENERAC®
**INDUSTRIAL
POWER**

Installation Drawings



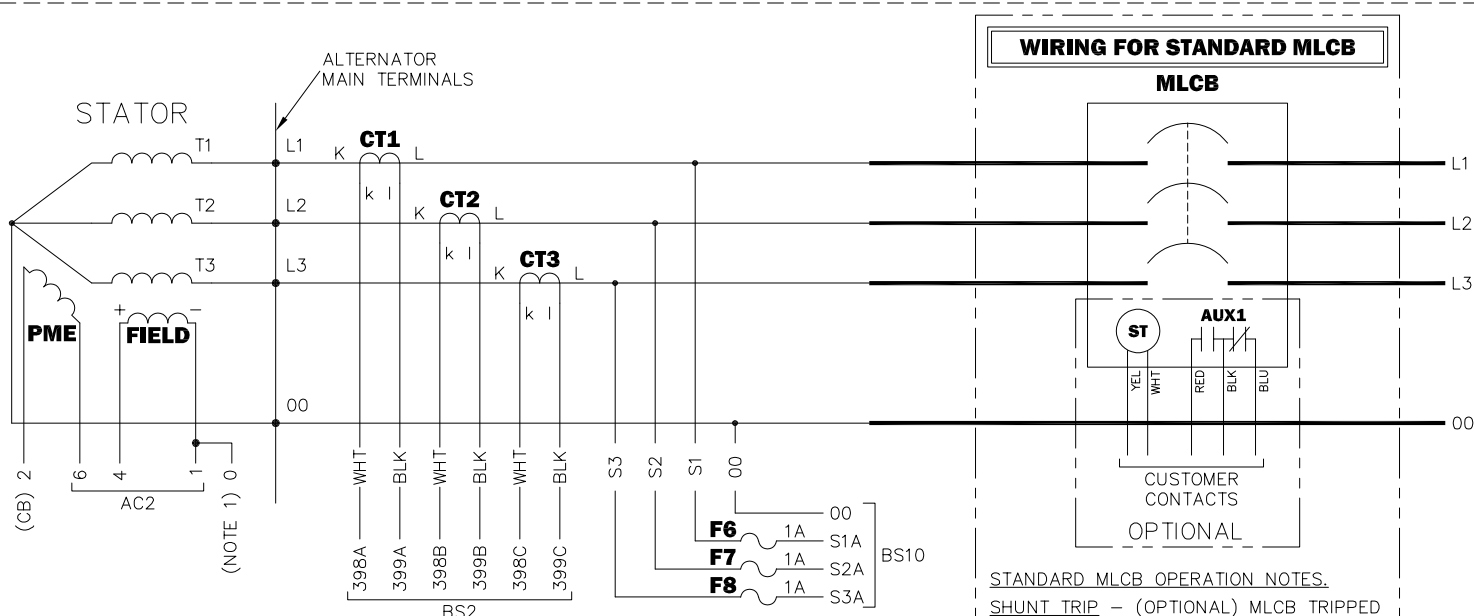
GENERAC®
**INDUSTRIAL
POWER**

Wiring Diagrams and Schematics



ES
ENERGY SYSTEMS

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**NOTES:**

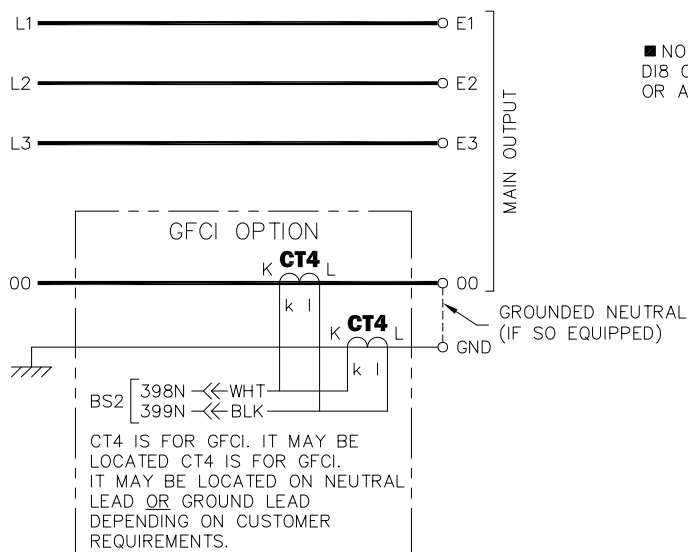
- 1) WIRE# 0 IS CHASSIS GROUND (BATTERY-) UNLESS NOTED OTHERWISE.
- 2) WIRE# 218 IS UNFUSED +24VDC (BATTERY+).
- 3) WIRE# 219 IS FUSED +24VDC POWER WHEN ENGINE IS CRANKING OR RUNNING.
- 4) WIRE# 220 IS FUSED +24VDC POWER WHEN E-STOP IS NOT ACTIVATED.
- 5) WIRE# 220A IS FUSED +24VDC POWER FOR GENERAL USE.
- 6) WIRE# 220C IS FUSED +24VDC POWER FOR THE MOTORIZED CIRCUIT BREAKER AND AVR.
- 7) WIRE# 220D IS FUSED +24VDC POWER FOR BASE STATION AND FUEL SOLENOID RELAYS.
- 8) WIRE# 220E IS FUSED +24VDC POWER CONTROLLED BY BASE STATION FOR SHUT DOWN ALARM.
- 9) WIRE# 220F IS FUSED +24VDC POWER TO BASE STATION WITH POLARITY PROTECTION.
- 10) WIRE# 13 IS UNFUSED +12VDC FROM THE BATTERY CENTER TAP.
- 11) WIRE# 14 IS FUSED +12VDC WHEN ENGINE IS CRANKING OR RUNNING.
- 12) WIRE# 15 IS FUSED +12VDC.
- 13) WIRE# 220G IS FUSED AUCTIONEERED +24VDC FOR POWER ZONE PERMISSIVE & LOAD SHED.

LEGEND

00 - NEUTRAL
 AC_ - AVR CONNECTOR
 AFS - AIR/FUEL SOLENOID
 AH1 - ALARM HORN
 ALT - DC CHARGE ALTERNATOR
 AUX_ - AUXILIARY CONTACT
 AVR - AUTOMATIC VOLTAGE REGULATOR
 BAT - BATTERY
 BC_ - BATTERY CHARGER CONNECTOR
 BCH - BATTERY CHARGER
 BS - POWER ZONE BASE STATION
 BS_ - BASE STATION CONNECTOR
 BTC - BATTERY TEMPERATURE CONNECTOR
 BTP - BATTERY CHARGER TEMP PROBE
 CB - CIRCUIT BREAKER
 CC - CLOSE COIL
 CON - CONTACTOR
 CONV - DC-DC CONVERTER

CT_ - CURRENT TRANSFORMER
 CVH_ - CRANKCASE VENT HEATER
 D1 - DIODE
 DB - DIODE BRIDGE
 DIS - POWERZONE DISPLAY
 ES1 - EMERGENCY STOP SWITCH
 F_ - FUSE BLOCK
 FPS - FUEL PRESSURE SENDER
 FS_ - FUEL SOLENOID
 GA1 - GOVERNOR ACTUATOR
 GC_ - GOVERNOR CONNECTION
 GOV - GOVERNOR MODULE
 GFCI - GROUND FAULT CURRENT INTERRUPT
 GND - GROUND BAR CONNECTION
 IC_ - IGNITION COIL
 ICM - IGNITION CONTROL MODULE
 LFP - LOW FUEL PRESSURE SWITCH
 MLCB - MAIN LINE CIRCUIT BREAKER
 MPU1 - MAGNETIC PICKUP (FLYWHEEL)

MPU2 - MAGNETIC PICKUP (CAMSHAFT)
 OPS - OIL PRESSURE SENDER
 OS - OXYGEN SENSOR
 OTS - OIL TEMPERATURE SENDER
 PME - PERMANENT MAGNET EXCITER
 R1 - RESISTOR
 RB_ - RELAY BOARD
 RB_A - RELAY BOARD CONNECTOR
 RCC - RELAY CLOSE COIL
 ROB - RELAY OPEN BREAKER
 RUR - RELAY UNDERVOLTAGE RELEASE
 SC - START CONTACTOR
 SM - STARTER MOTOR
 STC - SECONDARY TRIP COIL
 SW1 - OFF/AUTO/MANUAL SWITCH
 TR - TERMINATING RESISTOR
 WLS - COOLANT LEVEL SENDER
 WTS1 - COOLANT TEMPERATURE SENDER
 XMFR1 - TRANSFORMER



■ NOTE:
DI8 CAN BE USED WITH 3-WIRE START
OR AS A SPARE DIGITAL INPUT.

(NOTE 1) 0 — 0
(BS5) 183 — 183

(BS5) DI8 — N/C
(NOTE 1) 0 — COM
(BS5) 183 — N/O

BS1 [390 — +
391 — -
0 — GND
SHLD — SHLD]

BS3 [813 — MPS BACKUP
MODE ACTIVE
814 — CONNECTING TO
DEAD BUS
815 — CONNECTED TO
BUS IN BACKUP]

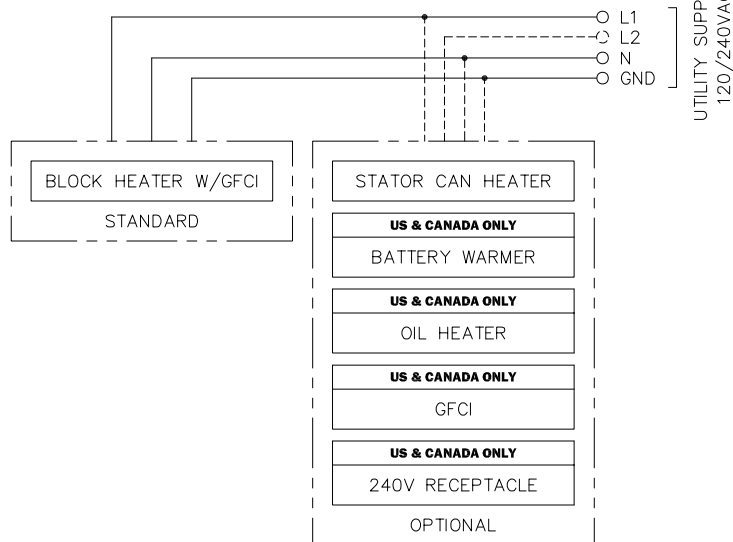
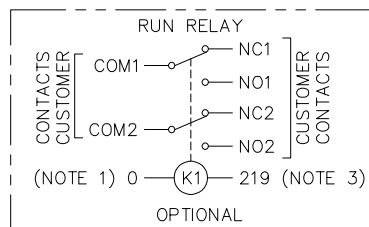
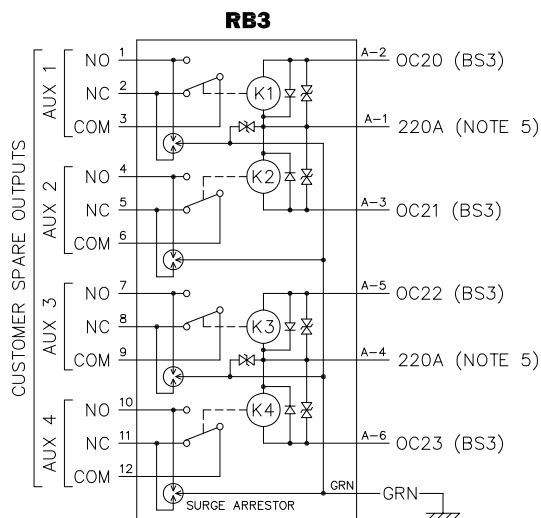
(BS5) 816 — INHIBIT DEAD
BUS CONNECT

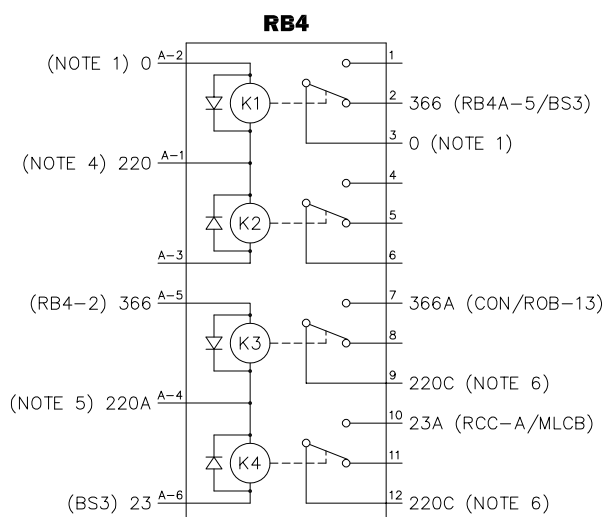
220G — +24 VDC AUCTIONEERED
(NOTE 5) 220A — +24 VDC

BS6 [AI1S — +
AI1R — ret]

BS5 [DI1 — DI1
0 — COM
DI2 — DI2
0 — COM
DI3 — DI3
0 — COM
DI4 — DI4
0 — COM
DI5 — DI5
0 — COM
DI6 — DI6
0 — COM
DI7 — DI7
0 — COM
DI8 — DI8
0 — COM]

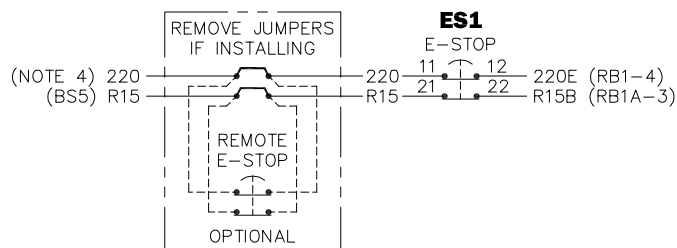
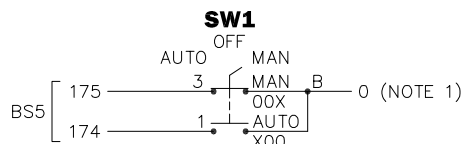
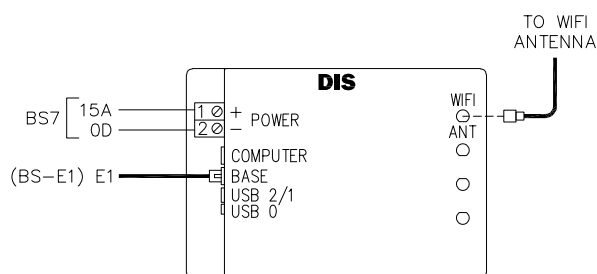
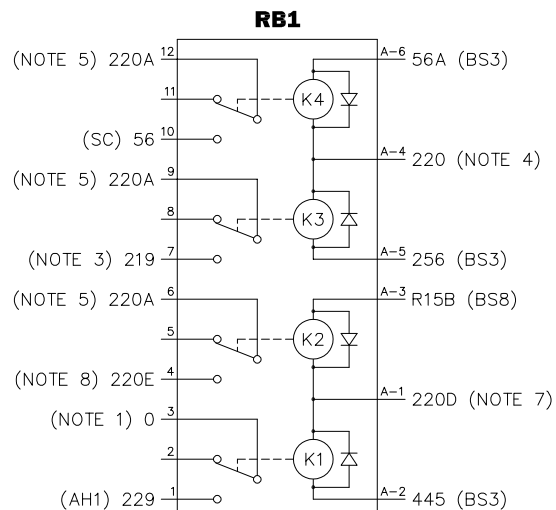
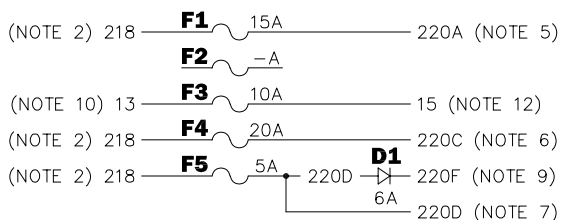
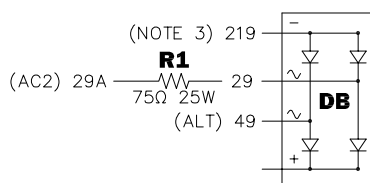
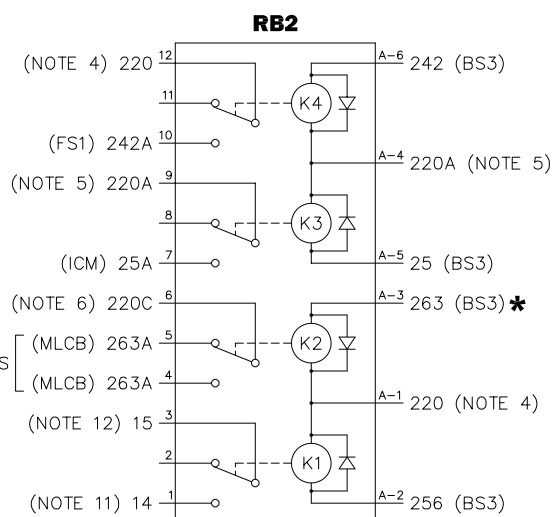
(NOTE 3) 219 — ENGINE RUNNING
SUPPRESSION
DIODE 6A

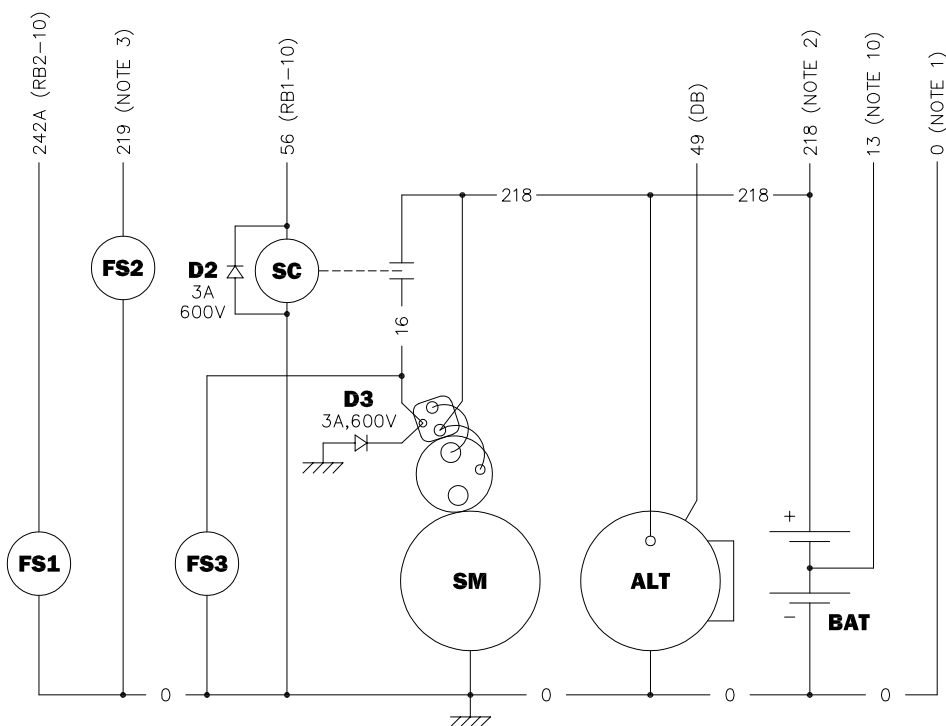
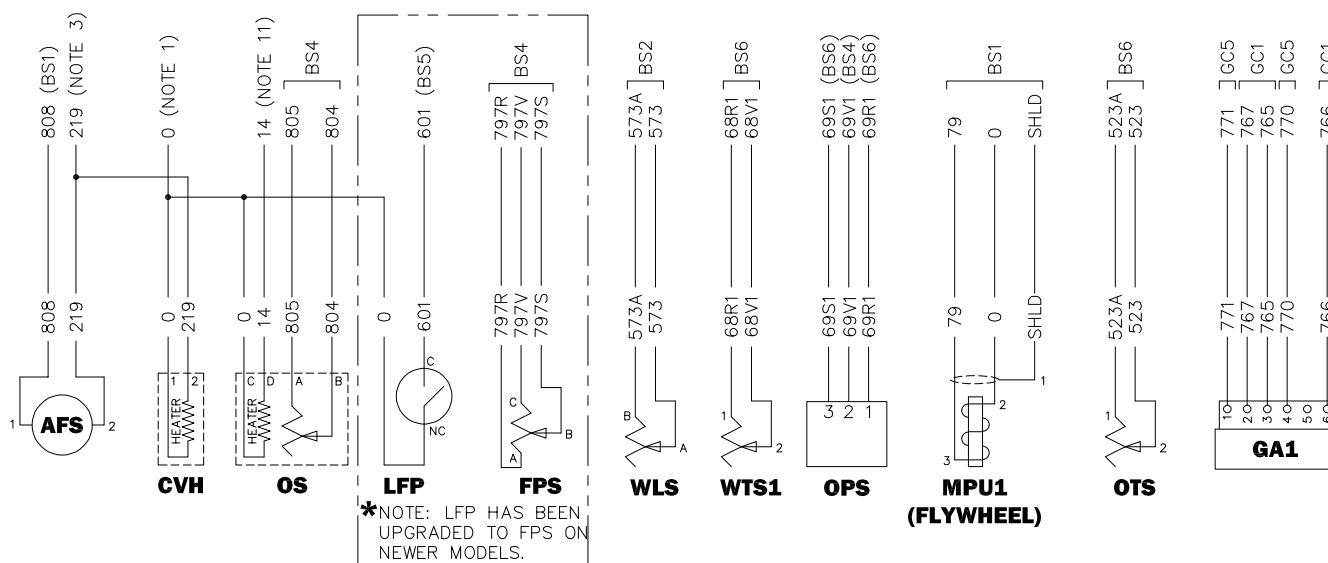


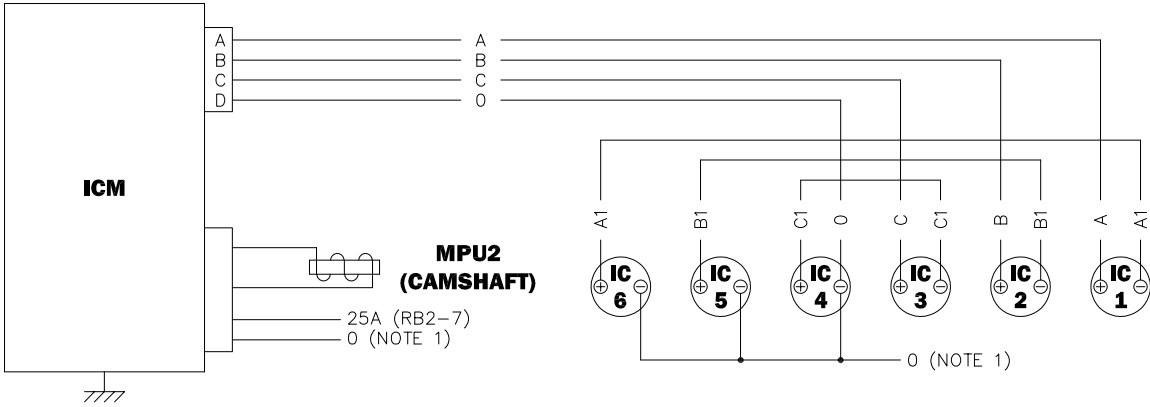


*SEE NOTES

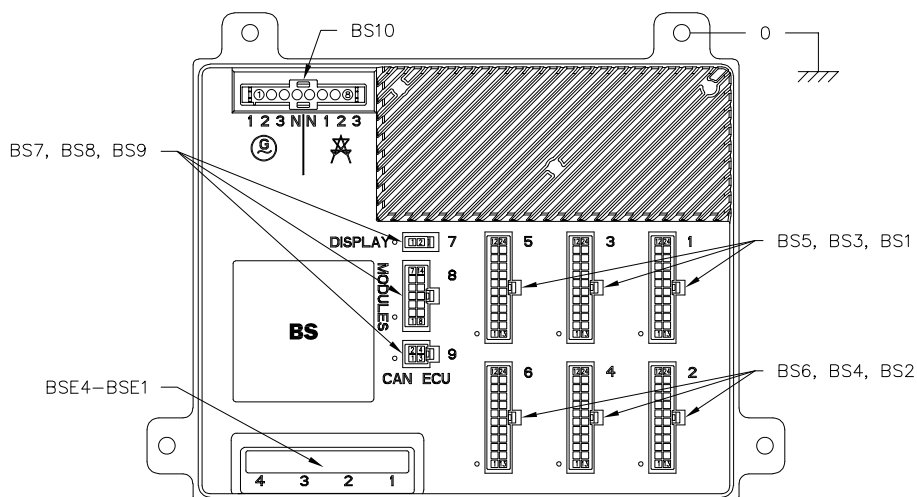
- *NOTES:
1. WIRE 263A IS WIRED TO RB2-5 WHEN SHUNT TRIP IS INSTALLED IN MLCB.
 2. WIRE 263A IS WIRED TO RB2-4 WHEN UVR IS INSTALLED IN MLCB.
 3. BS3-8 OUTPUT NEEDS TO BE ADJUSTED WHEN UVR IS INSTALLED IN MLCB.







BASE STATION

**BS1**

PIN	WIRE	TO	FUNCTION
1	391	CUST CONN	RS485- (TRANSFER SWITCH)
2	390	CUST CONN	RS485+ (TRANSFER SWITCH)
3	0	CUST CONN	RS485 GND (TRANSFER SWITCH)
4	SHLD	CUST CONN	RS485 DRAIN (TRANSFER SWITCH)
9	808	AFS-1	AIR/FUEL SOLENOID
10	220F	F5	NOTE 9
11	220F	F5	NOTE 9
16	0	MPU1-2	ENGINE RPM (-)
17	79	MPU1-3	ENGINE RPM (+)
18	SHLD	MPU1-1	ENGINE RPM SHIELD
22	0	GND	NOTE 1

BS2

PIN	WIRE	TO	FUNCTION
1	398A	CT1-2	GEN PHASE A CURRENT (+)
2	399A	CT1-1	GEN PHASE A CURRENT (-)
3	398B	CT2-2	GEN PHASE B CURRENT (+)
4	399B	CT2-1	GEN PHASE B CURRENT (-)
5	398C	CT3-2	GEN PHASE C CURRENT (+)
6	399C	CT3-1	GEN PHASE C CURRENT (-)
11	573A	WLS-B	COOLANT LEVEL (-)
12	573	WLS-A	COOLANT LEVEL (+)
19	398N	CT4-2	GEN PHASE C CURRENT (+)
20	399N	CT4-1	GEN PHASE C CURRENT (-)

BS3

PIN	WIRE	TO	FUNCTION
1	56A	RB1A-6	START RELAY
2	256	RB1A-5/RB2A-2	PRIMARY FUEL SOLENOID RELAY
3	445	RB1A-2	ALARM RELAY
5	25	RB2A-5	IGNITION ENABLE
6	242	RB2A-6	SECONDARY FUEL SOLENOID RELAY
7	813	CUST CONN	BACKUP MODE ACTIVE (MPS)
8	263	RB2A-3	SHUNT TRIP RELAY
9	814	CUST CONN	CONNECTING TO DEAD BUS (MPS)
10	815	CUST CONN	CONNECTED TO BUS IN BACKUP (MPS)
14	23	RB4A-6	CLOSE GENERATOR TO BUS (MPS)
16	366	RB4-2	OPEN GENERATOR FROM BUS (MPS)
17	OC20	RB3A-2	SPARE RELAY 1
18	OC21	RB3A-3	SPARE RELAY 2
19	OC22	RB3A-5	SPARE RELAY 3
20	OC23	RB3A-6	SPARE RELAY 4

BS4

PIN	WIRE	TO	FUNCTION
1	803V	BCH	BATTERY CHARGER CURRENT
4	797S	FPS-B	FUEL PRESSURE (S)
8	804	OS-B	OXYGEN SENSOR (+)
9	69V1	OPS1-2	OIL PRESSURE (+)
11	797V	FPS-C	FUEL PRESSURE (+)
16	797R	FPS-A	FUEL PRESSURE (-)
20	805	OS-A	OXYGEN SENSOR (-)

BSE1-BSE4

PORT	WIRE	TO	FUNCTION
BSE1	E1	DIS	DISPLAY TO BASE COM
BSE2	E2	GEN BUS	MPS GENERATOR TO GENERATOR COM
BSE3	E3	GEN BUS	MPS GENERATOR TO GENERATOR COM
BSE4	E4	AUX DEVICE	AUX OPTION COM

BS5

PIN	WIRE	TO	FUNCTION
1	174	SW1	AUTO START
2	175	SW1	MANUAL START
3	601	LFP-C	LOW FUEL PRESSURE
4	R15	ES1-21	EMERGENCY STOP
5	183	CUST CONN	REMOTE START
6	505	BCH	BATTERY CHARGER FAIL
9	DI5	CUST CONN	AUXILIARY DIGITAL INPUT 5
11	816	CUST CONN	INHIBIT DEAD BUS CONNECT (MPS)
13	371	CON-S1A	GENERATOR CONTACTOR POSITION
16	418	MLCB AUX	MLCB STATUS
18	DI3	CUST CONN	AUXILIARY DI3/LINE POWER
19	DI4	CUST CONN	AUXILIARY DI4/GENERATOR POWER
20	DI1	CUST CONN	AUXILIARY DIGITAL INPUT 1
21	DI2	CUST CONN	AUXILIARY DIGITAL INPUT 2
22	DI6	CUST CONN	AUXILIARY DIGITAL INPUT 6
23	DI7	CUST CONN	AUXILIARY DIGITAL INPUT 7
24	DI8	CUST CONN	AUXILIARY DIGITAL INPUT 8

BS6

PIN	WIRE	TO	FUNCTION
5	AI1R	CUST CONN	ANALOG INPUT 1 (-)
6	69R1	OPS1-1	OIL PRESSURE (-)
7	68R1	WTS1-1	COOLANT TEMPERATURE (-)
8	523A	OTS-1	OIL TEMPERATURE (-)
17	AI1S	CUST CONN	ANALOG INPUT 1 (+)
18	69S1	OPS1-3	OIL PRESSURE (SUPPLY)
19	68V1	WTS1-2	COOLANT TEMPERATURE (+)
20	523	OTS-2	OIL TEMPERATURE (+)

BS7

PIN	WIRE	TO	FUNCTION
1	15A	DIS1-1	DISPLAY POWER (+)
2	0D	DIS1-2	DISPLAY POWER (-)

BS8

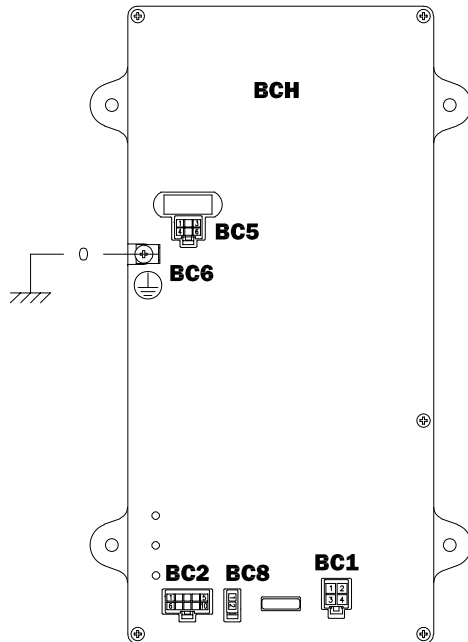
PIN	WIRE	TO	FUNCTION
1	SHLD	BC2-3	CAN BUS 1 SHIELD
2	R15B	RB1A-3/ES1-22	OVERSPEED/WATCHDOG TO E-STOP
4	0F	AC1-10	AVR MODULE POWER (-)
8	743G	BC2-5	CAN BUS 1 HIGH
9	744G	BC2-4	CAN BUS 1 LOW
10	15E	GC1-24	GOVERNOR MODULE POWER (+)
11	15F	AC1-11	AVR MODULE POWER (+)

BS10

PIN	WIRE	TO	FUNCTION
1	S1A	FB6-Y	GENERATOR VOLTAGE SENSE Aø
2	S2A	FB7-Y	GENERATOR VOLTAGE SENSE Bø
3	S3A	FB8-Y	GENERATOR VOLTAGE SENSE Cø
4	00	NEUTRAL	GENERATOR VOLTAGE SENSE NEU
5	T00	NEUTRAL	UTILITY VOLTAGE SENSE NEU (MPS)
6	T1A	FB9-Y	UTILITY VOLTAGE SENSE Aø (MPS)
7	T2A	FB10-Y	UTILITY VOLTAGE SENSE Bø (MPS)
8	T3A	FB11-Y	UTILITY VOLTAGE SENSE Cø (MPS)

BATTERY CHARGERS

OPTIONAL 20 AMP POWER ZONE BATTERY CHARGER

**BC1**

PIN	WIRE	TO	FUNCTION	
1	218	F5	BASE STATION SUPPLY POWER (+)	SEE NOTE
2	0	BS1-22	BASE STATION SUPPLY POWER (-)	
3	218	SM	BATTERY CHARGING (+)	
4	0	GND	BATTERY CHARGING (-)	

BC2

PIN	WIRE	TO	FUNCTION
1	—	—	—
2	—	—	—
3	SHLD	BS8-1	CAN BUS 1 SHIELD (IN)
4	744G	BS8-9	CAN BUS 1 LOW (IN)
5	743G	BS8-8	CAN BUS 1 HIGH (IN)
6	—	—	—
7	—	—	—
8	SHLD	AC1-4	CAN BUS 1 SHIELD (OUT)
9	744G	AC1-5	CAN BUS 1 LOW (OUT)
10	743G	AC1-6	CAN BUS 1 HIGH (OUT)

BC5

PIN	WIRE	TO	FUNCTION
1	GND	UTILITY	UTILITY AC GROUND
2	N	UTILITY	UTILITY AC NEUTRAL
3	L1	UTILITY	UTILITY AC POWER
4	—	—	—
5	—	—	—
6	—	—	—

BC6

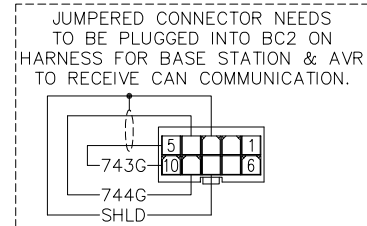
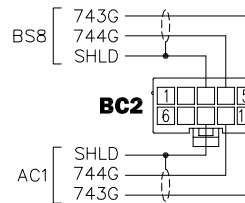
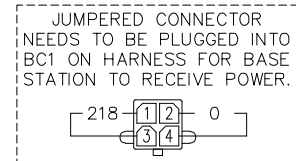
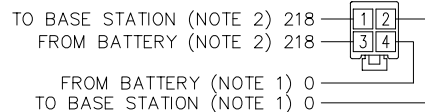
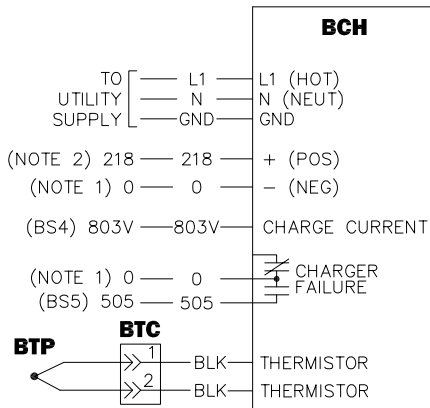
PIN	WIRE	TO	FUNCTION
—	0	GND	CHASSIS GROUND

BC8

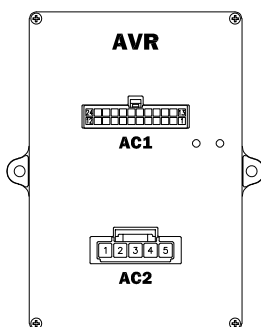
PIN	WIRE	TO	FUNCTION
1	604	BAT	BATTERY TEMP (THERMISTOR +)
2	605	BAT	BATTERY TEMP (THERMISTOR -)

NOTE:
THE BATTERY CHARGER CONTAINS A REGULATED POWER SUPPLY FOR THE BASE STATION. IF UTILITY POWER TO THE CHARGER IS LOST THE SUPPLY AUTOMATICALLY CONNECTS TO THE CHARGER LEADS. THIS ALLOWS THE BASE STATION TO RECEIVE POWER FROM THE BATTERIES.

OPTIONAL 10 AMP BATTERY CHARGER (NON-POWER ZONE)



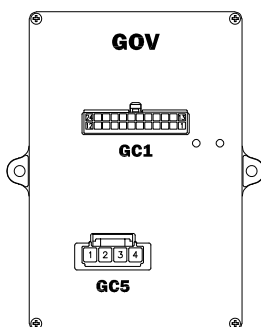
BTP NOTE:
NEWER BATTERY CHARGER MODELS ARE EQUIPPED WITH A BATTERY TEMPERATURE COMPENSATION PROBE. BTP THERMISTOR END TO BE LOCATED 1.5" to 3" FROM BATTERY POSITIVE TERMINAL POST.

AVR MODULE**AC1**

PIN	WIRE	TO	FUNCTION
4	SHLD	BC2-8	CAN BUS 1 SHIELD (IN)
5	744G	BC2-9	CAN BUS 1 LOW (IN)
6	743G	BC2-10	CAN BUS 1 HIGH (IN)
10	0F	BS8-4	AVR MODULE POWER (-)
11	15F	BS8-11	AVR MODULE POWER (+)
16	SHLD	GC1-3	CAN BUS 1 SHIELD (OUT)
17	744G	GC1-4	CAN BUS 1 LOW (OUT)
18	743G	GC1-5	CAN BUS 1 HIGH (OUT)

AC2

PIN	WIRE	TO	FUNCTION
1	29A	R1	EXCITER FIELD BOOST POWER INPUT
2	2A	CB	PME PHASE A INPUT (AFTER CB)
3	6	EXC-3	PME PHASE B INPUT
4	4	EXC-4	EXCITER FIELD POWER OUTPUT (+)
5	1	EXC-1	EXCITER FIELD POWER OUTPUT (-)

GOVERNOR CONTROLLER**GC1**

PIN	WIRE	TO	FUNCTION
3	SHLD	AC1-16	CAN BUS 1 SHIELD (IN)
4	744G	AC1-17	CAN BUS 1 LOW (IN)
5	743G	AC1-18	CAN BUS 1 HIGH (IN)
16	744G	TR-B	TERMINATING RESISTOR
17	743G	TR-A	TERMINATING RESISTOR
21	765	GA1-3	THROTTLE POSITION (-)
22	766	GA1-6	THROTTLE POSITION (SUPPLY)
23	767	GA1-2	THROTTLE POSITION (+)
24	15E	BS8-10	GOVERNOR MODULE POWER (+)

TR
120Ω

GC5

PIN	WIRE	TO	FUNCTION
1	771	GA1-1	EXCITER FIELD BOOST POWER INPUT
2	770	GA1-4	PME PHASE A INPUT (AFTER CB)
3	219	DB	(NOTE 3)
4	0	GND	(NOTE 1)

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LEGEND

AC_	-	AVR CONNECTOR
AFS	-	AIR/FUEL SOLENOID
AH1	-	ALARM HORN
ALT	-	DC CHARGE ALTERNATOR
AVR	-	AUTOMATIC VOLTAGE REGULATOR
BC_	-	BATTERY CHARGER CONNECTOR (20A)
BCC	-	BATTERY CHARGER CONNECTOR (10A)
BCH	-	BATTERY CHARGER
BPC	-	BATTERY CHARGER POWER CONNECTOR
BS	-	POWERZONE BASE STATION
BS_	-	BASE STATION CONNECTOR
BSE_	-	BASE STATION ETHERNET CONNECTOR
BSG	-	BASE STATION CHASSIS GROUND
BTC	-	BATTERY TEMPERATURE CONNECTOR
BTP	-	BATTERY CHARGER TEMP PROBE
CB	-	CIRCUIT BREAKER PME
CBC	-	(MLCB) CIRCUIT BREAKER CONNECTOR
CON	-	CONTACTOR
CONV	-	DC-DC CONVERTER
CT_	-	CURRENT TRANSFORMER
CTC	-	CURRENT TRANSFORMER CONNECTOR
CVH	-	CRANKCASE VENT HEATER
DB	-	DIODE BRIDGE
DIS	-	POWER ZONE TOUCH SCREEN DISPLAY
ES1	-	EMERGENCY STOP SWITCH
EXC	-	EXCITER
FR	-	FUSE BLOCK

- FPS — FUEL PRESSURE SENDER
- FS_ — FUEL SOLENOID
- GA1 — GOVERNOR ACTUATOR
- GC_ — GOVERNOR CONNECTOR
- GFCI — GROUND FAULT CURRENT INTERRUPT
- GND — GROUND BAR CONNECTION
- GOV — GOVERNOR
- IC_ — IGNITION COIL
- ICM — IGNITION CONTROL MODULE
- LFP — LOW FUEL PRESSURE SWITCH
- MLCB — MAIN LINE CIRCUIT BREAKER
- MPU1 — MAGNETIC PICKUP (FLYWHEEL)
- MPU2 — MAGNETIC PICKUP (CAMSHAFT)
- NEU — NEUTRAL BUS
- OPS — OIL PRESSURE SENDER
- OS — OXYGEN SENSOR
- OTS — OIL TEMPERATURE SENDER
- PWR — POWER ZONE POWER CONNECTOR
- PZC — MAIN POWER ZONE CONNECTOR
- PZ P&L — POWER ZONE PERMISSIVE & LOAD SHED
- R1 — RESISTOR
- RB_ — RELAY BOARD
- RB_A — RELAY BOARD CONNECTOR
- RCC — RELAY CONTACTOR CLOSE COIL
- ROB — RELAY OPEN BREAKER
- RUR — RELAY UNDERVOLTAGE RELEASE
- SC — START CONTACTOR

SM	-	STARTER MOTOR
ST	-	SHUNT TRIP
STC	-	SECONDARY TRIP COIL
SW1	-	OFF/AUTO/MANUAL SWITCH
TB	-	TERMINAL BLOCK
TR	-	CAN BUS TERMINATING RESISTOR
VSC	-	VOLTAGE SENSING CONNECTOR
WLS	-	COOLANT LEVEL SENDER
WTS1	-	COOLANT TEMPERATURE SENDER
XMFR1	-	TRANSFORMER

NOTE: ALL WIRES 18 AWG
300V UL LISTED UNLESS
SHOWN OTHERWISE

— AWG SIZE

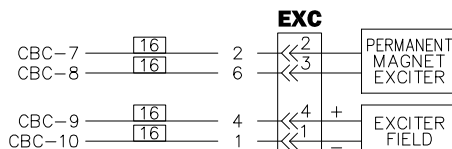
12

SPLICE
NUMBER

3

WIRE
SPLICE

ALTERNATOR EXCITATION

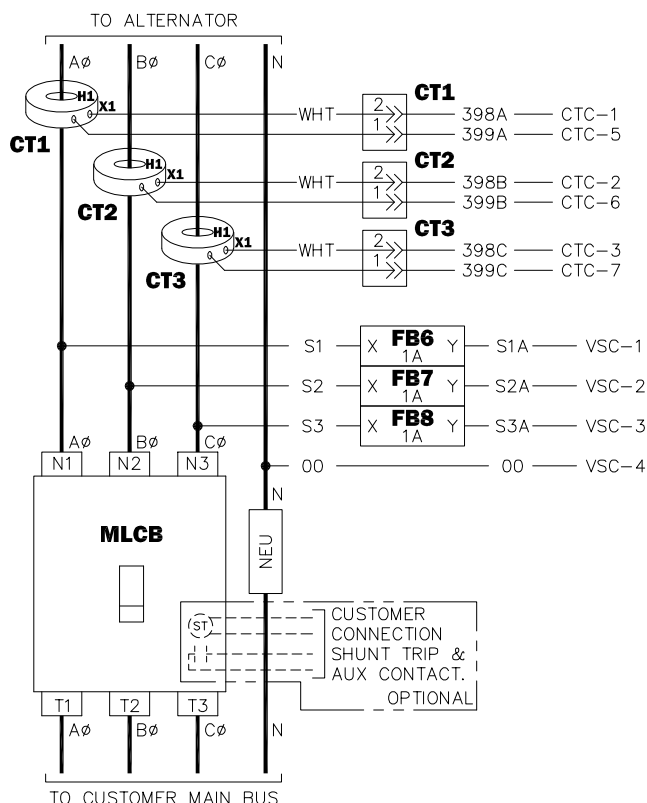
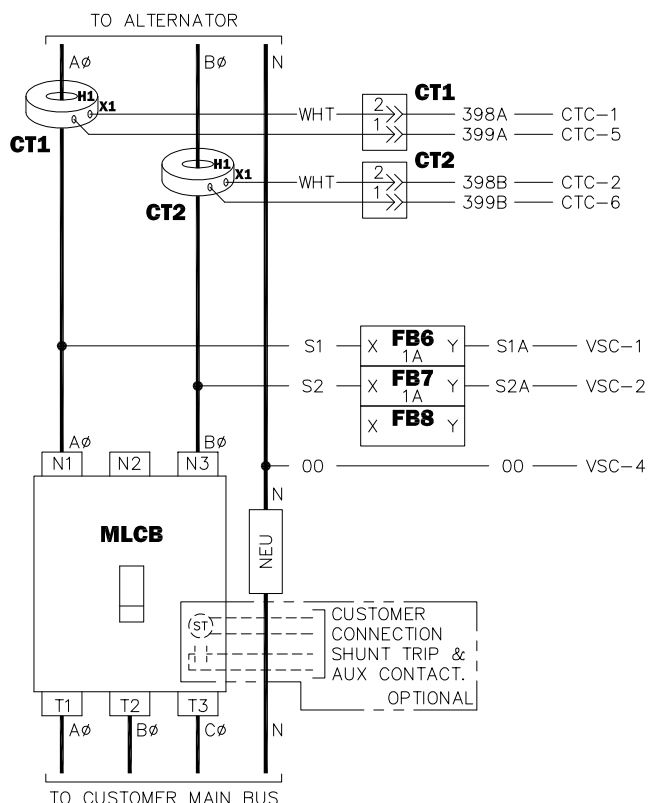


COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

CONNECTIONS FOR 10 UNIT

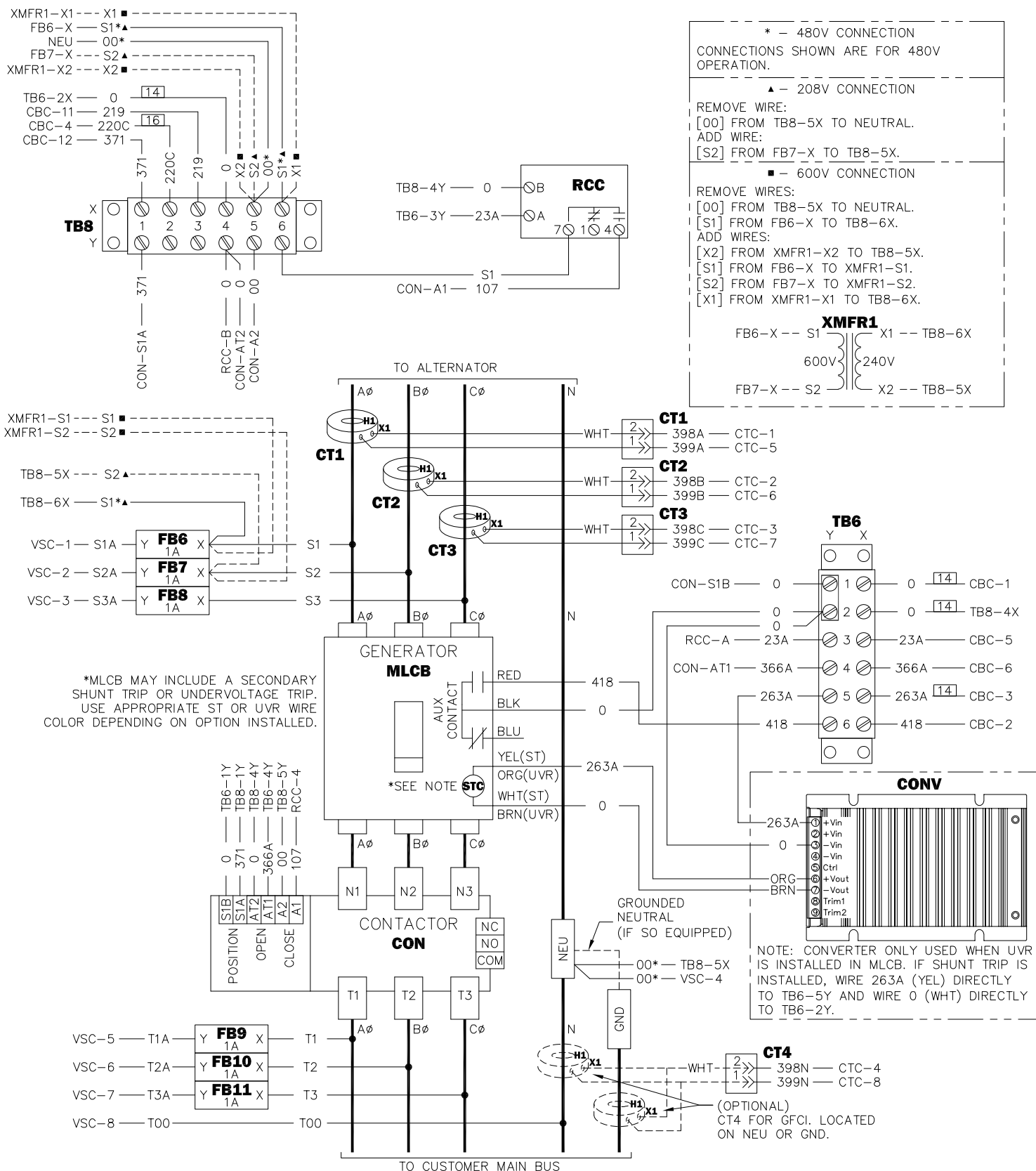
NOTE: ALL WIRES IN THIS SECTION ARE 600V RATED

CONNECTIONS FOR 30 UNIT



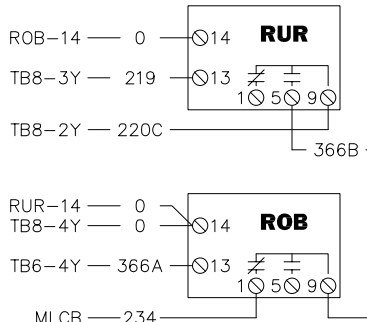
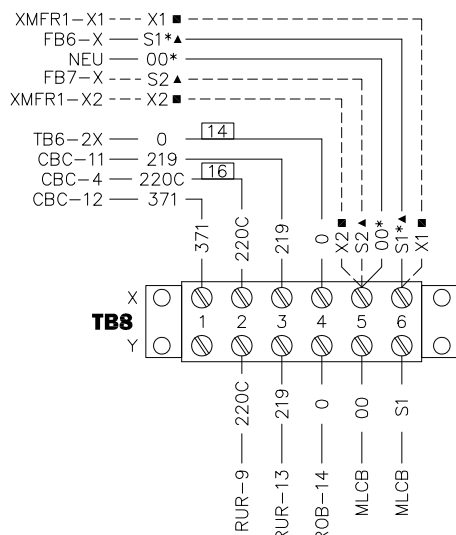
COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

WIRING FOR MPS CONTACTOR WITH MLCB OPTION



COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

WIRING FOR MPS MOTORIZED MLCB OPTION



* - 480V CONNECTION
 CONNECTIONS SHOWN ARE FOR 480V OPERATION.

▲ - 208V CONNECTION

REMOVE WIRE:

[00] FROM TB8-5X TO NEUTRAL.

ADD WIRE:

[S2] FROM FB7-X TO TB8-5X.

■ - 600V CONNECTION

REMOVE WIRES:

[00] FROM TB8-5X TO NEUTRAL.

[S1] FROM FB6-X TO TB8-6X.

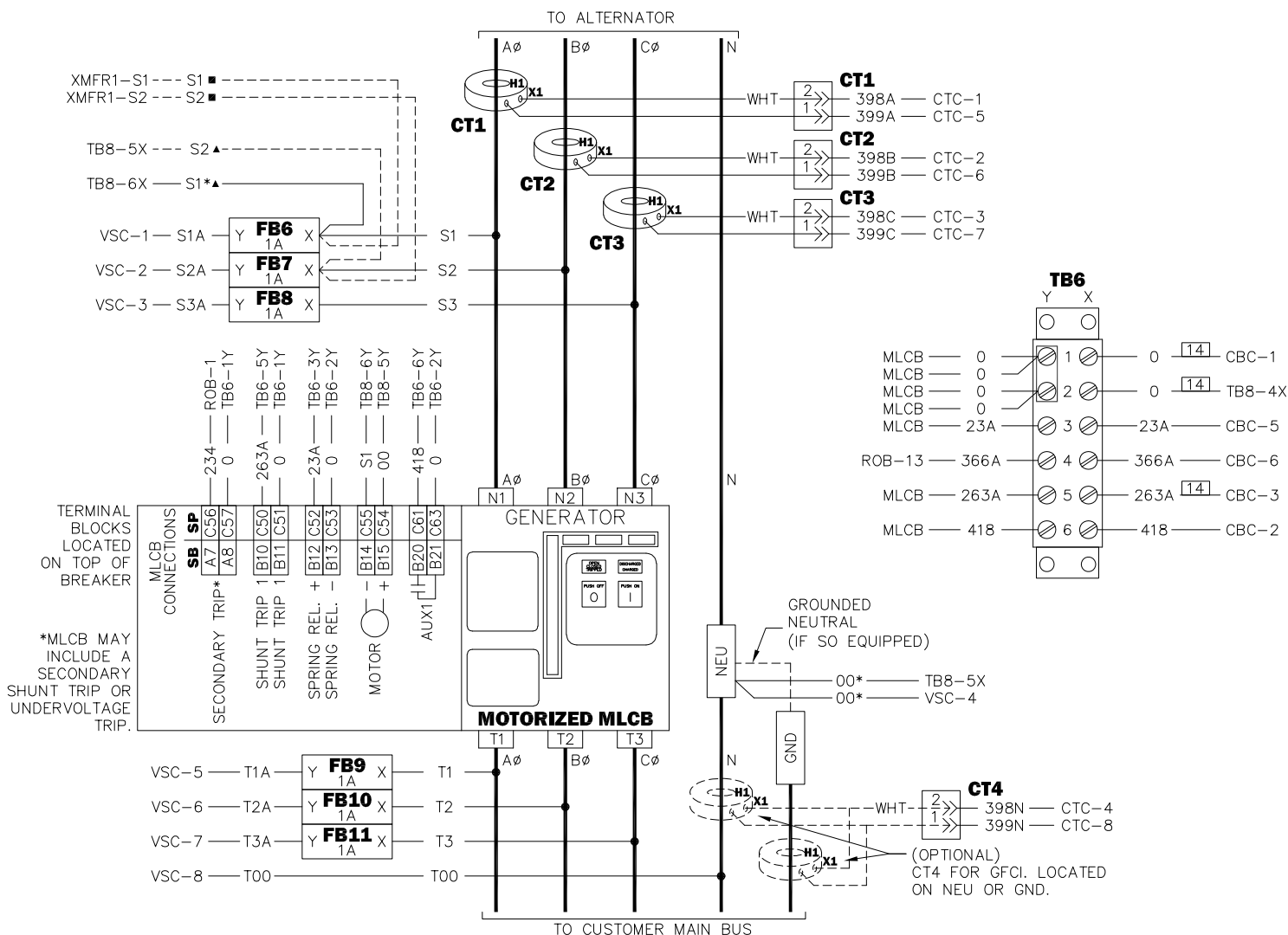
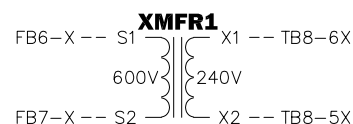
ADD WIRES:

[X2] FROM XMFR1-X2 TO TB8-5X.

[S1] FROM FB6-X TO XMFR1-S1.

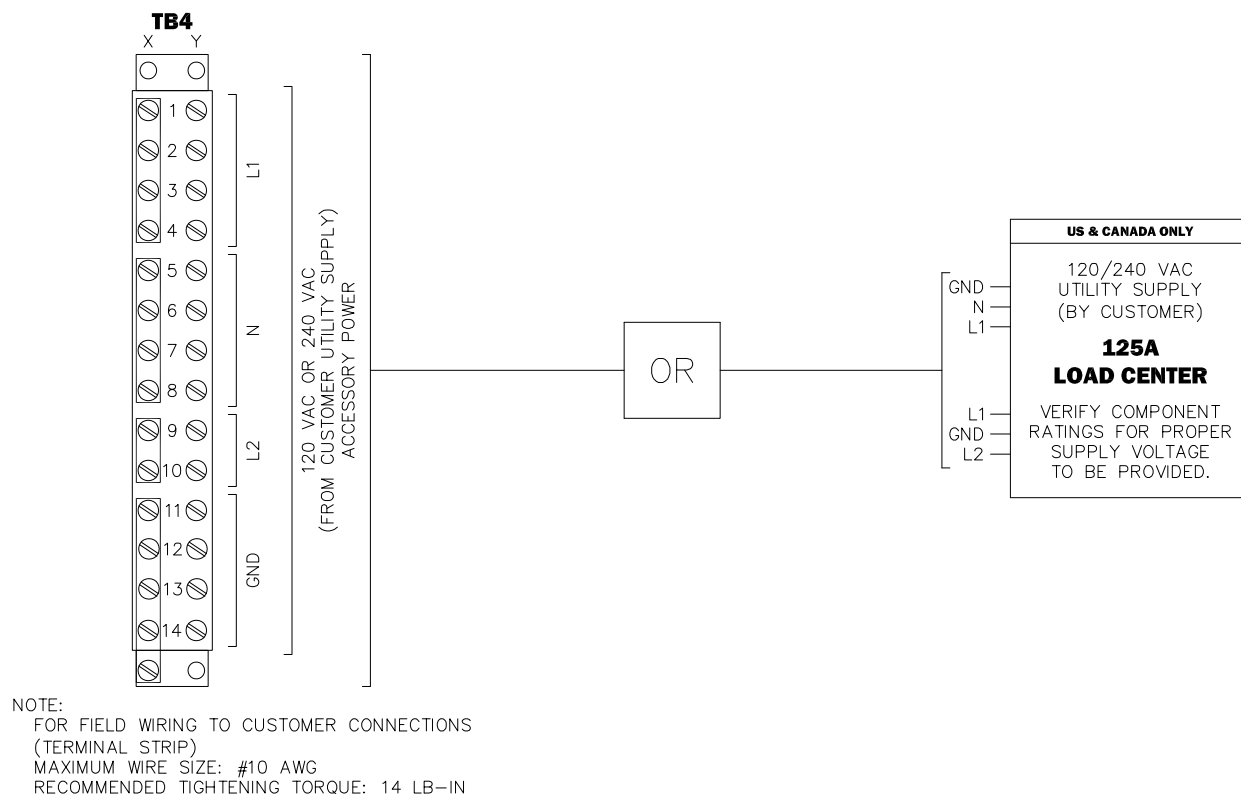
[S2] FROM FB7-X TO XMFR1-S2.

[X1] FROM XMFR1-X1 TO TB8-6X.



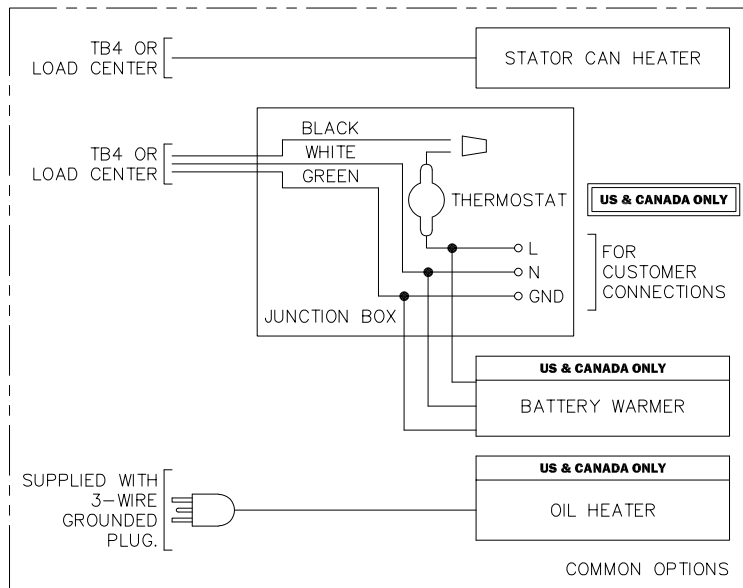
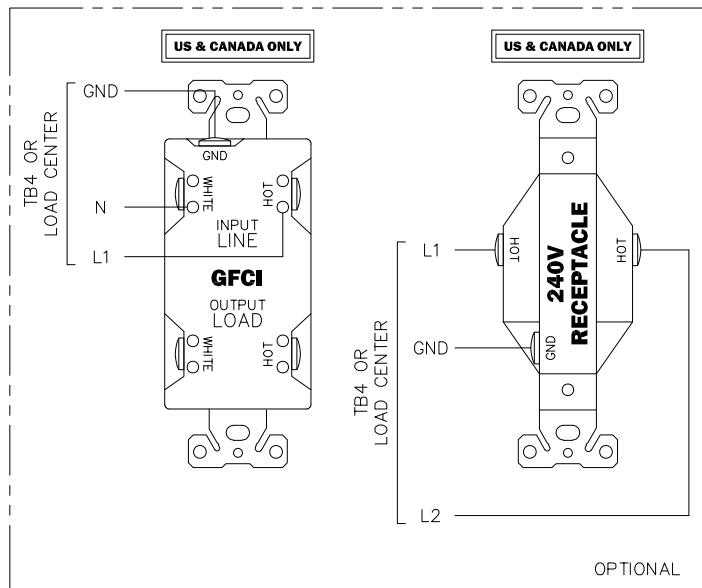
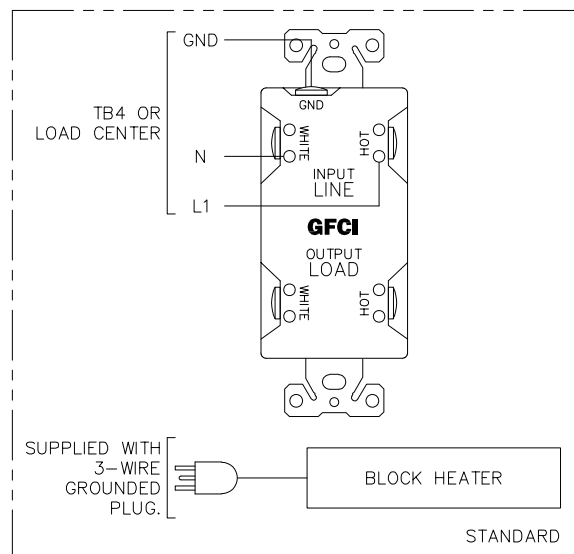
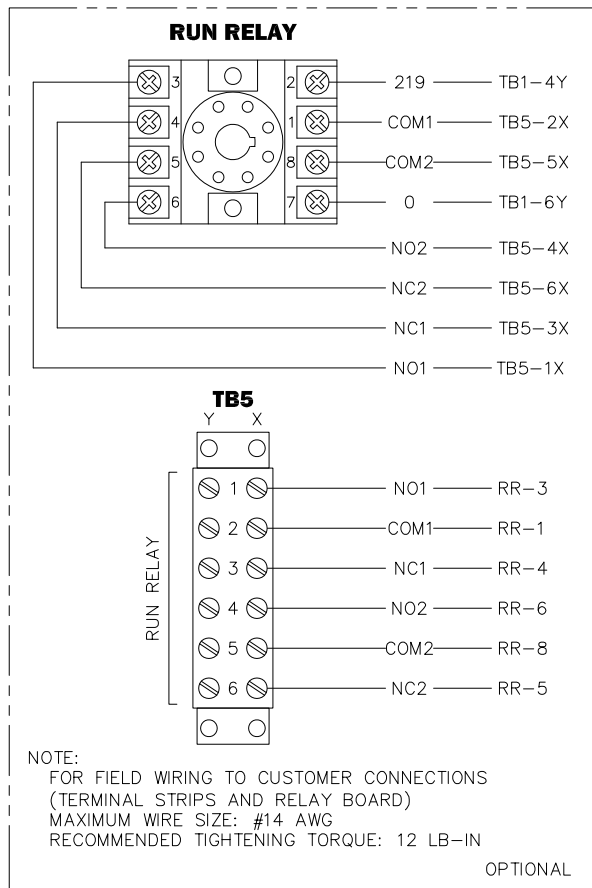
COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

NOTE: ALL WIRES ON THIS
PAGE ARE 600V RATED

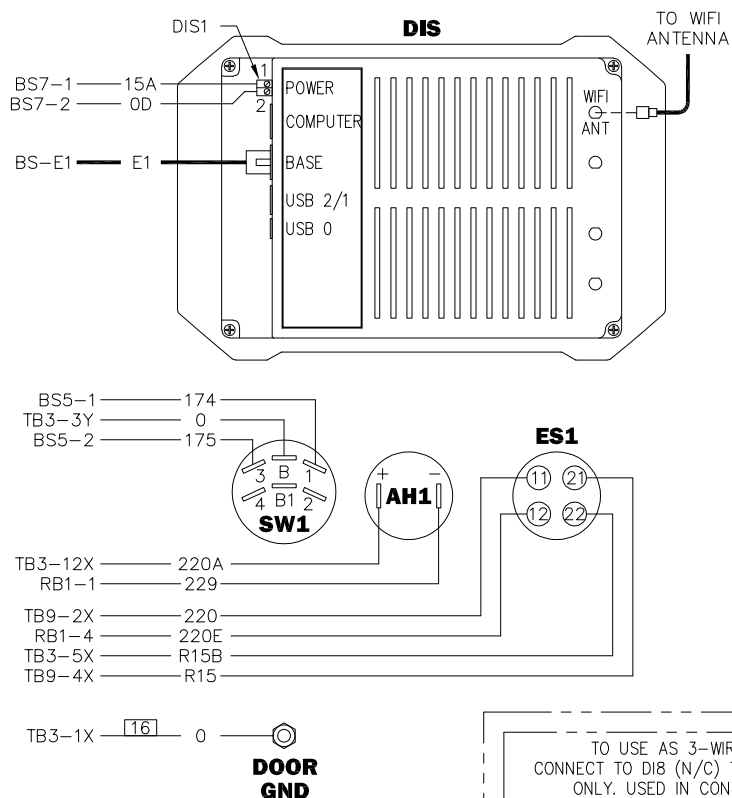


COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

NOTE: ALL WIRES ON THIS
PAGE ARE 600V RATED

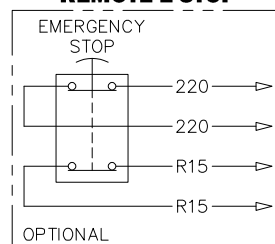


COMPONENTS LOCATED ON CONTROL PANEL DOOR

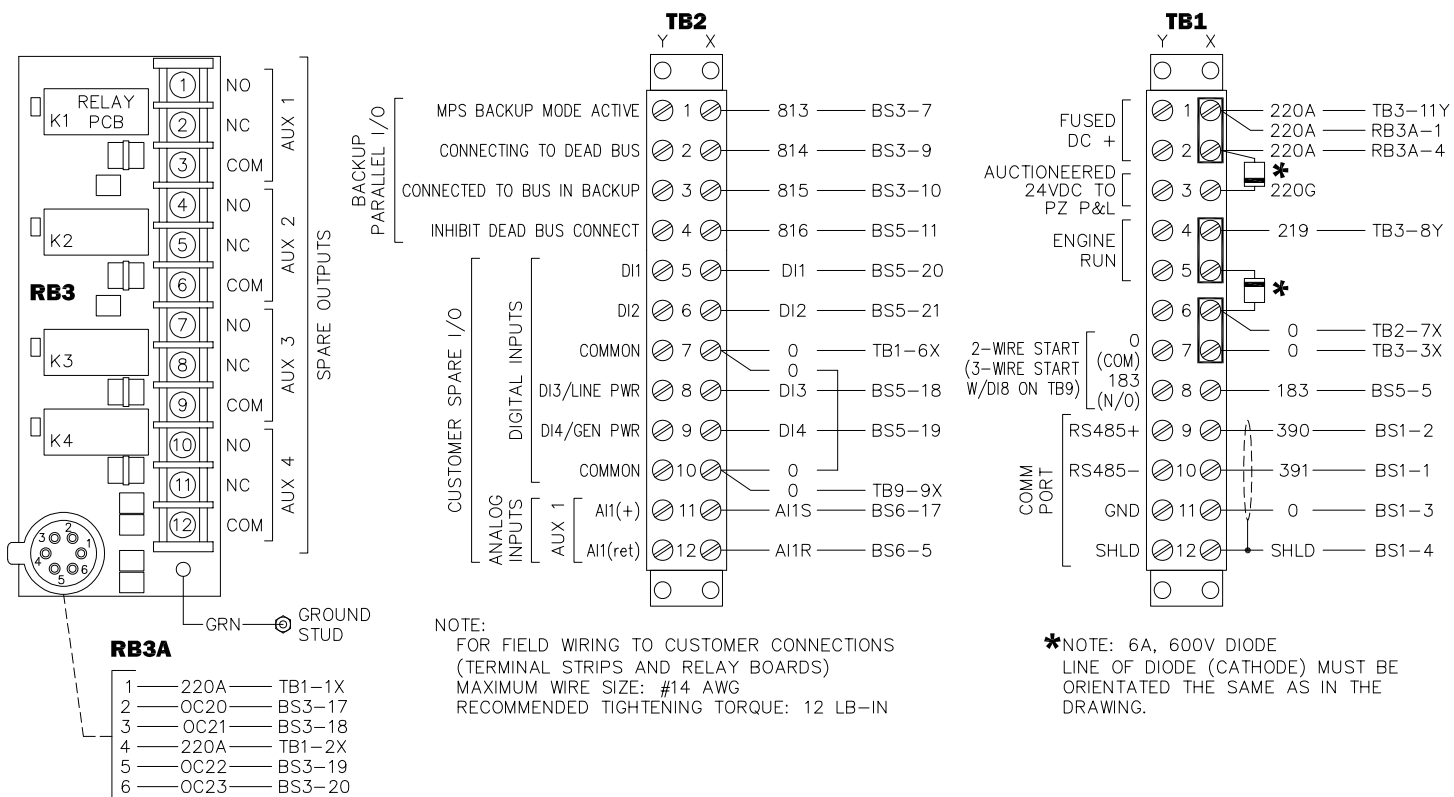
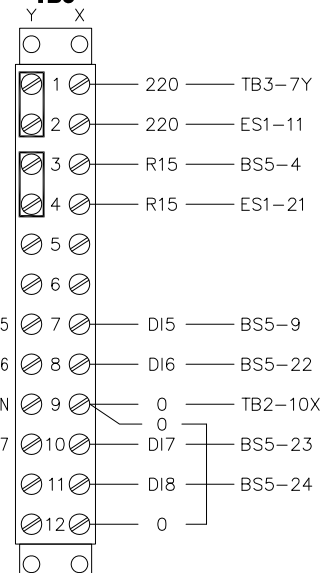
COMPONENTS LOCATED IN LOW VOLTAGE
CUSTOMER CONNECTION PANEL

NOTE:
REMOVE TERMINAL BLOCK
JUMPERS WHEN INSTALLING
REMOTE E-STOP.

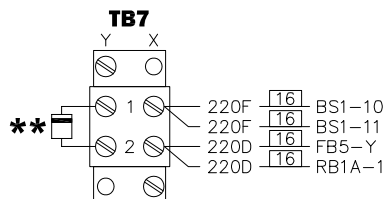
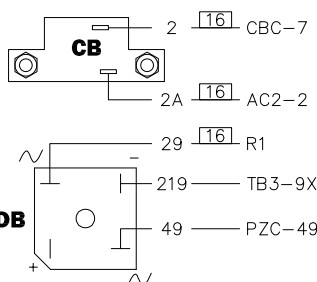
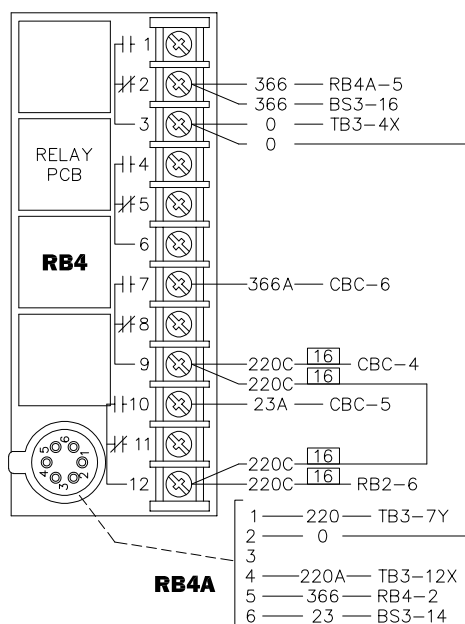
REMOTE E-STOP



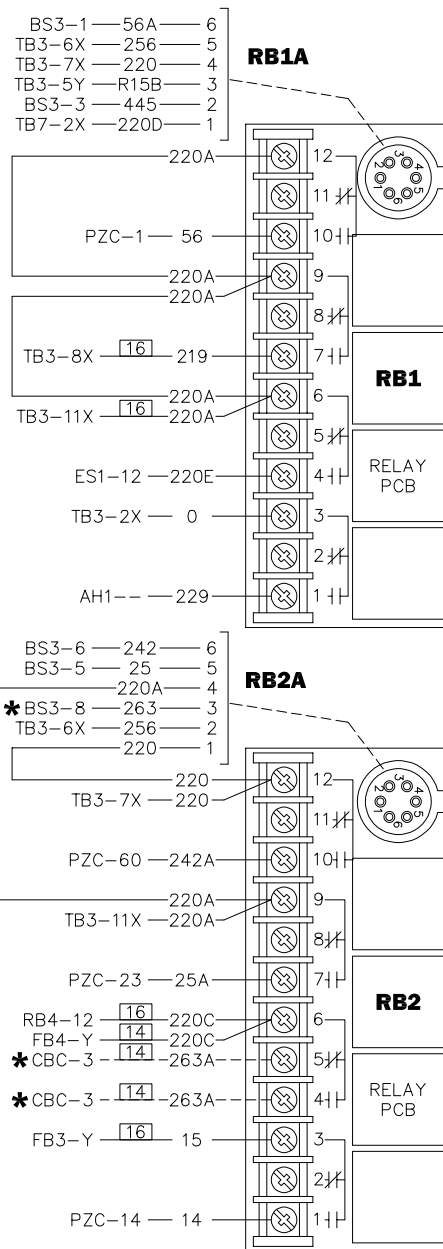
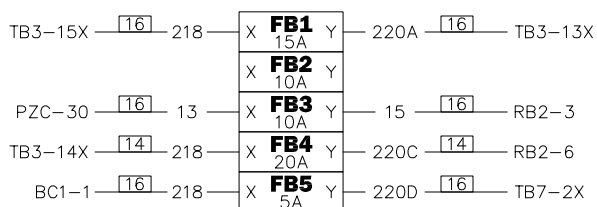
TB9



COMPONENTS LOCATED IN CONTROL PANEL LEFT SIDE

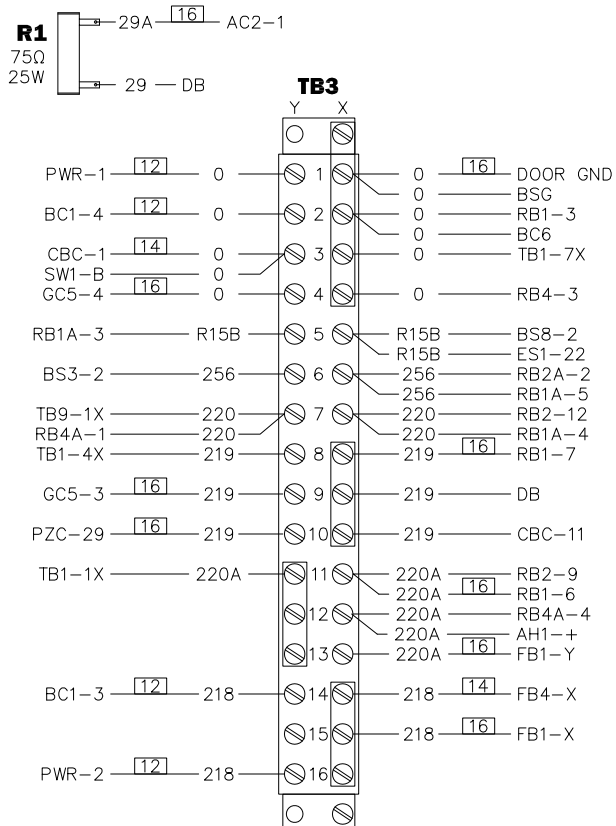


****NOTE:** 6A, 600V DIODE
LINE OF DIODE (CATHODE) MUST BE
ORIENTATED THE SAME AS IN THE
DRAWING.

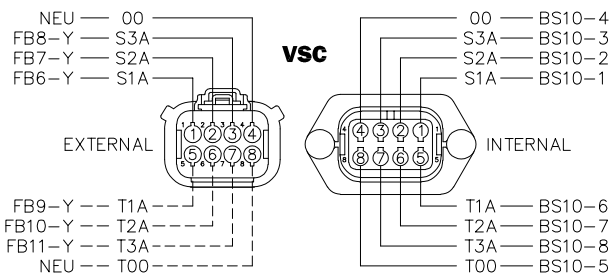
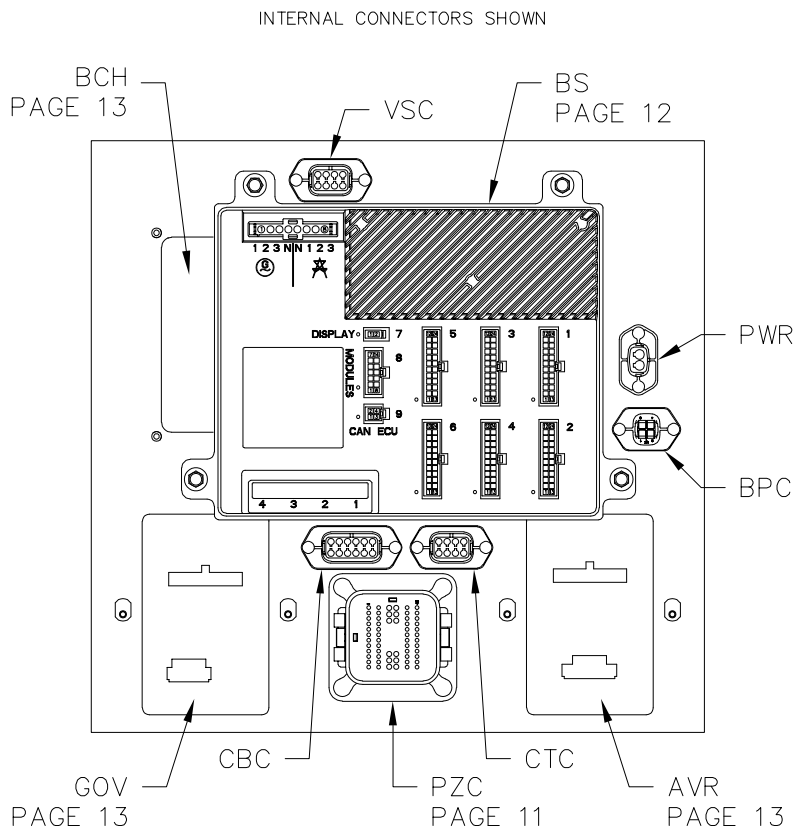


- *NOTES:**
1. WIRE 263A IS WIRED TO RB2-5 WHEN SHUNT TRIP IS INSTALLED IN MLCB.
 2. WIRE 263A IS WIRED TO RB2-4 WHEN UVR IS INSTALLED IN MLCB.
 3. BS3-8 OUTPUT NEEDS TO BE ADJUSTED WHEN UVR IS INSTALLED IN MLCB.

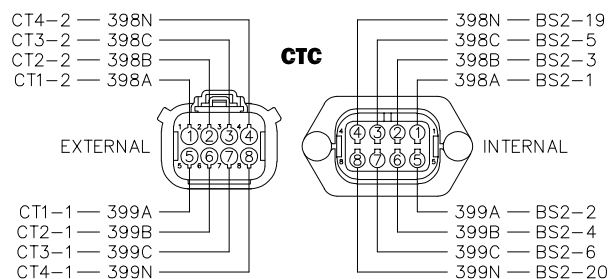
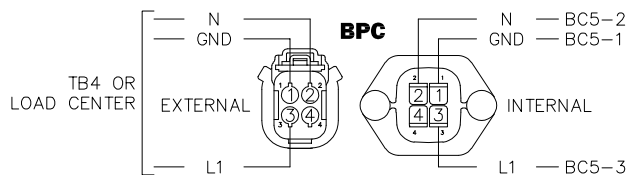
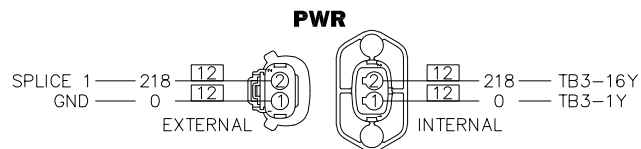
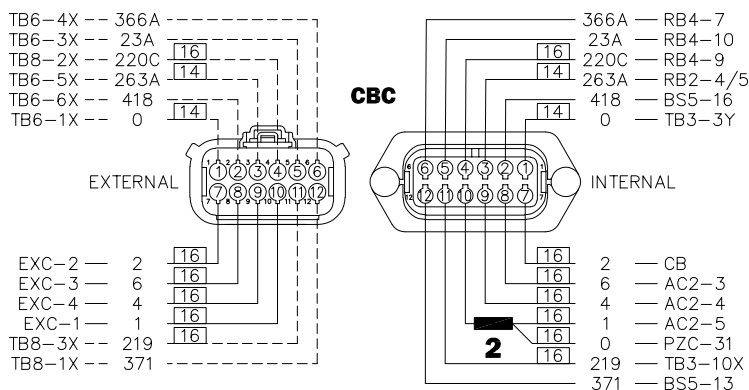
COMPONENTS LOCATED IN CONTROL PANEL RIGHT SIDE



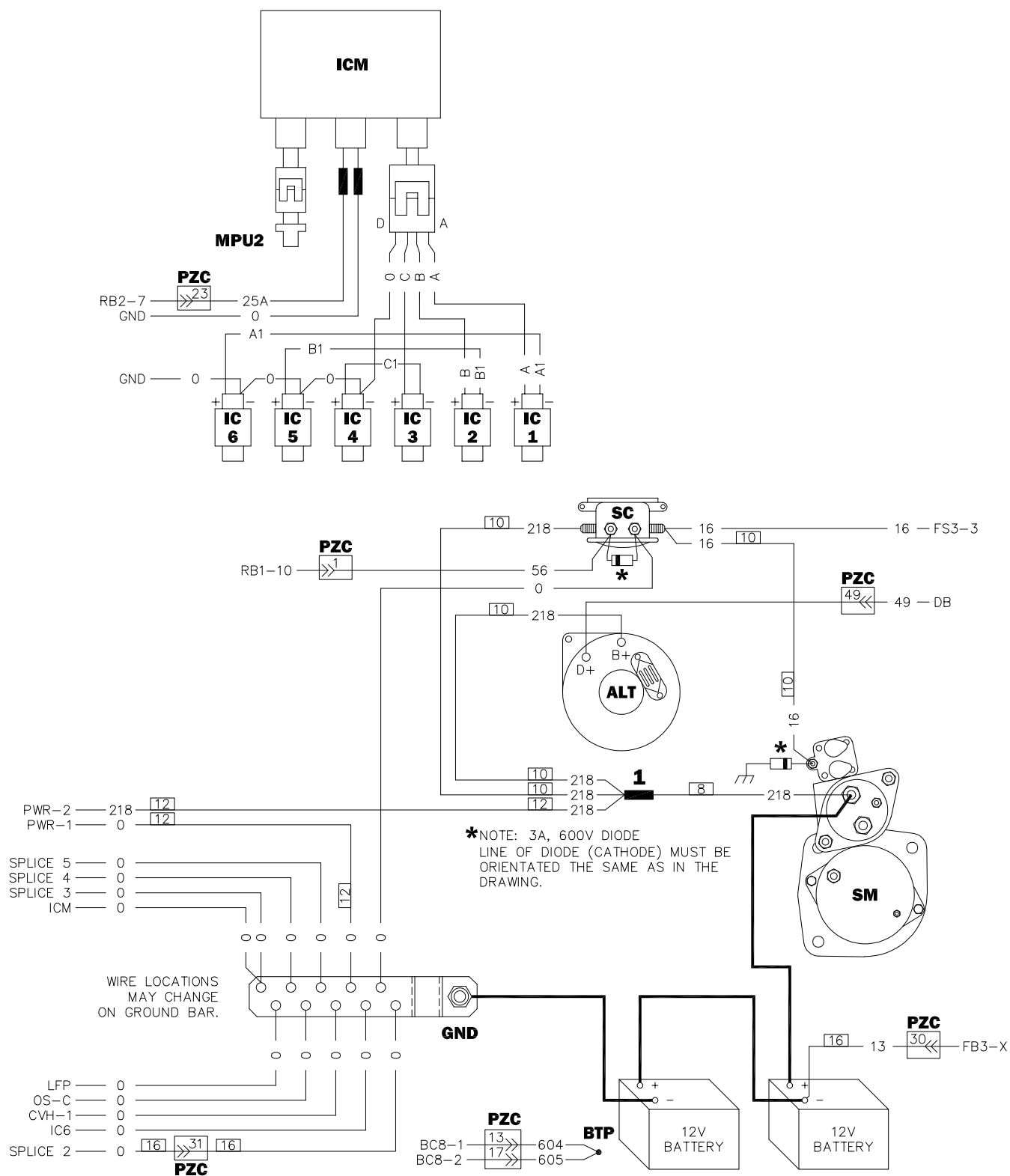
COMPONENTS LOCATED IN CONTROL PANEL



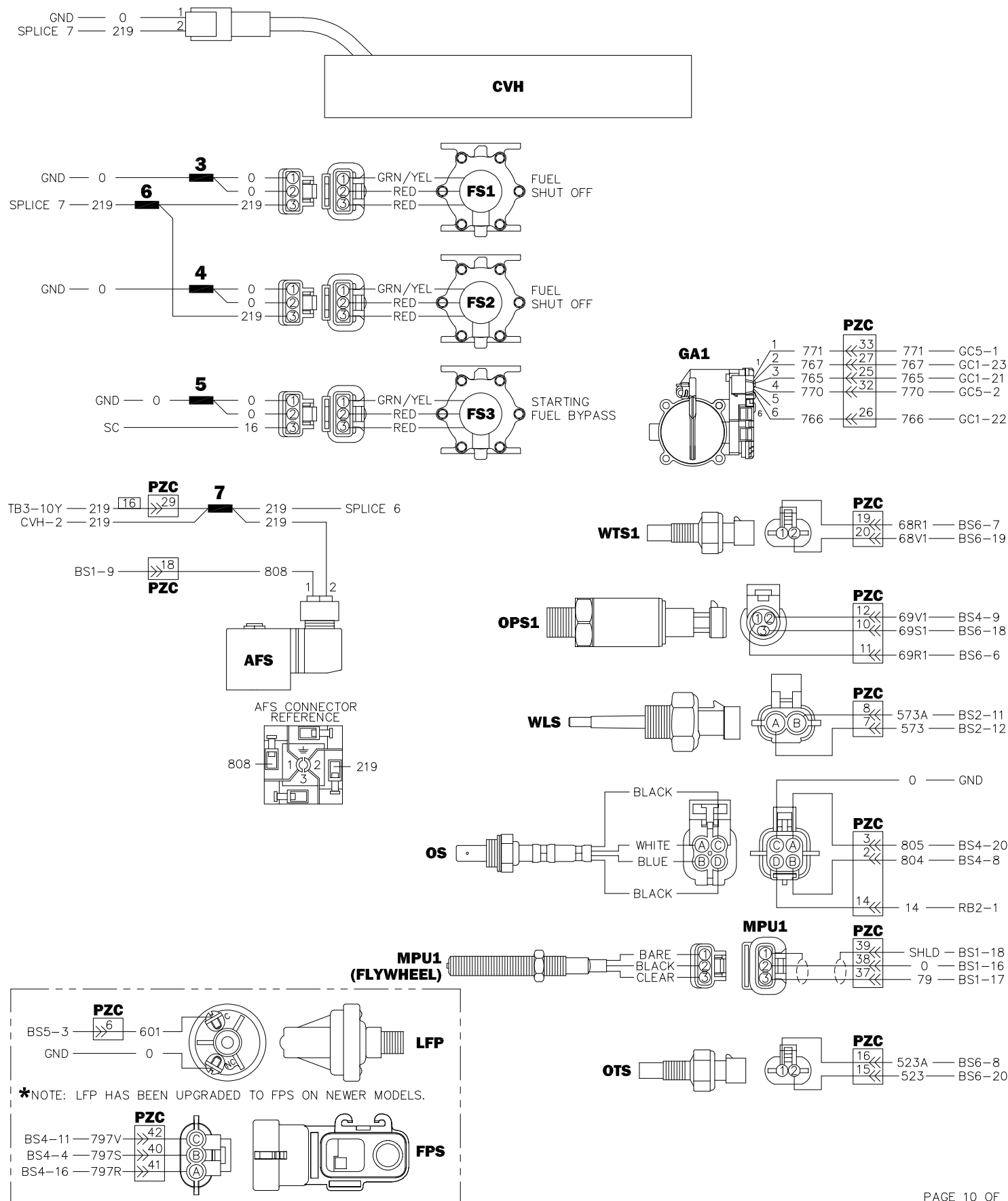
NOTE: THE DASHED WIRES IN CONNECTORS VSC AND CBC ARE POPULATED PER MPS APPLICATION.



COMPONENTS LOCATED ON ENGINE



COMPONENTS LOCATED ON ENGINE



COMPONENTS LOCATED IN CONTROL PANEL

PIN	WIRE	FROM	TO
1	56	RB1-10	SC
2	804	BS4-8	OS-B
3	805	BS4-20	OS-A
4	—	—	—
5	—	—	—
6	601	BS5-3	LFP-C
7	573	BS2-12	WLS-A
8	573A	BS2-11	WLS-B
9	—	—	—
10	69S1	BS6-18	OPS1-3
11	69R1	BS6-6	OPS1-1
12	69V1	BS4-9	OPS1-2

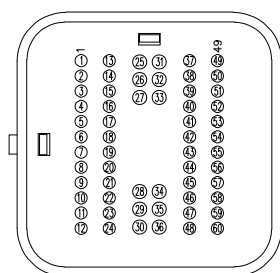
PIN	WIRE	FROM	TO
13	604	BC8-1	BTP
14	14	RB2-1	OS-D
15	523	BS6-20	OTS-2
16	523A	BS6-8	OTS-1
17	605	BC8-2	BTP
18	808	BS1-9	AFS-1
19	68R1	BS6-7	WTS1-1
20	68V1	BS6-19	WTS1-2
21	—	—	—
22	—	—	—
23	25A	RB2-7	ICM2
24	—	—	—

PIN	WIRE	FROM	TO
25	765	GC1-21	GA1-3
26	766	GC1-22	GA1-6
27	767	GC1-23	GA1-2

PIN	WIRE	FROM	TO
28	—	—	—
29	219	TB3-10Y	SPLICE 7
30	13	FB-3X	BATTERY

PIN
NUMBERS

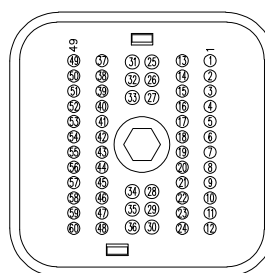
12 13 24 25 30 31 36 37 48 49 60



CONTROLLER SIDE
CONTROL PANEL

PIN
NUMBERS

60 49 48 37 36 31 30 25 24 13 12



ENGINE SIDE
CONTROL PANEL

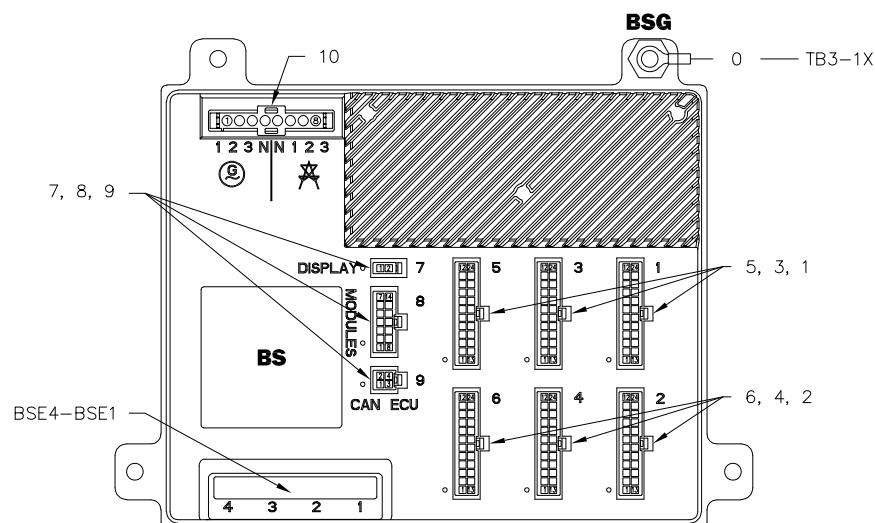
PIN	WIRE	FROM	TO
31	0	SPLICE 2	GND
32	770	GC5-2	GA1-4
33	771	GC5-1	GA1-1

PIN	WIRE	FROM	TO
34	—	—	—
35	—	—	—
36	—	—	—

PIN	WIRE	FROM	TO
37	79	BS1-17	MPU1-3
38	0	BS1-16	MPU1-2
39	SHLD	BS1-18	MPU1-1
40	797S	BS4-4	FPS-B
41	797R	BS4-16	FPS-A
42	797V	BS4-11	FPS-C
43	—	—	—
44	—	—	—
45	—	—	—
46	—	—	—
47	—	—	—
48	—	—	—

PIN	WIRE	FROM	TO
49	49	DB	ALT
50	—	—	—
51	—	—	—
52	—	—	—
53	—	—	—
54	—	—	—
55	—	—	—
56	—	—	—
57	—	—	—
58	—	—	—
59	—	—	—
60	242A	RB2-10	N/A

COMPONENTS LOCATED IN CONTROL PANEL



FROM	WIRE	PIN
—	—	12
TB2—4X	816	11
—	—	10
TB9—7X	DI5	9
—	—	8
—	—	7
BCC—8	505	6
TB1—8X	183	5
TB9—3X	R15	4
PZC—6	601	3
SW1—3	175	2
SW1—1	174	1

PIN	WIRE	FROM
24	D18	TB9-11X
23	D17	TB9-10X
22	D16	TB9-8X
21	D12	TB2-6X
20	D11	TB2-5X
19	D14	TB2-9X
18	D13	TB2-8X
17	—	—
16	418	CBC-2
15	—	—
14	—	—
13	371	CBC-12

FROM	WIRE	PIN
—	—	12
—	—	11
TB2-3X	815	10
TB2-2X	814	9
RB2A-3	263	8
TB2-1X	813	7
RB2A-6	242	6
RB2A-5	25	5
—	—	4
RB1A-2	445	3
TB3-6Y	256	2
RB1A-6	56A	1

BS3

PIN

PIN	WIRE	FROM
24	—	—
23	—	—
22	—	—
21	—	—
20	OC23	RB3A-6
19	OC22	RB3A-5
18	OC21	RB3A-3
17	OC20	RB3A-2
16	366	RB4-2
15	—	—
14	23	RB4A-6
13	—	—

FROM	WIRE	PIN
—	—	12
TB7-1X	220F	11
TB7-1X	220F	10
PZC-18	808	9
—	—	8
—	—	7
—	—	6
—	—	5
TB1-12X	SHLD	4
TB1-11X	0	3
TB1-9X	390	2
TB1-10X	391	1

BS1

PIN

PIN	WIRE	FROM
24	—	—
23	—	—
22	0	BC1-2
21	—	—
20	—	—
19	—	—
18	SHLD	PZC-39
17	79	PZC-37
16	0	PZC-38
15	—	—
14	—	—
13	—	—

FROM	WIRE	PIN	PIN
—	—	12	
—	—	11	
—	—	10	
—	—	9	
PZC-16	523A	8	
PZC-19	68R1	7	
PZC-11	69R1	6	
TB2-12X	A11R	5	
—	—	4	
—	—	3	
—	—	2	
—	—	1	1

PIN	WIRE	FROM
24	—	—
23	—	—
22	—	—
21	—	—
20	523	PZC-15
19	68V1	PZC-20
18	69S1	PZC-10
17	A11S	TB2-11X
16	—	—
15	—	—
14	—	—
13	—	—

FROM	WIRE	PIN
—	—	12
PZC-42	797V	11
—	—	10
PZC-12	69V1	9
PZC-2	804	8
—	—	7
—	—	6
—	—	5
PZC-40	797S	4
—	—	3
—	—	2
BCC-6	803V	1

BS4

PIN

PIN	WIRE	FROM
24	—	—
23	—	—
22	—	—
21	—	—
20	805	PZC-3
19	—	—
18	—	—
17	—	—
16	797R	PZC-41
15	—	—
14	—	—
13	—	—

FROM	WIRE	PIN
PZC-7	573	12
PZC-8	573A	11
—	—	10
—	—	9
—	—	8
—	—	7
CTC-7	399C	6
CTC-3	398C	5
CTC-6	399B	4
CTC-2	398B	3
CTC-5	399A	2
CTC-1	398A	1


BS2


PIN

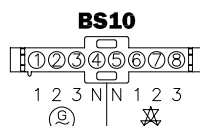
PIN	WIRE	FROM
24	—	—
23	—	—
22	—	—
21	—	—
20	398N	CTC-8
19	398N	CTC-4
18	—	—
17	—	—
16	—	—
15	—	—
14	—	—
13	—	—

FROM			WIRE			PIN		
DIS1-1			15A			1		

BS8

FROM	WIRE	PIN	PIN	PIN	WIRE	FROM
—	—	7		14	—	—
—	—	6		13	—	—
—	—	5		12	—	—
AC1—10	OF	4		11	15F	AC1—11
—	—	3		10	15E	GC1—24
TB3—5X	R15B	2	9	744G	BC2—4	
BC2—3	SHLD	1	8	743G	BC2—5	

FROM			PIN			PIN			FROM		
—	—	2				4	—	—	—	—	—
—	—	1				3	—	—	—	—	—



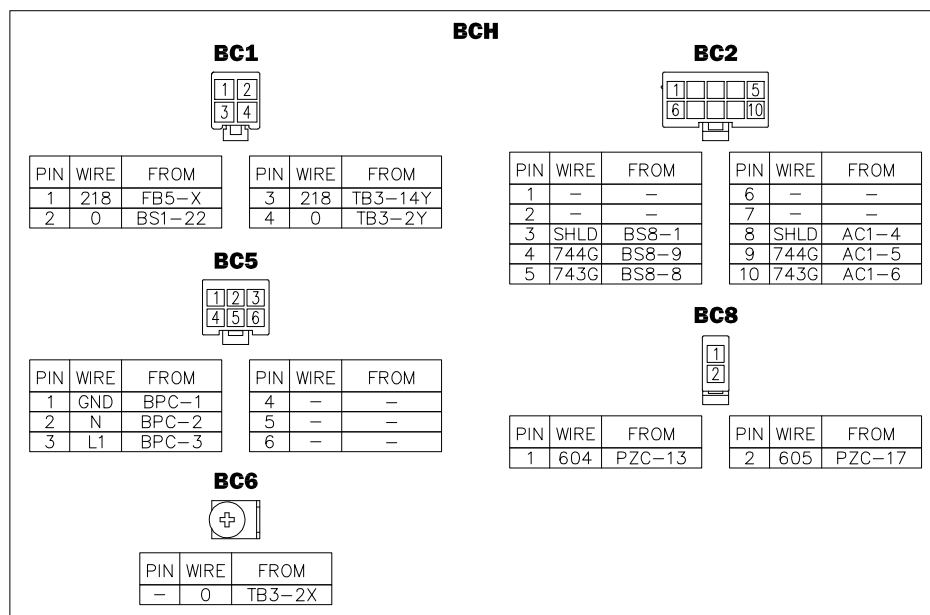
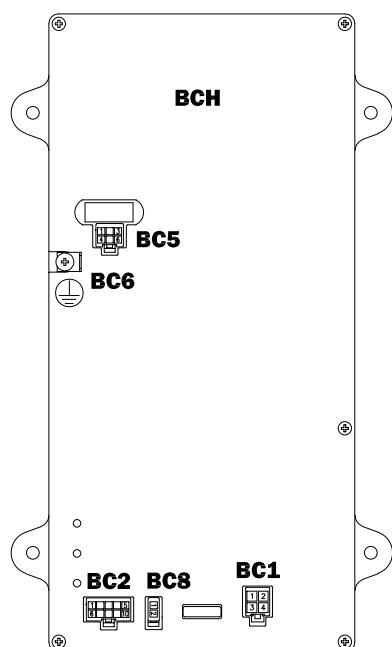
	PIN	WIRE	FROM
GEN 1	1	S1A	VSC-1
GEN 2	2	S2A	VSC-2
GEN 3	3	S3A	VSC-3
GEN N	4	00	VSC-4
UTIL N	5	T00	VSC-8
UTIL 1	6	T1A	VSC-5
UTIL 2	7	T2A	VSC-6
UTIL 3	8	T3A	VSC-7

PORT	WIRE	TO	FUNCTION
BSE1	E1	DIS	DISPLAY TO BASE COM
BSE2	E2	GEN BUS	MPS GENERATOR TO GENERATOR COM
BSE3	E3	GEN BUS	MPS GENERATOR TO GENERATOR COM
BSE4	E4	AUX DEVICE	AUX OPTION COM

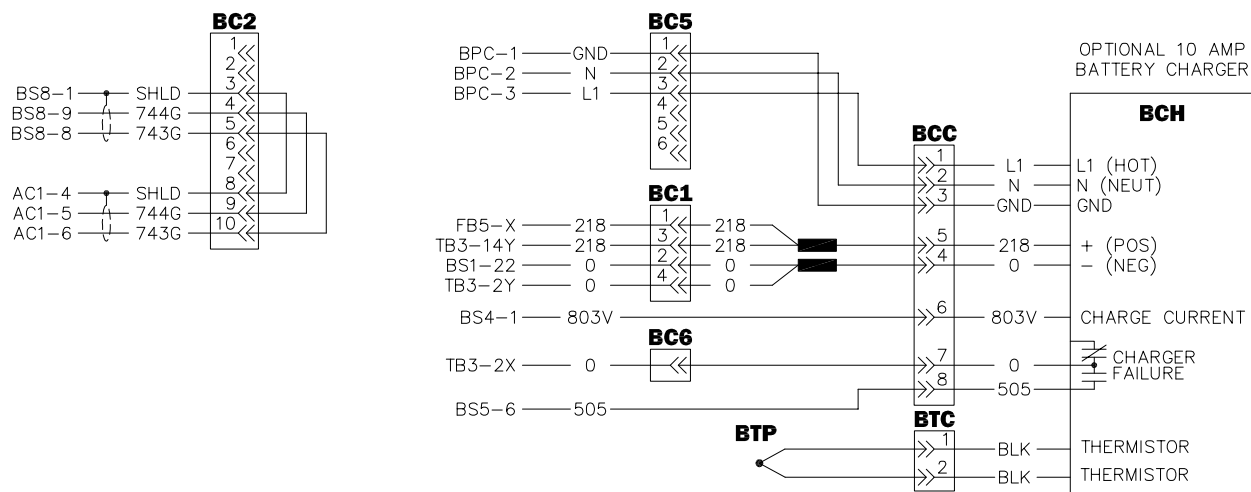
COMPONENTS LOCATED IN CONTROL PANEL

BATTERY CHARGER

OPTIONAL 20 AMP BATTERY CHARGER

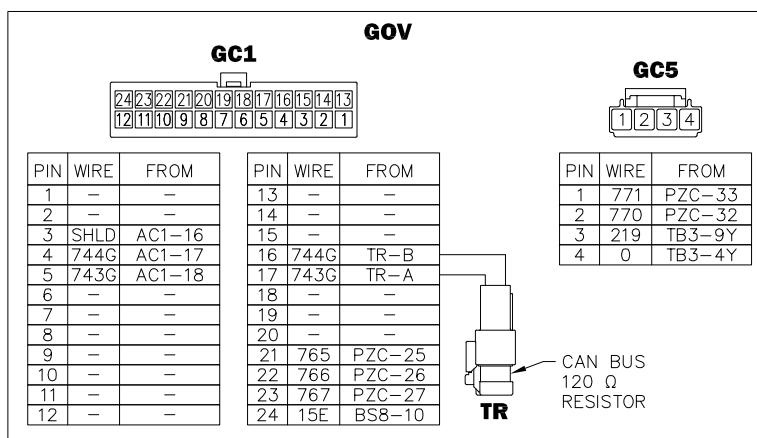
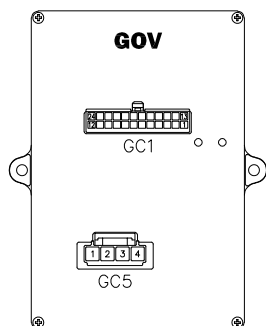


BATTERY CHARGER

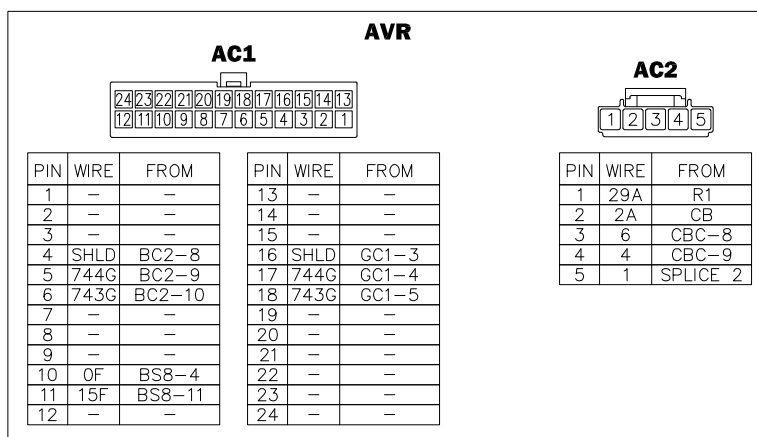
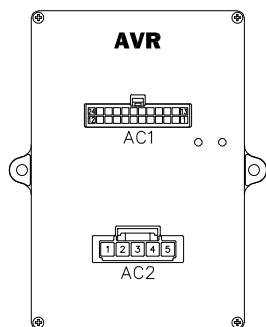


BTP NOTE:
NEWER BATTERY CHARGER MODELS ARE EQUIPPED WITH A BATTERY TEMPERATURE COMPENSATION PROBE. BTP THERMISTOR END TO BE LOCATED 1.5" to 3" FROM BATTERY POSITIVE TERMINAL POST.

COMPONENTS LOCATED IN CONTROL PANEL GOVERNOR CONTROLLER

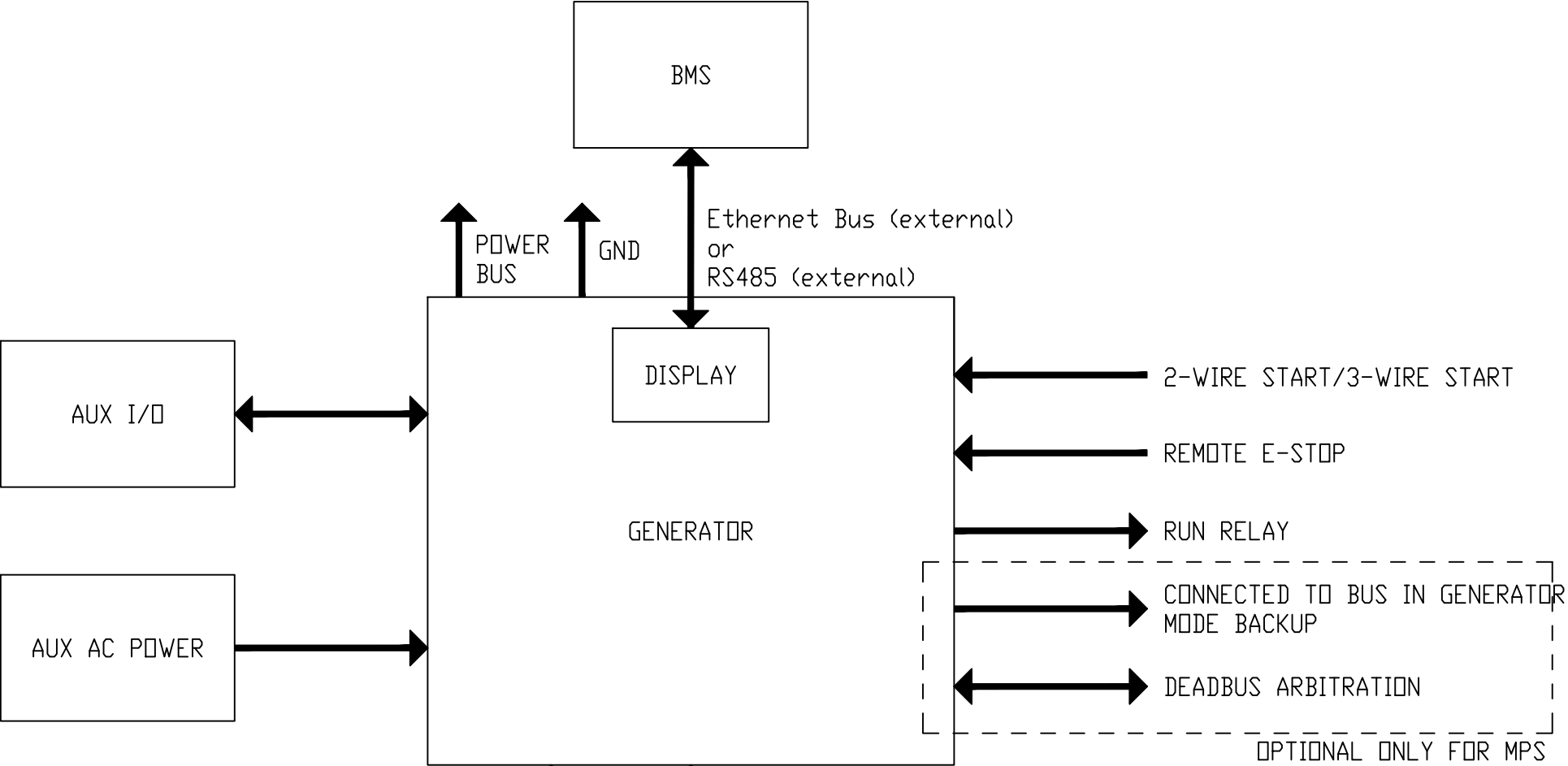


AVR CONTROLLER



B

B



Reference	
MPS	Modular Power System. Parallel generator system.
BMS	Building Management System using Modbus TCP/IP.
Remote E-Stop	Remote Emergency Stop to shutdown the generator incase of emergency
Run Relay	This is an optional wiring used by the customer to activate/deactivate optional features based on generator running status.
2-Wire Start	Transfer switches sense loss of normal power and initiate a system start through this function.
Connected to bus in Backup	Output from generator to P&L to indicate that the generator is connected to power bus.
Deadbus Arbitration	This function ensures that only one generator is closing into the dead bus when operating with failed communications.
Aux I/O	Each generator has 4 configurable relay outputs, 4 configurable inputs and 2 configurable analog inputs for customer special use.
Aux AC Power	Generator utilizes load center to power the block heater, battery charger etc. (refer to generator Specs for wiring details).
Ethernet Bus	Not indicated in the above picture, but the Ethernet Bus is used to connect a wide range of devices to the generator, like RAP/RRP, P&L and other generators. There are two networks - controller and external
Display	It can be accessed through PC/Tablet/Smartphone using Wifi/Bluetooth.

A

A

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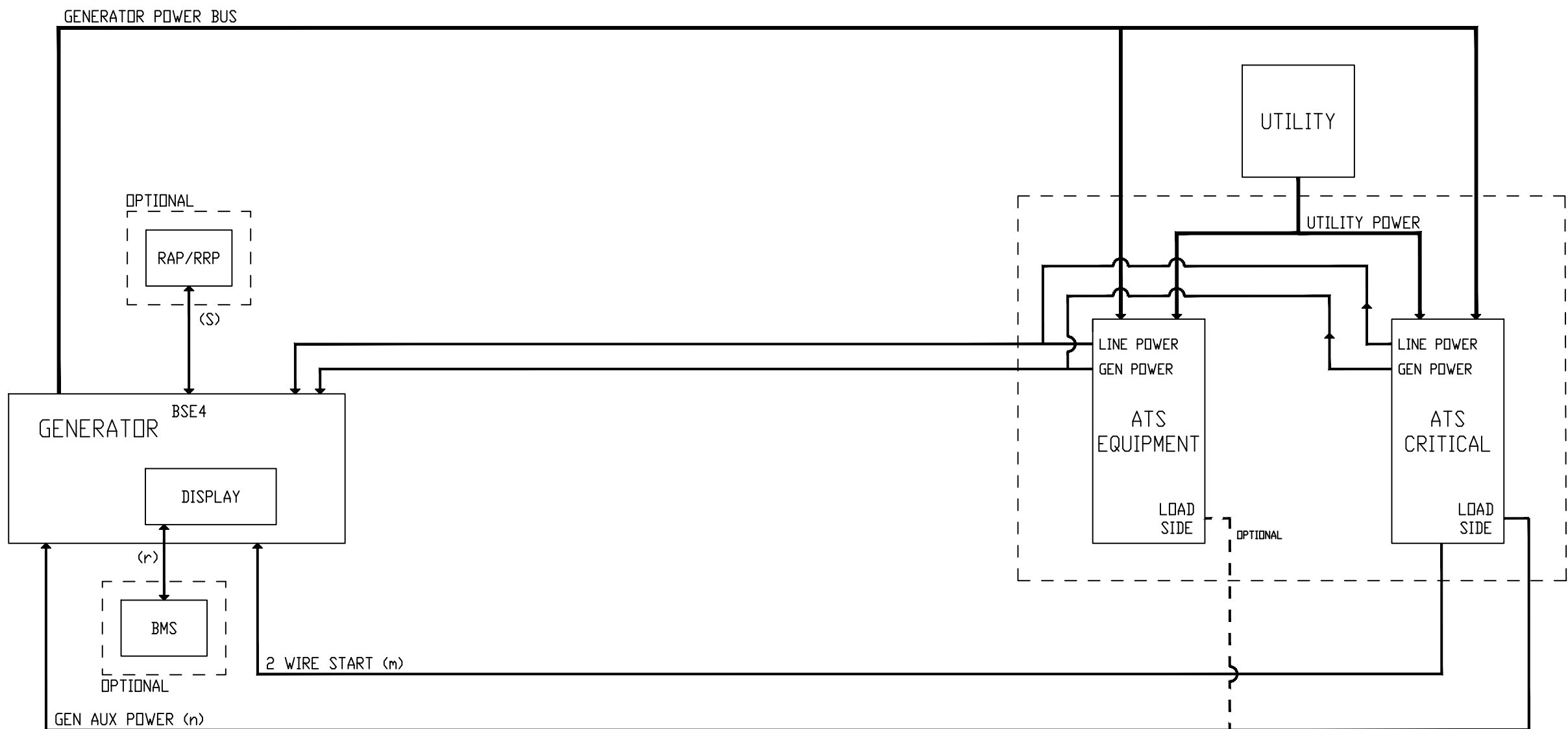
TITLE

INTERCONNECT DRAWING
POWER ZONE PRO SYNC

ISSUE DATE: 05/22/18

SIZE B	CAGE NO N/A	DWG NO 10000034013	REV D
SCALE N/A	WT-KG N/A	SHEET 1 of 12	

INTERCONNECT DRAWING SINGLE GENERATOR
(OBSOLETE ETHERNET RAP CONNECTION)



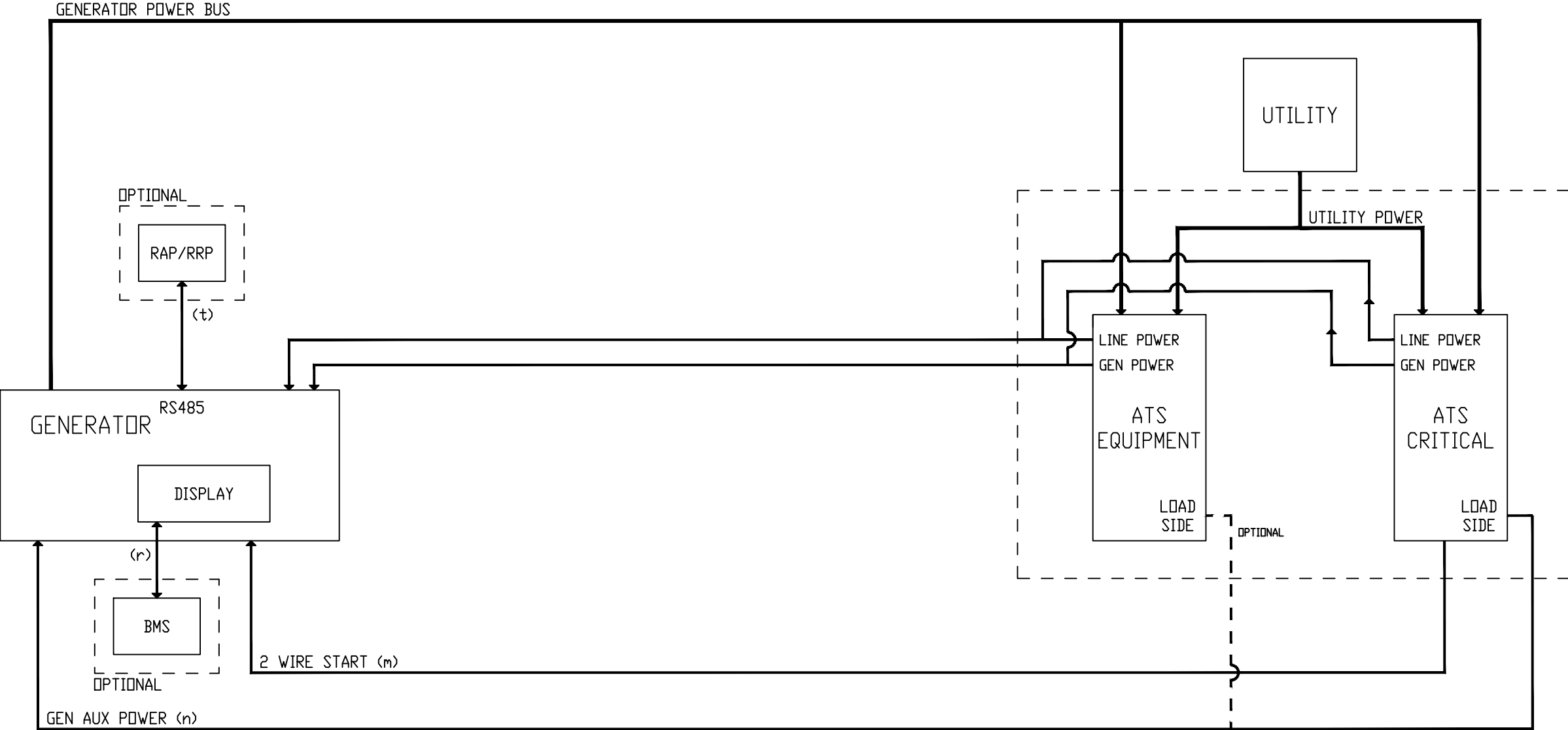
- NOTES:
- DISPLAY IS CONNECTED TO ETHERNET PORT 1 OF MAIN CONTROLLER

GENERAC

TITLE				
INTERCONNECT DRAWING POWER ZONE PRO SYNC				
ISSUE DATE: 05/22/18				
SIZE B	CAGE NO N/A	DWG NO 10000034013	REV D	
SCALE N/A	WT-KG N/A	SHEET 2 of 12		

INSTALLATION DRAWING

INTERCONNECT DRAWING SINGLE GENERATOR



- NOTES:
- DISPLAY IS CONNECTED TO ETHERNET PORT 1 OF MAIN CONTROLLER

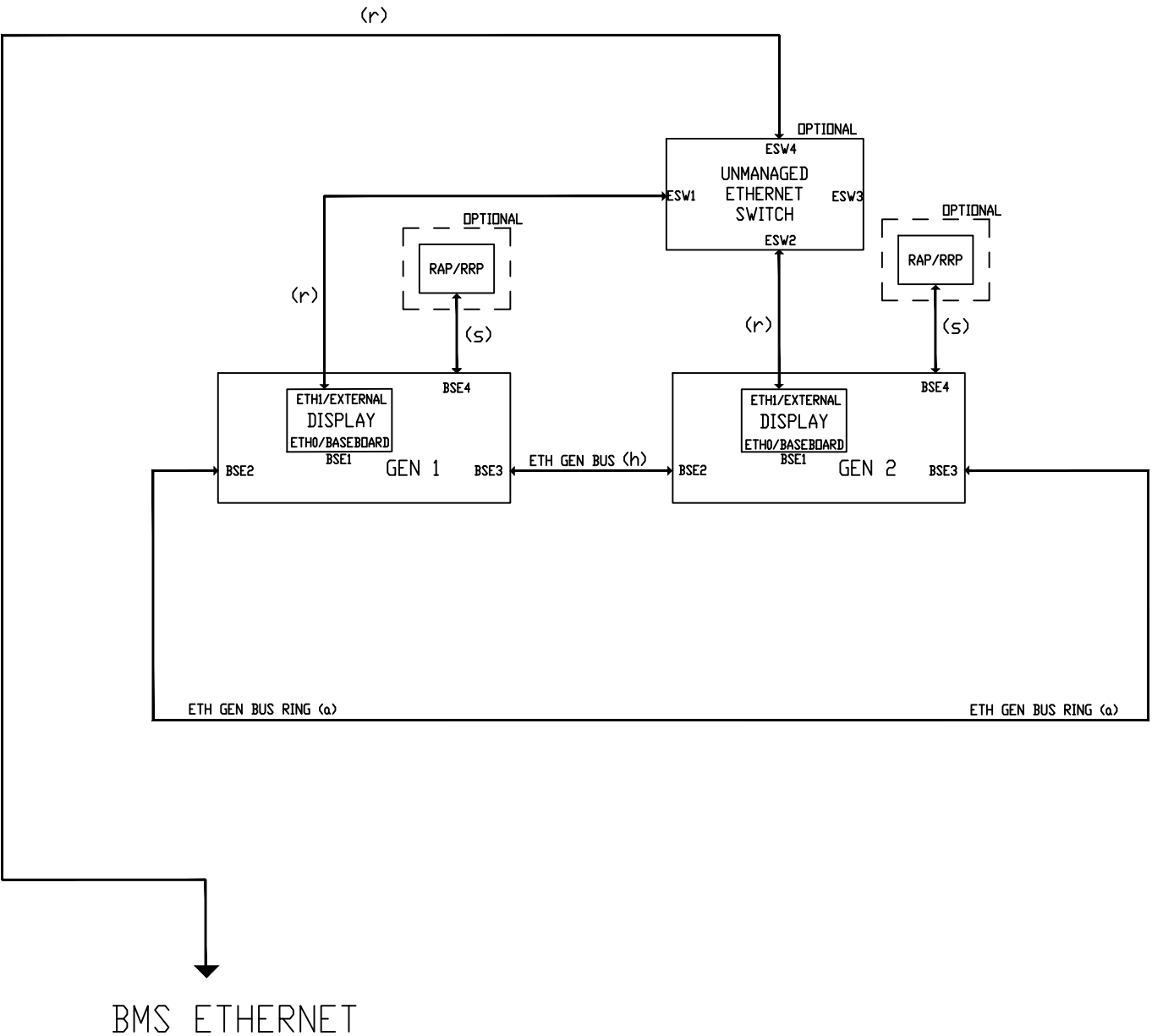
GENERAC

TITLE
INTERCONNECT DRAWING
POWER ZONE PRO SYNC

ISSUE DATE:		05/22/18	
SIZE	CAGE NO	DWG NO	REV
B	N/A	10000034013	D
SCALE	N/A	WT-KG	N/A
SHEET 3 of 12			

INSTALLATION DRAWING

INTERCONNECT TWO GENERATOR MPS
(OBSOLETE ETHERNET RAP CONNECTION)



- NOTES:
- 1. SHOWING GENERATOR ETHERNET CONNECTIONS ONLY
 - 2. DO NOT CHANGE CONFIGURATION OF THE CONNECTIONS IN ANY WAY
 - 3. UNMANAGED ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 - 4. GENERAC RECOMMENDS ANTAIRA P/N LNX-800AT (8 PORT) OR LNX-500AT (5 PORT) UNMANAGED ETHERNET SWITCH

INSTALLATION DRAWING

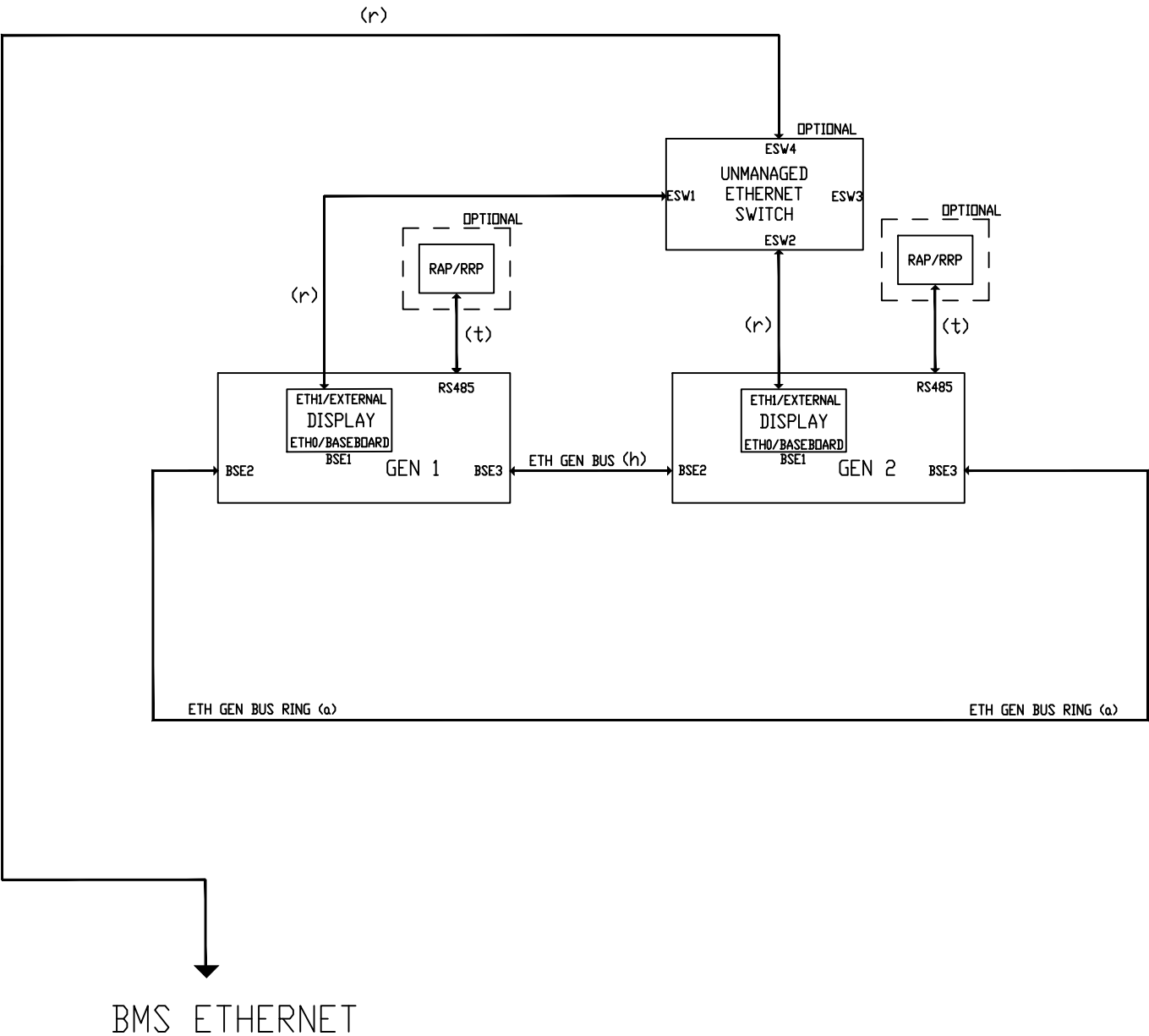


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INTERCONNECT DRAWING POWER ZONE PRO SYNC				
ISSUE DATE: 05/22/18				
SIZE B	CAGE NO N/A	DWG NO 10000034013	REV D	
SCALE N/A	WT-KG N/A	SHEET 4 of 12		

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INTERCONNECT TWO GENERATOR MPS



- NOTES:
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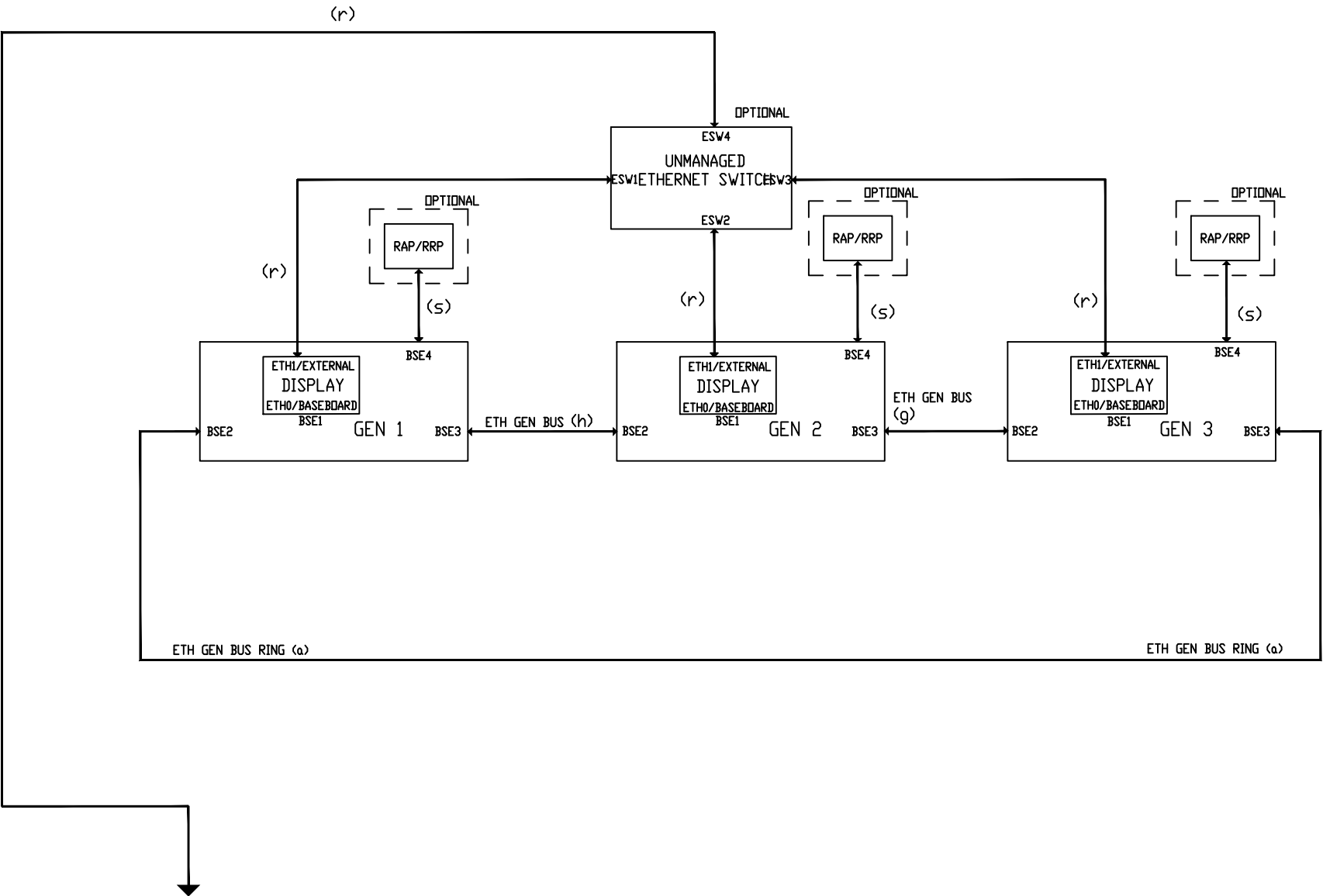
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INTERCONNECT DRAWING
POWER ZONE PRO SYNC

ISSUE DATE:		05/22/18	
SIZE	CAGE NO	DWG NO	REV
B	N/A	10000034013	D
SCALE	N/A	WT-KG	N/A
SHEET 5 of 12			

INSTALLATION DRAWING

INTERCONNECT THREE GENERATOR MPS
(OBSOLETE ETHERNET RAP CONNECTION)



BMS
ETHERNET

TO BUILDING

- NOTES:
- 1. SHOWING GENERATOR ETHERNET CONNECTIONS ONLY
 - 2. DO NOT CHANGE CONFIGURATION OF THE CONNECTIONS IN ANY WAY
 - 3. UNMANAGED ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 - 4. GENERAC RECOMMENDS ANTAIRA P/N LNX-800AT (8 PORT) OR LNX-500AT (5 PORT) UNMANAGED ETHERNET SWITCH

INSTALLATION DRAWING

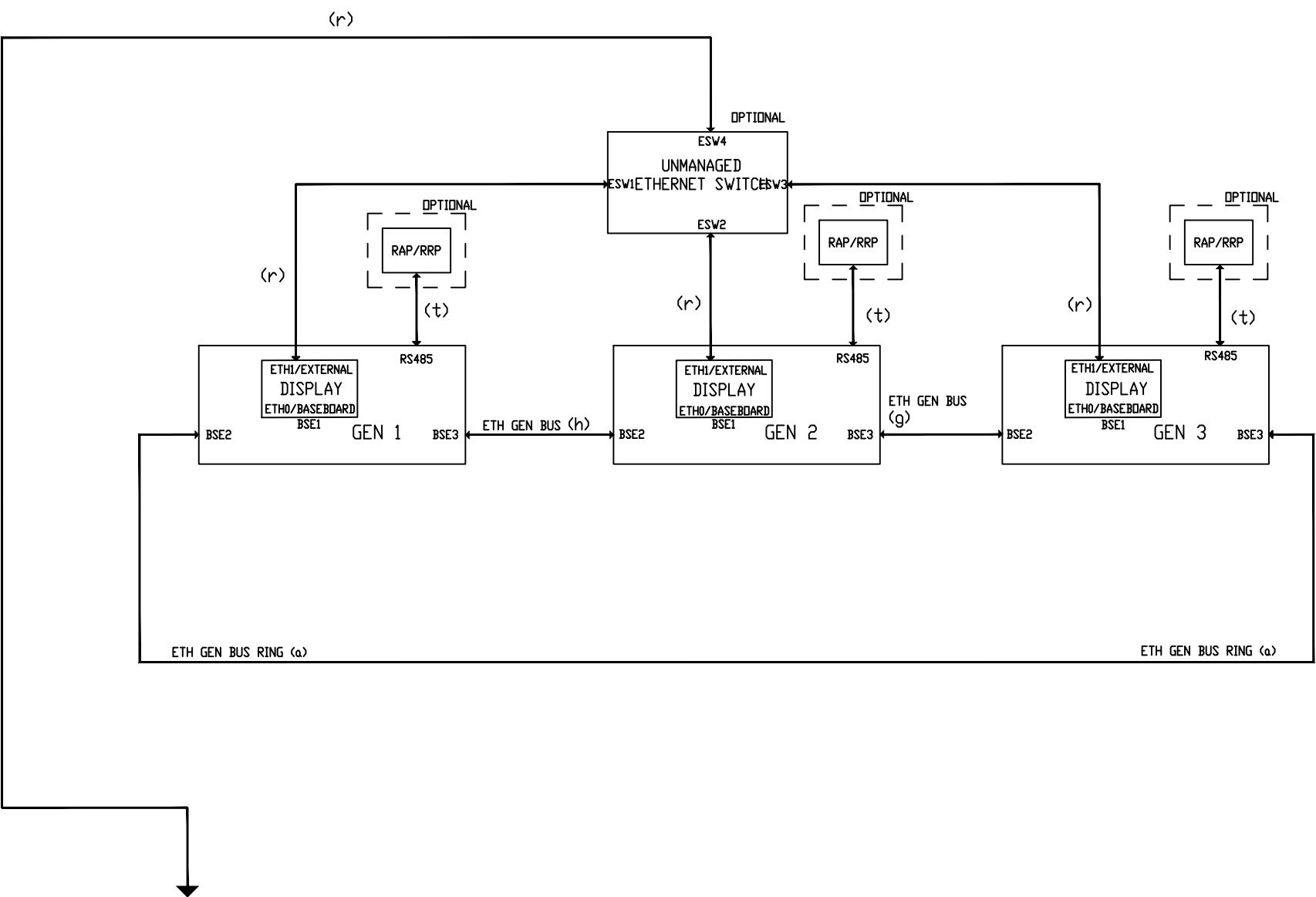
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INTERCONNECT DRAWING POWER ZONE PRO SYNC				
ISSUE DATE: 05/22/18				
SIZE	CAGE NO	DWG NO	REV	
B	N/A	10000034013	D	
SCALE	N/A	WT-KG	N/A	SHEET 6 of 12

INTERCONNECT THREE GENERATOR MPS



BMS
ETHERNET

TO BUILDING

- NOTES:
- 1. SHOWING GENERATOR ETHERNET CONNECTIONS ONLY
 - 2. DO NOT CHANGE CONFIGURATION OF THE CONNECTIONS IN ANY WAY
 - 3. UNMANAGED ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 - 4. GENERAC RECOMMENDS ANTAIRA P/N LNX-800AT (8 PORT) OR LNX-500AT (5 PORT) UNMANAGED ETHERNET SWITCH

INSTALLATION DRAWING



TITLE				
INTERCONNECT DRAWING POWER ZONE PRO SYNC				
ISSUE DATE: 05/22/18				
SIZE	CAGE NO	DWG NO	REV	
B	N/A	10000034013	D	
SCALE	N/A	WT-KG	N/A	SHEET 7 of 12

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BMS
ETHERNET

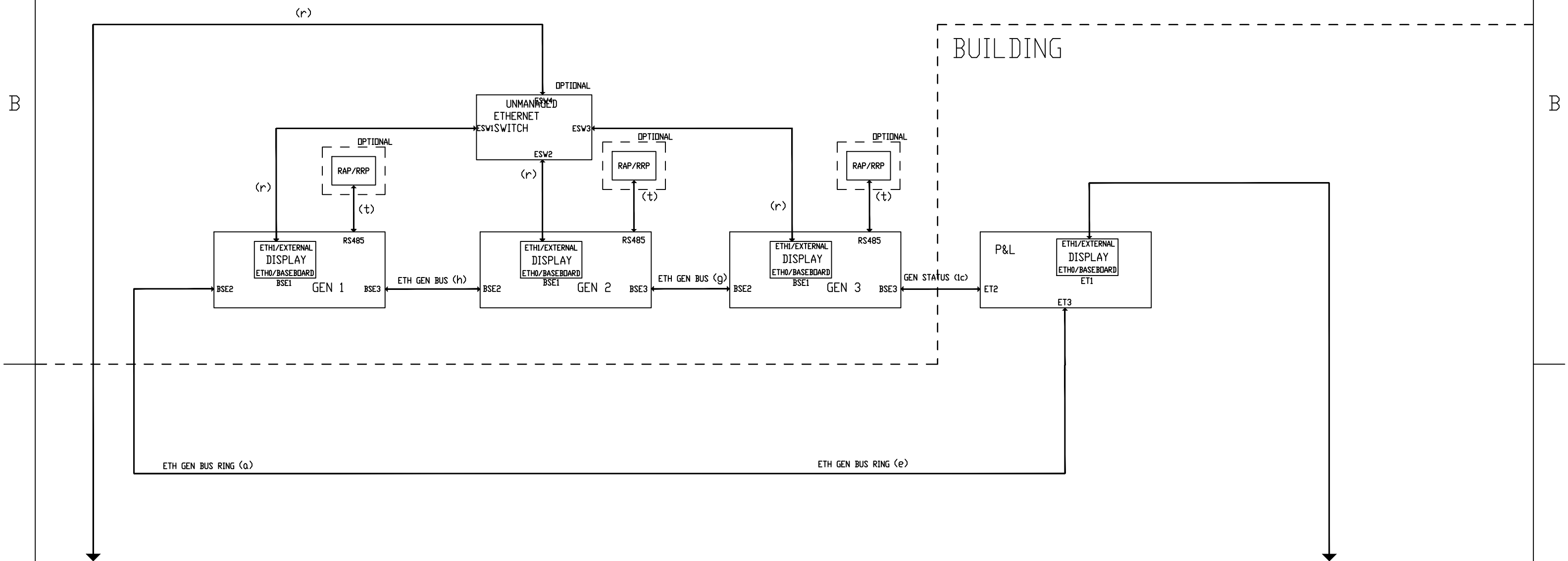
- # GENERAC®

INTERCONNECT DRAWING
POWER_ZONE_PRO_SYNC

SIZE B	CAGE NO N/A	DWG NO 10000034013	REV D
SCALE N/A	WT-KG N/A	SHEET 8 of 12	

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INTERCONNECT THREE GENERATOR MPS WITH P&L AND RAP/RRP



BMS
ETHERNET

BMS
ETHERNET

- NOTES:
1. SHOWING GENERATOR P&L AND RAP/RRP ETHERNET CONNECTIONS ONLY
 2. DO NOT CHANGE CONFIGURATION OF THE CONNECTIONS IN ANY WAY
 3. UNMANAGED ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 4. ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 5. GENERAC RECOMMENDS ANTAIRA P/N LNX-800AT (8 PORT) OR LNX-500AT (5 PORT) UNMANAGED ETHERNET SWITCH



TITLE				
INTERCONNECT DRAWING POWER ZONE PRO SYNC				
ISSUE DATE: 05/22/18				
SIZE	CAGE NO	DWG NO	10000034013	
B	N/A		REV D	
SCALE	N/A	WT-KG	N/A	SHEET 9 of 12

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B



NOTES:

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3. UNMANAGED ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
4. ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
5. GENERAC RECOMMENDS ANTAIRA P/N LNX-800AT (8 PORT) OR LNX-500AT (5 PORT) UNMANAGED ETHERNET SWITCH

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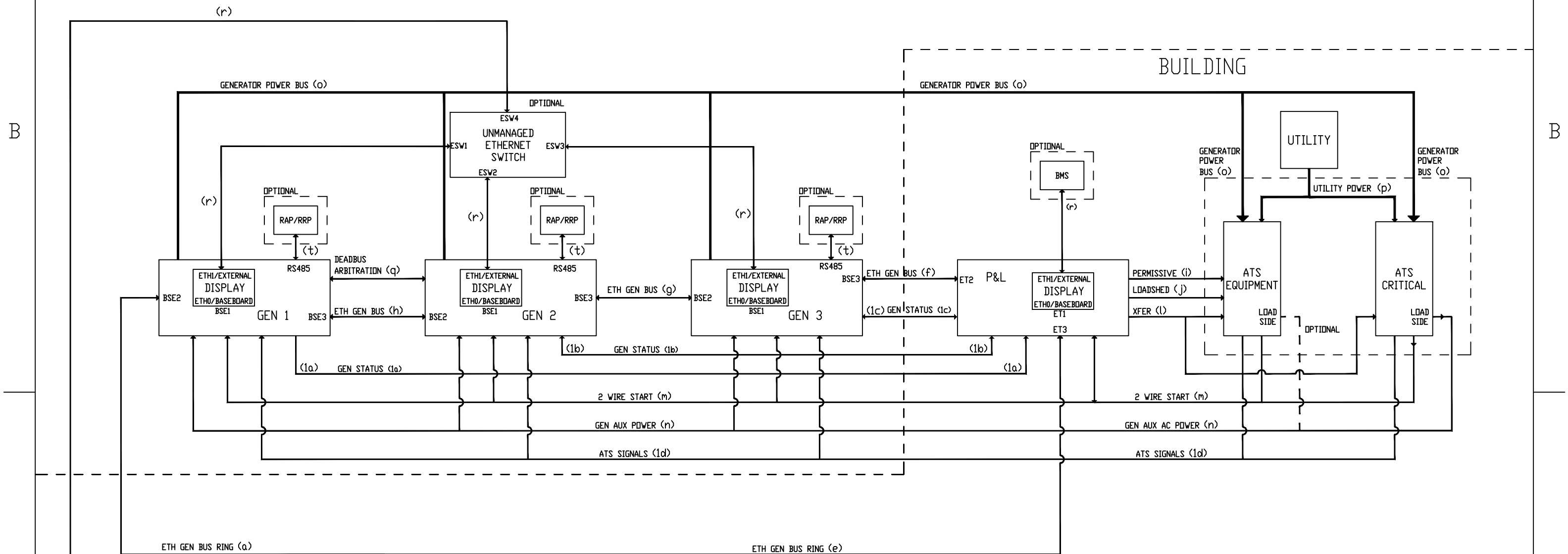
GENERAC

TITLE	INTERCONNECT DRAWING POWER ZONE PRO SYNC
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ISSUE DATE:		05/22/18	
SIZE B	CAGE NO N/A	DWG NO 10000034013	REV D
SCALE N/A	WT-KG N/A	SHEET 10 of 12	

INSTALLATION DRAWING

INTERCONNECT DRAWING MPS SYSTEM WITH ATS



BMS
ETHERNET

INSTALLATION DRAWING

- NOTES:
- 1. SHOWING GENERATOR ETHERNET CONNECTIONS ONLY
 - 2. DO NOT CHANGE CONFIGURATION OF THE CONNECTIONS IN ANY WAY
 - 3. UNMANAGED ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 - 4. ETHERNET SWITCH NOT SUPPLIED BY GENERAC (UPS BACKED POWER SUPPLY RECOMMENDED)
 - 5. GENERAC RECOMMENDS ANTAIRA P/N LNX-800AT (8 PORT) OR LNX-500AT (5 PORT) UNMANAGED ETHERNET SWITCH

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TITLE				
INTERCONNECT DRAWING POWER ZONE PRO SYNC				
ISSUE DATE: 05/22/18				
SIZE	CAGE NO	DWG NO	REV	
B	N/A	10000034013	D	
SCALE	N/A	WT-KG	N/A	SHEET 11 of 12

Reference	
Single RAP/RRP	When a RAP/RRP (Remote Annunciator Panel/Remote Relay Panel) is configured as singleRAP/RRP, it receives data from only the configured generator and annunciates alarms and warnings of that generator.
System RAP/RRP	If configured as System RAP/RRP, receives data from every generator and announces alarms and warnings occuring on any of the generators.
P&L	Permissive and Loadshed panel controls the Permissives and Loadsheds of ATS .
Gen	Generator
Ethernet Switch	Used to forward data packets from one ethernet port to the other ethernet port.
ATS Critical	Automatic Transfer Switch used to connect Critical Loads
ATS Equipment	Automatic Transfer Switch used to connect regular non critical Loads
BSEx	Base Station Ethernet Port x
ESWx	Ethernet Switch Port x
ETx	P&L Ethernet Port x

Reference	Function	Cable	From	To	Class
a	Communication from generator to all peripherals in controller network	Shielded CAT 5E	BSE2 on Gen1	ESW1 on Ethernet Switch	2
b	Remote Annunciator communication in controller network	Shielded CAT 5E	Eth(J12) on RAP/RRP Gen 1	ESW2 on Ethernet Switch	2
c	Remote Annunciator communication in controller network	Shielded CAT 5E	Eth(J12) on RAP/RRP Gen 2	ESW3 on Ethernet Switch	2
d	Remote Annunciator communication in controller network	Shielded CAT 5E	Eth(J12) on RAP/RRP Gen 3	ESW4 on Ethernet Switch	2
e	Close loop connecting P&L in controller network	Shielded CAT 5E	ESW6 on Ethernet Switch	Eth 3 on P&L	2
f	P&L connection to Generator 3 or the last generator in the controller network.	Shielded CAT 5E	Eth 2 on P&L	BSE3 on Gen 3	2
g	Communication between generators in controller network	Shielded CAT 5E	BSE2 on Gen 3	BSE3 on Gen 2	2
h	Communication between generators in controller network	Shielded CAT 5E	BSE2 on Gen 2	BSE3 on Gen 1	2
i	Up to 6 Permissive relay outputs to ATS	18 AWG,300V AC	P&L Panel	ATS Equipment	2
j	Up to 6 Loadshed relay outputs to ATS	18 AWG,300V AC	P&L Panel	ATS Equipment	2
k	Remote Annunciator communication in controller network	Shielded CAT 5E	Eth(J12) on System RAP/RRP	ESW5 on Ethernet Switch	2
l	Excercise with load transfer	18 AWG,300V AC	P&L Panel	ATS Equipment	2
m	2 Wire Start	18 AWG,300V AC	ATS Critical/ATS Equipment	All Generators and P&L	2
n	Generator Auxiliary Power	Custom cable based on generator auxiliary	ATS Critical/ATS Equipment loadside	All Generators	POWER
o	Generator power bus connections to ATS Critical & ATS Equipment	Custom cable proportional to ATS specifications	Generator power bus connecting all	ATS Critical and ATS	POWER
p	Utility power bus connections for ATS	Custom cable proportional to ATS specifications	Utility power bus	ATS Critical and ATS	POWER
q	Deadbus Arbitration -2 signals. Can be setup for any 2 Gens (optional for MPS only)	18 AWG,300V AC	Gen 1	Gen 2	2
r	Bus communication in external network (optional)	Shielded CAT 5E	Any generator	BMS	2
s	Local generator Remote Annunciator communication in controller network	Shielded CAT 5E	Any generator	Local gen RAP / RRP	2
t	RS485 connection configurable as single gen RAP/System RAP up to a max of 16 RAPs	Twisted cable	Any generator	RAP	--
1d	ATS Contractor Position (Utility and Gen) Signal	18 AWG,300V AC	ATS Critical / ATS Equipment	All generators	2
1a	Gen status connected to bus in Generator backup mode (optional)	18 AWG,300V AC	Gen 1	P & L	2
1b	Gen status connected to bus in Generator backup mode (optional)	18 AWG,300V AC	Gen 2	P & L	2
1c	Gen status connected to bus in Generator backup mode (optional)	18 AWG,300V AC	Gen 3	P & L	2

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INTERCONNECT DRAWING POWER ZONE PRO SYNC					
ISSUE DATE:		05/22/18			
SIZE	CAGE NO	DWG NO	10000034013		REV
B	N/A				D
SCALE	N/A	WT-KG	N/A	SHEET 12 of 12	

GAS SUPPLY CHECK LIST

Gas Service Meter and Serving Utility

- Available on site and reliable
- Rated for the combined loading of the facility and the generator (total BTU)
- Maintains generator minimum pressure requirements while under maximum loading

• Step Down Pressure Regulators

- 1.5X maximum site rated fuel consumption should be used for gas supply design practices
- Direct acting type with good dynamic response (no significant time lags in regulation)
- Selected for minimum no-load to full load pressure droop (< 1-2" w.c. desired)
- Located near the generator (allows the long piping runs to be at higher pressure)
- Located at least 10' away from generator connection (avoids regulator oscillations)
- Dedicated to a single generator (increases system reliability)

• Piping

- Sized large enough to minimize pressure drops to acceptable levels under full gas flow
- Minimize the number of elbows to avoid unwanted pressure drops
- Ensure entire gas supply system maintains acceptable generator pressure under full gas flow conditions
- Should be connected to generator with a flexible connection
- Should include a drip leg (sediment trap)

• LP

- LP tank's boil off rate (BTU capacity) needs to support rated BTU at minimum ambient
- LP liquid withdrawal systems should be considered: cold ambients, small tanks, large generators
- LP liquid systems require pressure rated piping and vaporization outside a building

• Generac Design Resources

- "Installation Guidelines for Stationary Industrial Generators" manual 046622 (detailed information)
- "Natural Gas Supply System Design Guide for Generac Industrial Spark Ignited Generators" manual 10000046207
- "Power Design Pro" software -- mechanical design tab (gas piping pressure drop calculator)

• National Codes and Standards

- NFPA 37 "Installation and use of Stationary Combustion Engines"
- NFPA 54 "National Fuel Gas Code"
- NFPA 58 "LP Gas Code"

DESIGN GUIDELINES

Natural Gas Supply System Design Guide for Generac Industrial Spark Ignited Generators

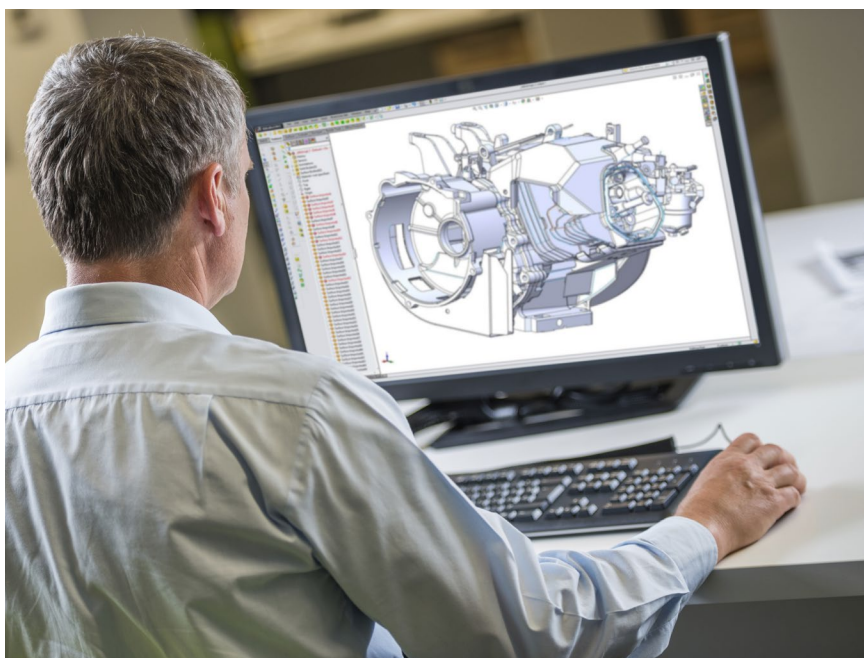
DESIGN GUIDE

Natural Gas Supply System Design Guide for Generac Industrial Spark Ignited Generators

INTRODUCTION

This design guidance document is to be provided to the consulting engineer during the project design phase and again at the time of submittal to the engineer and mechanical contractor for all Generac Industrial natural gas and propane fueled generator sets.

The following pages provide information and design best practices that have been demonstrated to minimize gas pressure instability and flow deficiency problems in the field. These design guidelines are to be used in combination with applicable national standards,¹ local fuel gas piping codes, and Generac's Installation Guidelines for Stationary Industrial Generators (Document #046622).



1. DESIGN OBJECTIVES

1.1. Provide the generator with a stable gas supply pressure over varying gas flow demand conditions. Maximum gas flow for all Generac generators are listed on the unit nameplate and generator data sheets.²

1.2. The pressure difference measured at the generator fuel pressure test port should typically be less than 2" water column (w.c.) from no-load running to full-load running condition.

1.3. The gas pressure must remain above the minimum specified for the generator set at all times, under all operating conditions. Failure to maintain adequate gas pressure and flow will result in operational problems such as extended crank cycles, inability to carry full load, and unstable engine speed.

1.4. Maintain a pressure and flow margin to allow for seasonal pressure variation on the upstream gas system. The emergency system must be before the facility shutoff.

1.5. Other facility loads must be factored in while sizing the Generator fuel system. It is recommended that the generator should have a dedicated fuel supply, which is not shared with any other appliances (furnace, water heaters, ranges, etc.) and the Generator fuel supply line shall be installed away from a high heat source so that the fuel temperature must remain at an acceptable operating range.

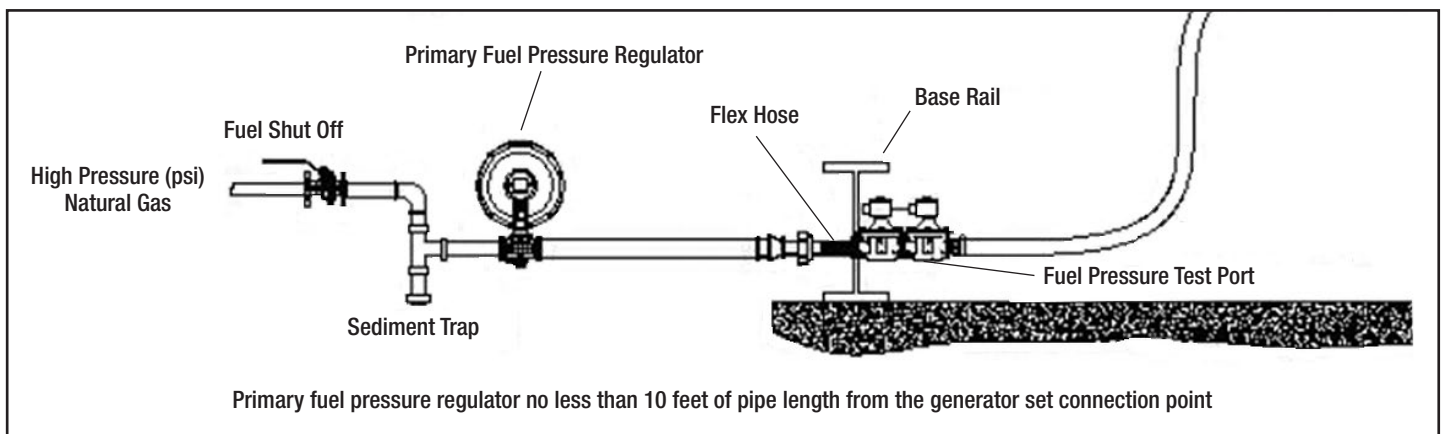


Figure 1: Typical natural gas supply regulator and piping configuration.

2. REGULATOR PERFORMANCE ATTRIBUTES³

2.1. Regulator Body Size: The inlet and outlet ports on a regulator are typically a single metal casting. The “body size” refers to the nominal diameter of the inlet and outlet pipe threads (or flange).

The regulator body size should never be larger than the pipe size, but it may be smaller provided the required flow can be obtained through the smaller regulator body size.

2.2. Pressure differential: The maximum flow rate of a service regulator is constrained by the gas pressure differential across the inlet and outlet port. When selecting a regulator for a specific gas flow requirement, it must correspond to the expected nominal upstream and downstream gas pressures. Consult manufacturers' published flow rate tables at various inlet and outlet pressure values to select an appropriate regulator (*See the example in Table 1*).

2.3. Flow and droop: Select a direct acting regulator that will deliver approximately 1.5 times the maximum gas flow required by the generator with 1" – 2" water column (w.c.) pressure droop at the expected nominal upstream and downstream gas pressures. Direct acting regulators provide the quick

response required for controlling fast changing gas flow demands encountered in engine-generator applications.

For example, a Generac SG500 generator, configured for 7" – 11" w.c. nominal gas pressure, requires 6,000 CFH of gas at full load. The selected regulator must be rated to flow approximately 9,000 CFH (1.5 X 6000 CFH = 9000 CFH). Given an upstream gas pressure of 2 psi, a 1½" Model 122-12 regulator with a blue spring would be the first choice. However, assume there is a substantial risk of seasonal pressure variation where the upstream gas pressure may fall closer to 1 psi, a larger 2" Model 122-12 regulator with a blue spring will still provide the required flow at the lower upstream pressure.

INLET PRESSURE	Set Point 5" w.c.	Set Point 7" w.c.	Set Point 11" w.c.	Set Point 18" w.c.	Set Point 28" w.c.	Set Point 2 w.c.	REGULATOR SIZE AND MODEL
	Red Spring 1" w.c. DROOP	Blue Spring 1" w.c. DROOP	Green Spring 2" w.c. DROOP	Orange Spring 2" w.c. DROOP	Orange Spring 3" w.c. DROOP	Black Spring 1/4" PSI DROOP	
8" w.c.	4000	3000	-	-	-	-	1 ½" Model 122-12
14" w.c.	4900	4500	3700	-	-	-	
1 psi	6600	6500	6000	5750	-	-	
2 psi	10500	10000	9800	9000	9500	-	
3 psi	12000	12000	11100	10000	10500	8900	
5 psi	14500	14500	13900	12000	12700	10000	
10 psi	16000	16000	15000	13500	14000	12700	
15 psi	18000	18000	19000	19000	20000	18000	2 ½" Model 122-12
8" w.c.	5000	4000	-	-	-	-	
14" w.c.	8800	8000	6600	-	-	-	
1 psi	12200	12000	11500	10700	-	-	
2 psi	18200	18000	17300	16500	16900	-	
3 psi	25000	25000	24000	22300	23000	18000	
5 psi	32000	32000	30000	28100	29000	27400	
10 psi	38000	38000	35000	32200	33000	30000	
15 psi	38000	38000	40000	39000	40000	36000	

Table 1: Typical regulator flow capacity table. Note how the same model regulator will flow larger volumes of gas with a higher inlet pressure while maintaining a set downstream pressure. Courtesy of Sensus.

Gas pressure regulators are feedback control systems driven by the pressure differential across the diaphragm and the case spring. When gas flow on the low-pressure side of the regulator causes a pressure drop, spring force in the regulator case pushes on the diaphragm and opens the valve to increase gas flow to maintain the set pressure.

The dynamic pressure maintained by the regulator decreases slightly as gas flow rate increases (Figure 2). This phenomenon is known as pressure droop or, more simply, “droop”. Regulator manufacturers design products to minimize pressure droop while still maintaining regulator stability for a given gas flow rate.

Regulators tend to exhibit the best stability and response time when they operate near the middle of their proportional band. Selecting a regulator with a published maximum gas flow of approximately 1.5 times the full-load gas flow required by the generator avoids operation very close to the fully open or fully closed position, minimizing the probability of unstable operation. A regulator that is too large, capable of flowing several times the maximum gas flow required by the generator, will operate very close to its fully closed position which may also result in unstable operation.

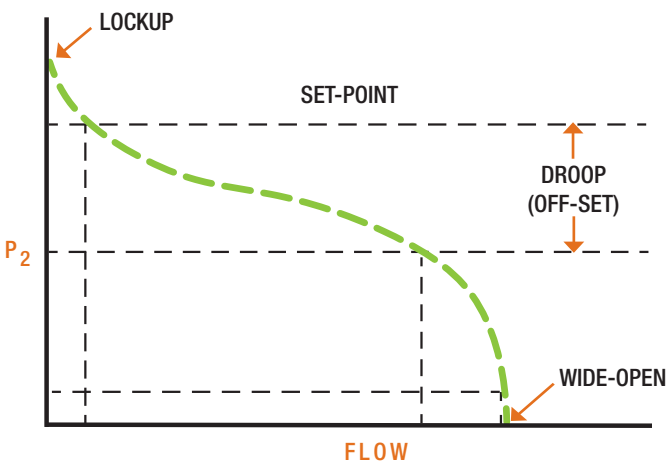


Figure 2: Pressure droop characteristic of a typical direct-operated regulator. Courtesy of Emerson-Fisher Natural Gas Application Guide.

2.4. Spring Rate, Accuracy, and Response Time:⁴

The regulator spring provides the force required to open the regulator valve and maintain the desired operating pressure. There may be more than one spring covering a desired operating pressure. Spring selection plays a role in regulator accuracy and response time.

In general, using the lightest spring rate (*a blue spring from the prior example referencing Figure 2*) that achieves the desired operating pressure will provide the best accuracy, minimizing pressure droop across the range of expected gas flow rates. However, a response that is “too fast” can introduce oscillation and instability. If instability is experienced during operation, moving to the next higher spring (*a green spring from the prior example referencing Table 1*) that includes the desired operating pressure is one potential method to mitigate oscillations.

2.5. Orifice size: For regulators where various orifice sizes are available, select the smallest orifice that will provide approximately 1.5 times the maximum gas flow required by the generator. Selecting an orifice that is significantly larger than necessary will result in the valve operating very close to the seat (nearly closed) and may result in pressure instability, increased seal wear, or audible noise from the regulator.

2.6. Lockup or hard shutoff: A regulator with a lockup or hard shutoff feature must be used. Lockup is the pressure above the regulator setpoint that is required to shut the regulator off tight so no gas flows. Typically, the lockup pressure is 1"-3" W.C. above the dynamic pressure setpoint measured when a small volume of gas is flowing (*i.e. no-load running condition on the generator*). The lockup feature prevents the low-pressure side of the regulator from

creeping up to the regulator line side pressure during long periods of zero gas flow when the generator is not running. If excessive gas pressure is allowed to build up on the low-pressure side of the regulator, the generator solenoid valves may be unable to open against the excessive pressure and the engine will not start.

2.7. Internal vs. external pressure registration:

Internally registered regulators are recommended because they generally have fewer operational problems in the field.

The diaphragm case of a regulator must have a connection to the low-pressure side in order to function. Internally registered regulators have a passage built into the body casting which provides a path for low-pressure gas to act against the diaphragm and spring force. Externally registered regulators lack this internal connection path but instead have an additional pipe fitting on the regulator case where a smaller diameter pipe is field-fabricated to a downstream location on the low-pressure side of the main gas piping system. Because all the pipe fabrication is done in the field, variation in the main gas piping system and the remote pressure registration line can cause unpredictable performance that is difficult to troubleshoot.

Externally registered regulators can be used, but the engineer and installation contractor must be aware of the dynamic effects introduced by variables such as; flow turbulence, length and diameter of the sensing line, location of the sensing point in the low pressure piping system, increases and decreases in pipe diameter.

If an externally registered regulator is used, locate the remote sensing point 8 to 10 pipe diameters downstream of the regulator in the largest diameter pipe section. The start of 8 to 10 pipe diameters is

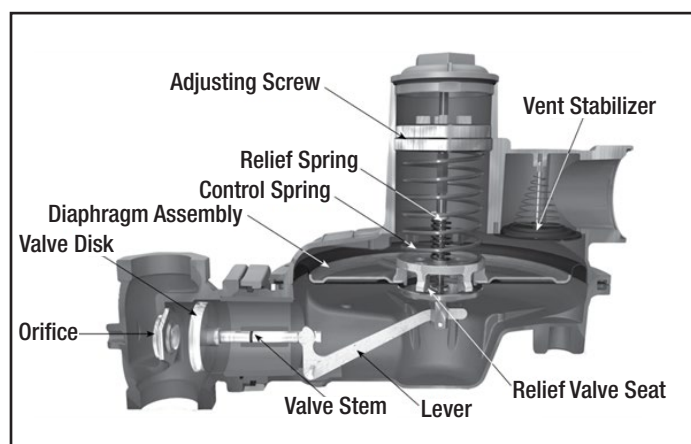


Figure 3: Major components of a direct-acting lever-type regulator, internally registered.
(Courtesy Emerson Fisher).

after the transition to the largest diameter pipe or any other throttling devices, component and/or fittings that will disrupt flow and create turbulence. The sensing line should be taken off the top of the main line to keep it free of debris and condensate. If possible, it should horizontally slope back to the main so that any condensate will drain back into the main rather than accumulate in the regulator's diaphragm case. Minimize the fittings used in running the sensing line. An externally registered regulator will respond to the pressure changes sensed at the remote tap rather than within the regulator body. It is advisable to install a pressure gauge at the sensing line tap on the main as this will be the control point of the regulator.

2.8. Recommended gas regulators:

The list of regulators below is not an exhaustive list of all suitable regulators that are available in the market, nor is it a list of "Generac Approved" regulators. The list is intended to help design engineers and mechanical contractors identify a range of products that have demonstrated their suitability for engine-generator service in past projects. Consult your Generac Distributor or gas regulator supplier for additional information.

- Sensus⁵
- Emerson Fisher
- Itron

3. FLOW CHARACTERISTICS OF GAS PIPING SYSTEMS:

3.1. Elbows and Tees: Minimize the number of elbows and tee fittings that increase pressure drop and flow turbulence in the system. Where more than three elbows and/or tees are required, use of swept radius elbows (typical for welded pipe sections) will help reduce pressure loss.

3.2. Reducing bushings (swages): Pipe reducing bushings are the transition from a larger to smaller pipe diameter or vice versa. Gas flow velocity is slower in a larger diameter pipe compared to a smaller diameter pipe moving the same volume of gas. If a remote sensing regulator is used, it is important to understand the dynamic pressure effects caused by the gas flow velocities in different sized pipe sections and design accordingly.⁶

In some installations where it is impractical to run approximately 10 feet of pipe, swaging up to a larger diameter pipe is a practical method to increase the gas volume between the service regulator and the generator fuel system. For installations where this method is used, an internally registered regulator is strongly recommended.

3.3. Flexible fuel lines: Flexible fuel lines are intended to isolate the rigid gas piping system from vibrations on the generator set and must be installed as straight as possible. They are not intended to correct misaligned pipe sections or to serve as an elbow.

3.4. Regulator vent lines: Regulator vents must open downward and be screened to prevent insects and water from entering the regulator case. Regulator vent lines should be kept as short as possible to reduce the possibility of affecting the regulator response time.

4. DESIGN REQUIREMENTS:

4.1. Use Generac's Power Design Pro⁷ gas pipe sizing module to determine the minimum recommended pipe size for the selected generator's gas flow given the anticipated length of the pipe run between the service regulator and the generator fuel inlet, including all elbows. Select the option to design for <0.5" water column pressure drop. Refer to the Table 1 for more detail.

4.2. The flexible fuel line shall be installed at the generator fuel inlet located on the frame rail and must exit the generator perpendicular to the frame rail. No pipe fittings (elbows or swages) are permitted between the flexible fuel line and the generator fuel inlet port.

4.3. The flexible fuel line must be as straight as possible. It is designed to isolate the rigid gas piping system from vibrations on the generator set. It is not intended to correct misaligned pipe sections or to serve as an elbow.

4.4. Given the combined effects of pipe friction loss and regulator droop, gas pressure should typically not drop more than 2" w.c. from no-load running to full-load running. Under no circumstances shall the gas pressure measured at the test port on the inside frame rail of the generator set drop below the minimum rated gas pressure listed on the generator nameplate.

4.5. Full-port ball valves, the same diameter as the pipe which they are connected to, are to be used for all shut-offs.

4.6. For multiple generator set installations (Generac MPS), each generator set must have its own regulator installed. Do not share a single large regulator across multiple generator sets.

Table 2: Natural Gas Fuel Pipe Sizing

KW	PIPE SIZE (inches)							
	1.00"	1.25"	1.5"	2"	2.5"	3"	4"	5"
25	10	95	220	739				
30		60	147	565				
40		25	75	315	790			
50			50	220	560			
60			25	145	390	1185		
70			5	75	225	710		
80				65	195	630		
100				40	140	460		
130					50	215		
150					30	150		
200					15	95	475	
250						62	315	1020
300						35	255	850
350						10	145	535
400							107	452
500							42	245
625								120
750								112

TABLE VALUES ARE MAXIMUM PIPE RUN IN (feet)

NOTE: Pipe sizing is based on 0.5" H₂O pressure drop for Natural Gas. Also sizing includes nominal number of elbows and tees. Please verify adequate service and meter sizing.

5. RECOMMENDED DESIGN BEST PRACTICES:

5.1. Provide approximately 10 feet of pipe between the regulator and generator gas inlet. This does not have to be a single straight run. The pipe volume decouples the dynamic response of the generator throttle control system and the service regulator, reducing the probability of oscillation and unstable operation.

5.2. Avoid installing elbows or pipe swages immediately upstream or downstream of a regulator, unless specifically allowed by the regulator manufacturer. This will increase the turbulence of the gas flow, having a negative impact on pressure regulation accuracy and stability. Regulator

manufacturers typically recommend 10 pipe diameters of straight pipe run upstream and downstream of a regulator. For example, on a regulator with 2" diameter pipe fittings, 20" of straight pipe should be fitted upstream and downstream of the regulator. When field conditions prohibit meeting both constraints, place the elbow on the high-pressure side of the regulator. The straight run on the low-pressure side is more critical for proper regulator operation.

5.3. Avoid installing pipe swages immediately before or after an elbow. The combined flow turbulence of the swage and elbow in close proximity can cause unexpectedly large pressure drops at high flow rates.

5.4. Minimize the number of 90-degree elbows.

If more than three elbows are needed downstream of the regulator to accommodate the design, swept radius elbows are recommended to minimize pressure drop.

5.5. Use of an internally registered regulator is strongly recommended. Regulators with external pressure registration lines add an additional variable into the system that can be difficult to troubleshoot should the gas pressure become unstable under high-flow conditions.

5.6. For more stable gas flow with longer gas piping, the high pressure side may be raised as high as code allows and regulate it down to generator operating pressure at the generator. (This is the same design concept used in the electrical industry; “high voltage for long distances, transformation at the loads”). This may also help reduce cost as pipe diameters can be smaller, saving material and installation costs.

6. INSTALLATION AND COMMISSIONING RECOMMENDATIONS:

6.1. Refer to Generac’s Installation Guidelines for Stationary Industrial Generators (Document #046622) for additional installation details.

6.2. Pig all gas pipes after installation to remove pipe dope, weld slag and other contaminants that could damage the regulator valve seat and cause pressure creep.

6.3. Install a dirt trap and/or screen before the gas regulator.

6.4. Set the regulator pressure with the generator running at no-load. Measurements are taken at the generator fuel pressure test port on the inside of the frame rail. For units configured for 7"-11" w.c. operating pressure, set the regulator to 11" w.c. no-load running. For units configured for 11-14" w.c. operating pressure, set the regulator to 14" w.c.

no-load running. Pressure droop at full-load running will be a combination of regulator droop and pipe friction loss. Proper design will limit the no-load to full-load running pressure drop to no more than 2" w.c. and at no time can the gas pressure fall below the minimum pressure listed on the generator nameplate. Expect the lockup static pressure typically to be higher than the no-load running dynamic pressure.

7. METHODS FOR CORRECTING UNDESIRABLE PERFORMANCE:

7.1. Pressure surging and cycling: Should the regulator experience “hunting” or other unstable operating behavior, an extended vent line may be creating resonant condition on the atmospheric side of the regulator diaphragm. If this is suspected, temporarily disconnect the vent line or remove the cap from the regulator spring case and observe if the unstable behavior stops. Shortening the length or increasing the diameter of the vent line will often correct an instability caused by vent line resonance.

The pipe volume between the service regulator and the generator may be insufficient to decouple the control action of the regulator and the generator’s throttle control system. Increase the pipe volume between the regulator and the generator.

Change the response time of the regulator. In some cases, a small adjustment of the regulator spring (up or down 1 w.c.) will be enough to restore stability to the system. If available for the selected regulator, using the next higher spring is another inexpensive and easy to implement option. This will slow the regulator response and can reduce or eliminate the instability. Keep in mind that changing to a higher spring rate will also increase pressure droop and reduce the regulator’s maximum flow capacity which limits the applicability of this corrective measure.

7.2. Low gas pressure under high load: There are several potential causes of low gas pressure under high load.

Pipe runs with excessive friction loss caused by a pipe diameter that is too small for the required gas flow and pipe length and/or a large number of elbows. The only corrective action for this is to increase the pipe diameter between the regulator and the generator or to raise the pressure of the high pressure gas. Avoid this problem by using a gas pipe sizing tool during the design phase.

Insufficient regulator capacity. Confirm the upstream gas main and regulator flow capabilities for a given upstream gas pressure. If the upstream gas pressure is lower than originally anticipated, investigate the possibility adjusting the utility regulator (if present). If increasing upstream gas pressure is not possible, a larger orifice and/or different spring combination may be available for the existing regulator to increase flow and reduce pressure droop. If the previous steps fail to correct the situation, a larger regulator will be required. Avoid this problem by thoroughly reviewing the regulator manufacturer's flowrate tables prior to ordering.

7.3. Excessive transient pressure drop during generator crank cycle or block load application: If the transient pressure drop during a generator crank cycle or block load application is large enough to impact performance, speeding up the regulator response will reduce the transient pressure drop. Avoid this problem by using a direct-acting regulator that is suitable for engine-generator applications. If available for the selected regulator, using a lighter spring will increase the regulator response speed and reduce transient pressure dip. Finally, if a remotely registered regulator is used, increase the pipe diameter of the remote sensing line.

7.4. Pressure creep: Ensure the selected regulator has a lockup or hard-shutoff feature. Pressure creep is almost always caused by contaminants in the pipe system upstream of the regulator. The contaminants either get caught on the regulator valve disk or cause physical damage to the valve disk, making it impossible to achieve a hard shutoff. Avoid this problem by pigging all pipe components prior to installing the regulator and ensure a dirt trap is installed upstream of the regulator.

7.5. Failure to start, run smoothly, or accept 100% load: Barring a mechanical failure on the generator, failure to make 10-second start, run smoothly, or carry full load is almost always caused by an underlying gas supply problem.

8. PROPANE VAPOR AND LIQUID:

8.1. Propane vapor system: This type of system uses the vapors formed above the liquid fuel in the supply tank. The maximum tank liquid capacity is 80% and a minimum of approximately 20% of the tank capacity is required to boil off liquid into the vapor state. Gas pressure and volume requirements for an LPG system at the connection point of the generator are listed on the unit specification sheet. The piping system connecting the outlet of the first stage regulator to the connection point on the second stage regulator must be properly sized to provide the fuel volume required by the unit at 100% load.

The piping system between the outlet of the second stage regulator and the generator connection point must be sized to provide the fuel volume required by the generator at 100% load while also staying within the pressure range noted on the unit specification sheet.

8.2. Tank vaporization rate: In addition to sizing the gas piping system in a similar manner to natural gas, LP-vapor systems must also size the propane storage tanks to ensure a sufficient volume of gas will boil off

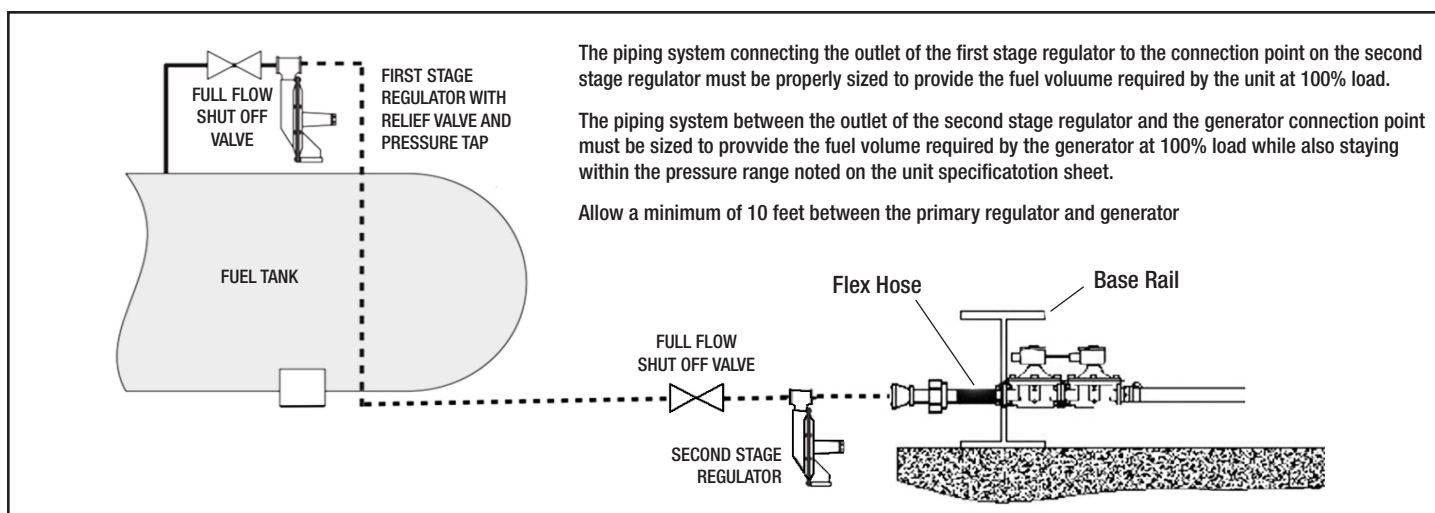


Figure 4: Typical LP vapor withdrawal system.

under a range of environmental conditions and various liquid levels in the tank. Liquid propane absorbs ambient heat from the surrounding environment to boil off liquid into a gas. Low liquid levels in a tank coupled with cold ambient temperatures can result in a condition where the tank boil off rate is insufficient to meet the demands of the generator.

The local propane supplier is often a good resource to help with tank sizing. The Emerson-Fisher LP-Gas Serviceman's Handbook is another valuable resource for sizing propane systems and includes tank vaporization tables.⁸ In many cases, the tank volume must be larger (sometimes much larger) than the gas required to achieve a desired runtime. Where practical, buried tanks can improve the vaporization rate by protecting the tank from extremely low ambient air temperatures.

8.3. Liquid propane system: This system delivers propane in a liquid state (LPL) to the connection point on the generator set. Liquid propane systems are used where it is impractical to achieve the required boil off rate from the available fuel tank volume. For the engine to use the LPL fuel, the liquid must be vaporized prior to being delivered to the fuel mixer (carburetor). LPL will vaporize at a temperature of

Max. Intermittent Withdrawal Rate (BTU/HR) Without Tank Frosting* If Lowest Outdoor Temperature (Average for 24-Hours) Reaches . . .

TEMPERATURE	TANK SIZE (Gallons)			
	150	250	500	1,000
40°F	214,900	288,100	478,800	852,800
30°F	187,900	251,800	418,600	745,600
20°F	161,800	216,800	360,400	641,900
10°F	148,000	198,400	329,700	587,200
0°F	134,700	180,600	300,100	534,500
-10°F	132,400	177,400	294,800	525,400
-20°F	108,800	145,800	242,300	431,600
-30°F	107,100	143,500	238,600	425,000

* Tank frosting acts as an insulator, reducing the vaporization rate.

Table 3: Above ground AMSE Tank vaporization rate, LP-Gas Serviceman's Handbook.

(-44°F/-42.2°C). The generator set LPL fuel system delivery pressure operates over the range of 58-180 psi (400-1242 kPa), depending on the ambient temperature and liquid level in the storage tank. LPL enters the vaporizer and passes into a "flash" chamber. The pressure drop in this chamber vaporizes the liquid to a gas and is regulated to negative 11"-14" w.c. (2.9-3.5 kPa). Heated engine coolant from the jacket water heater is used to heat the flash chamber of the vaporizer and to prevent the vaporizer from icing.

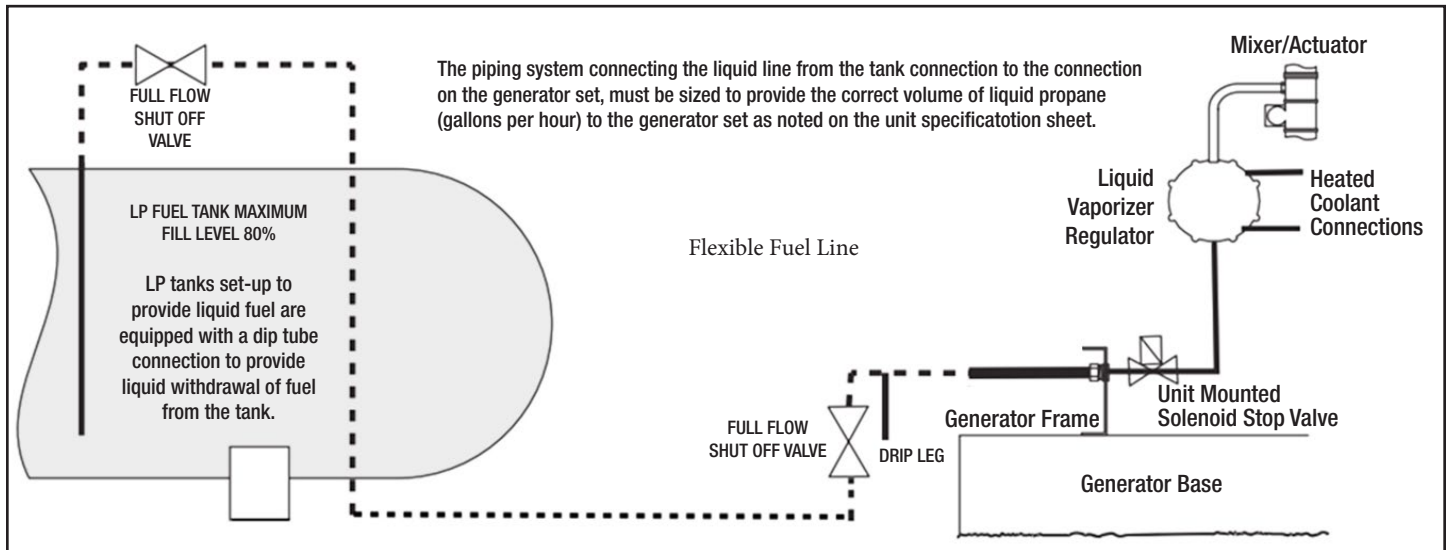


Figure 5: Typical LP liquid withdrawal system.

8.4. Dual fuel, natural gas primary and propane secondary: Some applications use a dual fuel system where the primary source may not be available during a power outage. Dual fuel systems use natural gas as

the primary fuel and LPG or LPL withdrawal as the secondary fuel. For dual fuel units, the specific fuel pressure, volume, and pipe sizing requirements for each fuel type must be observed.

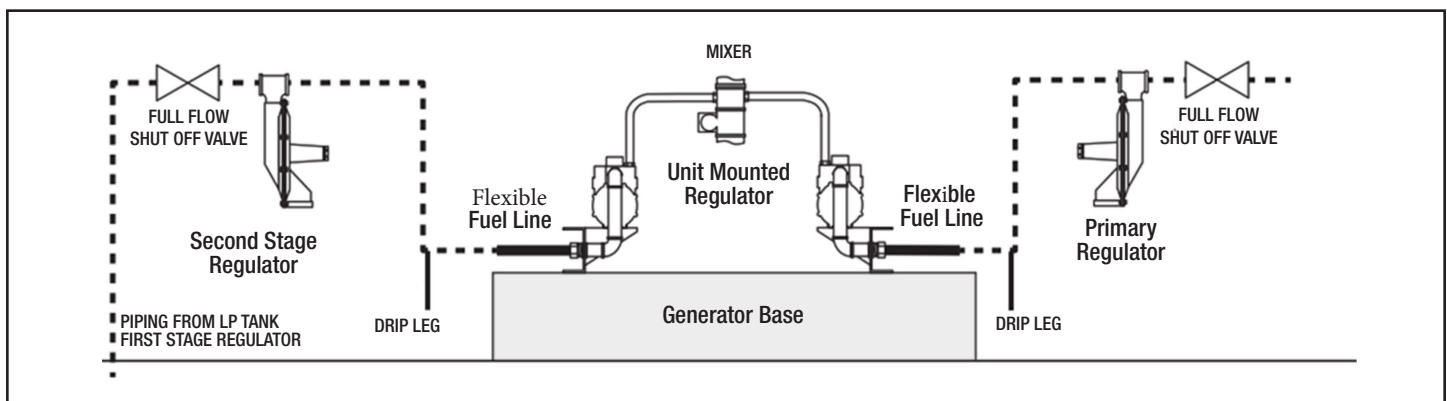


Figure 6: Typical dual-fuel system.

9. ADDITIONAL RESOURCES:

¹ NFPA 37 “Installation and use of Stationary Combustion Engines”

NFPA 54 “National Fuel Gas Code”

NFPA 58 “LP Gas Code”

Free access to view NFPA code documents can be found at:

<https://www.nfpa.org/Codes-and-Standards/All-Codes-and-Standards/Free-access>.

² Data sheets for Generac Industrial gas generator sets:

<https://www.generac.com/Industrial/products/gaseous-generators>.

³ A more thorough description of the operational principles and performance attributes of gas regulators can be found in Emerson-Fisher’s Natural Gas Application Guide at:

<http://www.emerson.com/en-us/automation/valves-actuators-regulators/regulators>.

⁴ Causes and Cures of Regulator Instability, Class #6010. William H Earney, Fisher Controls International Inc. 1995.

<https://www.scribd.com/document/197653841/Causes-and-Cures-of-Regulator-Instability>

⁵ Sensus product data sheets: <https://sensus.com/products/?utility=gas>

⁶ The Bernoulli Effect will cause a difference in gas pressure only when gas is flowing. When a remote sensing regulator is used, and the remote sensing point is located in a pipe section that is a larger diameter than the generator fuel inlet, under high-flow conditions it can result in an additional 1”-2” w.c. of pressure difference that cannot be eliminated. https://en.wikipedia.org/wiki/Bernoulli%27s_principle

⁷ Power Design Pro is Generac’s web-based generator sizing tool that includes modules for gas supply pipe sizing and exhaust pipe sizing. It can be accessed and used free of charge at:

<https://pdp.powerdesignpro.com>.

⁸ LP-Gas Serviceman’s Handbook, Emerson Fisher.

<http://www.squibbtaylor.com/uploaded/lp10servicemaninst.pdf>.

FUEL SPECIFICATION

Natural Gas

Generac products are designed to run on natural gas and are tested for performance and reliability with clean, dry, pipeline quality natural gas. The properties presented in this standard represent the natural gas used in product testing. The performance and reliability of Generac products using non-conforming fuels are unknown and cannot be guaranteed.

Natural gas is, by definition, any gas that occurs organically, but this standard focuses on natural gas that intended for use as fuel in reciprocating internal combustion engines. This natural gas is generally assumed to have specific properties, but compositional differences and contaminants greatly influence the fuel's quality and combustion stability. This variation can lead to lower power output, pre-ignition, detonation, and corrosion if the fuel does not meet this standard. This standard identifies an acceptable fuel composition for use in Generac products.

Fuel Specifications

The fuel used by Generac is clean, dry, pipeline quality natural gas adhering to the following:

Component / Property	Unit	Range
Methane	% Volume	80 Minimum
Ethane	% Volume	0-10
Propane	% Volume	0-5
Butanes	% Volume	0-2
Pentanes and Heavier	% Volume	0-0.5
Nitrogen and Other Inerts	% Volume	0-3
Carbon Dioxide	% Volume	0-3
Total Diluents Gases	% Volume	0-5
Hydrogen Sulfide	g/100scf (mg/m3)	0.25-0.3 (6-7)
Total Sulfur	g/100scf (mg/m3)	5-20 (115-460)
Water Vapor	lb/MMscf (mg/m3)	4-7 (60-110)
High Heating Value	Btu/scf (kJ/m3)	950-1,150 (35,400-42,800)
Methane Number	MN	80 Minimum

Notes:

- The fuel must be free of liquid water and hydrocarbons at delivery temperature and pressure.
- The fuel must be free of particulate matter.

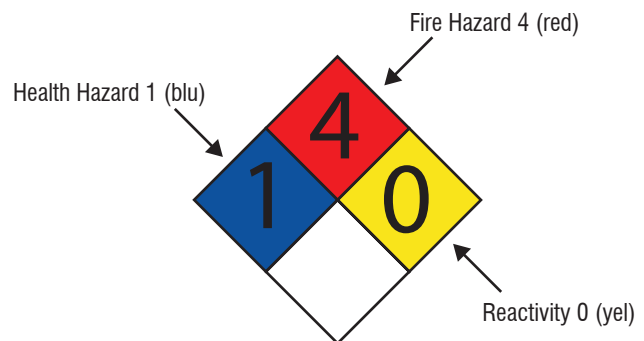
Hazards Information

Emergency Overview

DANGER!
EXTREMELY FLAMMABLE GAS - MAY CAUSE FLASH FIRE OR EXPLOSION!

High concentrations may exclude oxygen and cause dizziness and suffocation. Contact with pressurized vapor may cause frostbite or freeze burn.

NFPA 704 Hazard Identification System



4 - Severe 3 - Serious 2 - Moderate 1 - Slight 0 - Minimal

Estimate Proposal

To: California Professional Management
Attn: Chase Cooper
19153 Town Center Drive #105
Apple Valley, CA 92308

July 22, 2025

Project: **Phelan-Pinon Hills Community Service building Switchgear-Generator
Procurement**

The Mike Cox Electric, Inc. hereby proposes to furnish all labor, material, equipment and supervision to complete the electrical portion of work for the above mentioned project in accordance with the project documents.

EATON Switchgear Package	per attached BOM	195,000.00
Generac Generator/ ATS:	per attached BOM	145,411.00
Coordination Study	per Single Line	3,500.00
Estimated Freight:	LTl Shipping	1,200.00
	Materials Subtotal	\$ 343,911.00
Estimated Tax:	Sales Tax	\$ 30,092.21
Technician Labor 16 hrs :	IBEW Standard Rate	
Travel Expense :	Included	
	Labor Subtotal	\$ 1,864.00
Equipment Expense:	Equipment Offloading	3,500.00
Subcontract Expense:	Optional Factory	2,500.00
Overhead Expense:	Genset Start Up	
	20%	
	Expense Subtotal	\$ 82,613.44
	Preferred Partner Discount:	(\$11,276.02)
	TOTAL ESTIMATE:	\$447,205

SPECIFIC SCOPE OF WORK:

- EATON Switchgear Package includes Distribution Board "MS", Distribution Board "EX-Modular-DB", Distribution Board "CC-DB", 200KW Generator "NG" and By-Pass Isolation "ATS" as shown on Sheets E2 Single Line and per attached BOM.
- NOTE: Due to Cost and Procurement concerns, Distribution Board CC-DB is not quoted with integral ATS section as shown. ATS is quoted as a separate standalone ASCO - 7000 Series switch. Bid set documents will need to be updated to reflect feeder cabling between ATS and CC-DB.
- EATON BOM also includes Electrical Short Circuit and Coordination Studies for Electrical Equipment being provided and as shown on the design bid set.
- Proposal includes a complete review of all quoted electrical switchgear, taking delivery of all quoted items, and delivery to project site for installation by others. **Proposal does not include installation labor or offloading for any of the items listed.**

DELIVERY ADDRESS:

Civic Center Building
9535 Sheep Creek Road
Phelan, CA 92329

Thank you for the opportunity for submitting this proposal. Please contact our office with any questions and/or comments.

Regards,


Shane B. Cox



WALTERS - RIVERSIDE
1880 SPRUCE STREET
RIVERSIDE, CA 92507-2647
951-680-0210
Fax 951-680-1646



Quotation

QUOTE DATE	QUOTE NUMBER	PAGE NO.
07/22/2025	S128397292	1 of 1
CUST PO#:	PHELAN PINON HILLS	
JOB/REL#:	SWITCHGEAR	

QUOTE TO:

SHIP TO:

THE MIKE COX ELECTRIC INC
160 N RANCHO AVE
SAN BERNARDINO, CA 92410-1597

THE MIKE COX ELECTRIC INC
160 N RANCHO AVE
SAN BERNARDINO, CA 92410-1597

CUSTOMER NUMBER	CUSTOMER PHONE	ORDERED BY	SALESPERSON		
419039	909-889-7992	SHANE	RICHARD VILLASENOR		
WRITER		SHIP VIA	TERMS	EXPIRATION DATE	FREIGHT EXEMPT
RICHARD VILLASENOR		17WALTERSCD70	NET 25TH	08/21/2025	No
ORDER QTY	DESCRIPTION			UNIT PRICE	EXT PRICE
LOT	^CH LOT ITEM: EATON This Lot Shipment Consists of:			195000.000	195,000.00
<div>Order Qty 1</div>	<div>Description MS - 4000A Meter Service, EX-MODULAR-DB DB 800A, CC-DB 1000A</div>				
	An Over Current Protective / Flash Arc study. \$3,500.00lot (ALL LINES + TAX & FREIGHT)				

Prices listed on this quotation are subject to change without notice beyond expiration date, include only the equipment listed and do not include any sales tax unless noted otherwise. Expiration date does not apply to commodity pricing which may be subject to change after 24 hours. Special order items cannot be cancelled unless the manufacturer permits cancellation. NOTE, Pricing does not account for potential future U.S. tariffs, which may impact costs. Good-thru

Subtotal	195,000.00
Shipping Chgs	TBD
Amount Due	195,000.00



Date: 7/11/2025

To: Mike Cox Electric

Attn: Shane Cox

Reference: Quote # 21017700

Project Name: Phelan Pinion Hills CSB / 200 kW Natural Gas Generator Package

West Coast Energy Systems is pleased to offer the following proposal:

SCOPE OF SUPPLY:

1 - Generac Industrial gaseous engine-driven generator, turbocharged/aftercooled 6 cylinder 14.2L engine, consisting of the following features and accessories:

- Stationary Emergency-Standby rated
- 200kW Rating, wired for 120/208 VAC three phase, 60 Hz
- Natural Gas fuel system
- Permanent Magnet Excitation
- UL2200
- EPA Emergency Certified
- SCAQMD
- Standard Weather Protective Enclosure, Steel
 - Industrial Grey Baked-On Powder Coat Finish
- Power Zone Digital Control Panel for Single or MPS Generators
 - Meets NFPA 99 and 110 requirements
 - Temp Range -40 to 70 degrees C
 - Humidity 2 – 95% (Non Condensing)
 - UL6200
 - C-ETL-US
 - CE
 - FCC
 - IEC801 (Radiated Emissions, Susceptibility, and Surge Immunity)
 - 7" Resistive Color Touchscreen
 - Built-in Webserver
 - IP65 (front)
 - Auto/Manual/Off key switch, Alarm Indication, Not in Auto Indication, audible alarm, emergency stop switch
 - Dual Core Digital Microprocessor
 - RS485, Ethernet and CANbus ports
 - Sensors: Oil Pressure, optional Oil Temp, Coolant Temp and Level, Fuel Level/Pressure (where applicable), Engine Speed, DC Battery Voltage, Run-time Hours, Generator Voltages, Amps, Frequency, Power, Power Factor
 - Alarm Status: Low or High AC Voltage, Low or High Battery Voltage, Low or High Frequency, Pre-low or Low Oil Pressure, Pre-high or High Oil Temp (optional), Low Water Level and Temp, Pre-high or High Engine Temp, High, Low, and Critical-low Fuel Level/Pressure (where applicable), Overcrank, Over and Under Speed, Unit Not in Automatic
 - Programmable I/O
 - Built-in PLC for special applications
 - Engine function monitoring and control:
 - Full range standby operation; programmable auto crank, Emergency Stop, Auto-Off-Manual switch
 - Isochronous Governor

- 0.25% digital frequency regulation with: soft-start ramping - adjustable, gain - adjustable, overshoot limit - adjustable
- 3 Phase RMS Voltage Sensing
 - +/-0.5% digital voltage regulation with: soft-start voltage ramping - adjustable, loss of sensing protection - adjustable, negative power limit - adjustable, Hi/Lo voltage limit - adjustable, V/F slope and gain - adjustable, fault protection
- Service reminders, trending, fault history (alarm log)
- I2T function for full generator protection
- Selectable low-speed exercise
- 2 and 3-wire start controls for any industrial grade transfer switch
- Primary MLCB, 80% Rated LSI Electronic Trip
 - PDG43K0800B2N
 - 800 Amp
- 225 AH, 1155 CCA Group 8D Batteries, with rack, installed
- Battery Charger, 10 Amp, NFPA 110 compliant, installed
- Coolant Heater, 2000W, 240VAC
- Flex Fuel Line, shipped loose
- Industrial Connectivity Gateway Device
- Oil Temp Sender
- 3 Owner's Manuals
- Standard 2-Year Limited Warranty
- SG0200GG20142S18PPYYE

1 - ATS

Product Description : ASCO 7000 Series, Automatic Open Transition ByPass Switch

Catalog Number : H07ATBB31000C5XM

Switch Rating = 1000,

Bypass Isolation : YES

Service Voltage / Hz : 208V/60Hz

Optional Accessories : 31BG,40KY4,44G,125A

No. of Switched Poles: 4

Neutral Configuration : Switched

No. of Cables & Lug Size : 4, #1/0 AWG to 600 MCM

Frame = H,

Enclosure : Type 3R secure double door enclosure

Pricing:

Generator & ATS Pricing **\$145,411.00 + taxes**

Optional Adders via change order:

Delivery to Job site –Not Unloaded..... \$ 500.00

Factory Start Up and Site load testing\$ 2,500.00

Shipping:

Estimated Generator lead time from factory, excluding transit: **22 weeks ARO.**

Estimated ATS lead time from factory, excluding transit: **32 weeks ARO.**

Scope Clarifications:

- Quote is based on your 1-Line Drawing E-2 requirements only.
- No equipment will be ordered without written release to proceed.
- Pricing includes freight to site.
- Installation, fueling and termination of connections not included. The Energy Systems provided start-up checklist and supporting pictures must be received by Supplier two weeks prior to technician scheduling.

- Installation and mounting not included.
- Pricing is based on work being completed during regular business hours.
- **Items Not included unless otherwise noted:** equipment offloading, installation, fuel, permits, signage, taxes, exhaust system backpressure test, exhaust emissions test, infrared scanning, NETA testing, harmonic testing, concrete pad, anchoring, fuel pipe, exhaust pipe, pipe insulation, Building communication integration, license fees.

Terms and Conditions:

1. Offer Validity: 30 days.
2. 10 % deposit required at time of release.
3. Payment terms: NET 30, invoiced at shipment. (Based on Credit Approval)
4. Credit is subject to approval by Energy Systems upon receipt of business credit application.
5. ExWorks factory with freight allowed to the jobsite, on a truck, curbside.
6. Manufacturer lead time to be confirmed upon approved release for production letter and receipt of a West Coast Energy Systems approved purchase order.
7. Equipment cannot be held by Energy Systems or its suppliers without prior written agreement.
8. Any sale of goods or services, and any extension of credit, is governed by and subject to West Coast Energy Systems' Terms and Conditions of Sales and Service ("Terms") located at <https://energysystems.com/terms-and-conditions-of-sale-and-service> which is incorporated by reference. The Terms are subject to change at any time and you are advised to frequently re-review the Terms. Unless pursuant to a written agreement mutually executed by both parties, the Terms shall be binding upon the parties, and any other terms, communications or documents are to be disregarded and hereby expressly rejected.

Sincerely,

Paul Crafts

Territory Manager

Energy Systems

(562) 639-3145 / 928-242-2146 Cell #

pcrafts@energysystems.com



Acceptance of Quote

Purchase orders for equipment or services on this quotation indicates acceptance of the conditions of sale listed above.

Please return a signed copy of this quote as acknowledgement of receipt.

Signature

Date accepted

Print Name

Company Name

Detail Bill of Material

Project Name: Phelan Pinon Hills CSD
General Order No:

Negotiation No: S19E0709X5K1
Alternate No: 0000

Item No.	Qty	Product	Description
	1	Switchboards	Pow-R-Line Xpert Switchboard, Front Access/ Front and Rear Align, Type 1, 208Y/120V 3-Phase 4-Wire, 1200 Copper, Minimum Interrupting Rating: 65kA, Bus Bracing Rating: 65kA, Depth: 18 In

Catalog No XSBAGDNNNCN00NN5F0B1A1AX
Designation CC-DB

Structure

- 1 1200 Amp CU Distribution Structure**
Compartment 1 - Metering PXE2 Meter, 1200 Amp CTs, with Display, Standard (Modbus RTU)
Compartment 2 - Breaker 200A, 3P PDG23G Breaker [225A Frame]
 Mechanical (1) #4-4/0
 Thermal Mag Trip - Standard
Compartment 3 - Breaker 200A, 3P PDG23G Breaker [225A Frame]
 Mechanical (1) #4-4/0
 Thermal Mag Trip - Standard
Compartment 4 - Breaker 200A, 3P PDG23G Breaker [225A Frame]
 Mechanical (1) #4-4/0
 Thermal Mag Trip - Standard
Compartment 5 - Breaker 200A, 3P PDG23G Breaker [225A Frame]
 Mechanical (1) #4-4/0
 Thermal Mag Trip - Standard
Compartment 6 - Breaker 1000A, 3P PDG53M Breaker, [1200A Frame]
 Mechanical (3) 500-750 kcmil
 PXR20 LSI Trip Unit w/ ARMS Option M no control wiring
 Trip Unit Amps 1200A, Sensor 1200A
 Local using breaker interface

Qty List of Materials

- 1 Seismic Freestanding Label (IBC/CBC Seismic Qualified)
 1 1200 Amp CU Distribution Structure
 1 Mechanical (3) 500-750 kcmil
 1 Padlockable lockoff device
 4 Mechanical (1) #4-4/0
 1 PXE2 Meter, 1200 Amp CTs, with Display, Standard (Modbus RTU)
 1 Please contact metersandrelaysbusinessunitcleoh@eaton.com for Pricing and Availability
 1 Copper Ground Bus
 1 1000A, 3P PDG53M Breaker, [1200A Frame], Trip 1000 A, PXR20 LSI w/ ARMS, (3) 500-750 kcmil, Mechanical, Bottom
 4 200A, 3P PDG23G Breaker [225A Frame], Trip 200 A, Thermal Mag, (1) #4-4/0, Mechanical

Item No.	Qty	Product	Description
	1	Switchboards	Pow-R-Line Xpert Switchboard, Front Access/ Front and Rear Align, Type 3R (nonwalk-in) Flat Roof, 208Y/120V 3-Phase 4-Wire, 800 Copper, Minimum Interrupting Rating: 65kA, Bus Bracing Rating: 65kA, Depth: 24 In

Catalog No XSBAGCNNNCN00NN4F0B1B1BX
Designation DB

Project Name: Phelan Pinon Hills CSD
General Order No:

Negotiation No: S19E0709X5K1
Alter nate No: 0000

Structure

- 1 **800 Amp CU Distribution Structure**
Compartment 1 - Metering PXE2 Meter, 800 Amp CTs, with Display, Standard (Modbus RTU)
Compartment 2 - Breaker 125A, 3P PDG23G Breaker [225A Frame]
Thermal Mag Trip - Standard
Mechanical (1) #4-4/0
Compartment 3 - Breaker 125A, 3P PDG23G Breaker [225A Frame]
Thermal Mag Trip - Standard
Mechanical (1) #4-4/0
Compartment 4 - Breaker 125A, 3P PDG23G Breaker [225A Frame]
Thermal Mag Trip - Standard
Mechanical (1) #4-4/0
Compartment 5 - Breaker 125A, 3P PDG23G Breaker [225A Frame]
Thermal Mag Trip - Standard
Mechanical (1) #4-4/0
Compartment 6 - Breaker 125A, 3P PDG23G Breaker [225A Frame]
Thermal Mag Trip - Standard
Mechanical (1) #4-4/0
Compartment 7 - Breaker 125A, 3P PDG23G Breaker [225A Frame]
Thermal Mag Trip - Standard
Mechanical (1) #4-4/0
Compartment 8 - Breaker 800A, 3P PDG43M Breaker [800A Frame]
Thermal Mag Trip - Standard
Mechanical (2) 500-750 kcmil

Qty List of Materials

- 1 Type 3R (nonwalk-in) Flat Roof
- 1 Copper Ground Bus
- 1 Seismic Freestanding Label (IBC/CBC Seismic Qualified)
- 1 800 Amp CU Distribution Structure
- 1 Mechanical (2) 500-750 kcmil
- 1 Padlockable lockoff device
- 1 PXE2 Meter, 800 Amp CTs, with Display, Standard (Modbus RTU)
- 1 Please contact metersandrelaysbusinessunitcleoh@eaton.com for Pricing and Availability
- 6 Mechanical (1) #4-4/0
- 1 800A, 3P PDG43M Breaker [800A Frame], Trip 800 A, Thermal Mag, (2) 500-750 kcmil, Mechanical, Bottom
- 6 125A, 3P PDG23G Breaker [225A Frame], Trip 125 A, Thermal Mag, (1) #4-4/0, Mechanical

Item No.	Qty	Product	Description
	1	Switchboards	Commercial Metering Switchboard, Front Access/ Front and Rear Align, Type 3R (nonwalk-in) Flat Roof, 208Y/120V 3-Phase 4-Wire, 4000 Copper, Minimum Interrupting Rating: 65kA, Bus Bracing Rating: 65kA, Depth: 36 In
		Catalog No	XSDEGINNNNN10NNWDF1B0B8BX
		Designation	MS-4000

Structure

- 1 **4000 Amp CU Bussed Utility Pull Section**
Vertical Isol. Barrier (Service Entrance)
Compartment 1 - Utility 4000A Pull Section - SOUTHERN CALIFORNIA EDISON (SCE)

Structure	2	4000 Amp CU Main Structure Vertical Isol. Barrier (Service Entrance) Compartment 1 - Breaker 4000A 3P Power Defense SB Brkr SPN-C4N [Fixed-Manual] Main Breaker Service Entrance PXR20 LSIG w/ARMS and Modbus RTU Local using breaker interface
Structure	3	4000 Amp CU Commercial Metering Structure
Structure	4	4000 Amp CU Main Structure Horizontal Isol. Barrier (Service Entrance) Compartment 1 - Utility 800A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE) Utility Meter Socket Compartment 2 - Breaker 800A, 3P PDG43M Breaker [800A Frame] Thermal Mag Trip - Standard Mechanical (2) 500-750 kcmil
Structure	5	4000 Amp CU Main Structure Horizontal Isol. Barrier (Service Entrance) Compartment 1 - Utility 600A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE) Utility Meter Socket Compartment 2 - Breaker 600A, 3P PDG33G Breaker [600A Frame] Thermal Mag Trip - Standard Mechanical (2) #2-500 kcmil
Structure	6	4000 Amp CU Main Structure Horizontal Isol. Barrier (Service Entrance) Compartment 1 - Utility 1000A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE) Utility Meter Socket Compartment 2 - Breaker 1000A, 3P PDG53M Breaker [1200A Frame] Mechanical (3) 500-750 kcmil PXR20 LSI Trip Unit w/ ARMS Option M no control wiring Trip Unit Amps 1200A, Sensor 1200A Local using breaker interface
Structure	7	4000 Amp CU Main Structure Horizontal Isol. Barrier (Service Entrance) Compartment 1 - Utility 1000A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE) Utility Meter Socket Compartment 2 - Breaker 1000A, 3P PDG53M Breaker [1200A Frame] Mechanical (3) 500-750 kcmil PXR20 LSI Trip Unit w/ ARMS Option M no control wiring Trip Unit Amps 1200A, Sensor 1200A Local using breaker interface
Structure	8	4000 Amp CU Main Structure Horizontal Isol. Barrier (Service Entrance) Compartment 1 - Utility 600A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE) Utility Meter Socket Compartment 2 - Breaker 600A, 3P PDG33G Breaker [600A Frame] Thermal Mag Trip - Standard Mechanical (2) #2-500 kcmil

Detail Bill of Material

Project Name: Phelan Pinon Hills CSD
General Order No:

Negotiation No: S19E0709X5K1
Alter nate No: 0000

Qty	List of Materials
8	Type 3R (nonwalk-in) Flat Roof
1	Service Entrance Label
8	Copper Ground Bus
8	Seismic Freestanding Label (IBC/CBC Seismic Qualified)
1	4000 Amp CU Commercial Metering Structure
5	4000 Amp CU Main Structure
1	800A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)
8	Utility Meter Socket
1	Mechanical (2) 500-750 kcmil
5	Padlockable lockoff device
5	Horizontal Isol. Barrier (Service Entrance)
2	600A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)
2	Mechanical (2) #2-500 kcmil
2	1000A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)
2	Mechanical (3) 500-750 kcmil
1	4000 Amp CU Main Structure
2	Vertical Isol. Barrier (Service Entrance)
1	Auxiliary Switch, 4 Form C
1	Pre Wired
1	Main Breaker Service Entrance
1	4000 Amp CU Bussed Utility Pull Section
1	4000A Pull Section - SOUTHERN CALIFORNIA EDISON (SCE)
1	800A, 3P PDG43M Breaker [800A Frame], Trip 800 A, Thermal Mag, (2) 500-750 kcmil, Mechanical, Bottom
2	600A, 3P PDG33G Breaker [600A Frame], Trip 600 A, Thermal Mag, (2) #2-500 kcmil, Mechanical, Bottom
2	1000A, 3P PDG53M Breaker [1200A Frame], Trip 1000 A, PXR20 LSI w/ ARMS, (3) 500-750 kcmil, Mechanical, Bottom
1	4000A 3P Power Defense SB Brkr SPN-C4N [Fixed-Manual], Trip 4000 A, PXR20 LSIG w/ARMS and Modbus RTU

Eaton Selling Policy 25-000 applies.

If Eaton and the buyer entity listed on this purchase order have a separate executed written agreement for the products/services herein, then that agreement applies. Otherwise, Eaton's Selling Policy 25000 (<https://www.eaton.com/ca/en-gb/support/terms-conditions.html>) controls and supersedes all prior correspondence or communications between Eaton and the buyer, and any additional or different terms proposed by the buyer are rejected.

All orders must be released for manufacture within 90 days of date of order entry. If approval drawings are required, drawings must be returned approved for release within 60 days of mailing. If drawings are not returned accordingly, and/or if shipment is delayed for any reason, the price of the order will increase by 1.0% per month or fraction thereof for the time the shipment is delayed.

Seller shall not be responsible for any failure to perform, or delay in performance of, its obligations resulting from the COVID-19 pandemic or any future epidemic, and Buyer shall not be entitled to any damages resulting thereof.

Switchboard General Information

Pow-R-Line Xpert - Specifications

Quantity: 1

Alignment: Front Access/ Front and Rear Align

Service: 208Y/120V 3-Phase 4-Wire

Minimum Interrupt Rating: 65 kA

Bus Specifications

Bus Amps: 1200

Neutral Amps: 1200

Bus Material: Copper

Bus Bracing Rating: 65kA

Heat Test

Ground Bus Material: Copper Ground Bus Bolted To Frame, (1)
#6-350 kcmil Ground Lug

Incoming/Outgoing Information

Incoming Entry: Bottom

Incoming Qty & Size: Terminals, Mechanical, (3) 500-750 kcmil,
Bottom

Structure Specifications

Non Service Entrance

Enclosure Type: Type 1

Seismic Label (IBC/CBC Seismic Qualified) - Freestanding

Refer to seismic installation data sheet TD01508002E
and drawing 1A32496 for details.

Special Notes / Common Mods

Qty Description

Catalog Number

Enclosure properties

Struct #

1

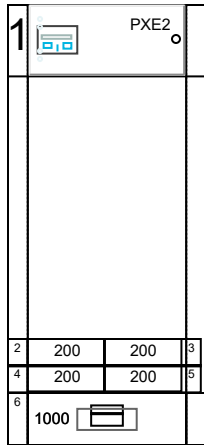
Description/Modifications

Bottom incoming chassis mounted main device (Incoming Main
Device/MLO Section)

The information on this document is created by Eaton Corporation. It is disclosed in confidence and it is only to be used for the purpose in which it is supplied.

PREPARED BY		DATE	EatonSumterSC		
RICHARD VILLASENOR		7/14/2025			
APPROVED BY		DATE	JOB NAME Phelan Pinon Hills CSD		
			DESIGNATION CC-DB		
VERSION 9.0.36.4		TYPE Switchboards		DRAWING TYPE CustAppr	
REVISION 0	DWG SIZE DwgA		G.O.	ITEM	SHEET 1 of 4

Avail : 30X

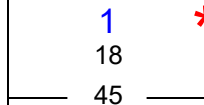


Front View

Struct

Depth

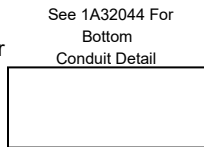
Width



Power Flow



Floor PlanRear



Total of 1 Structures, Total Weight of 795 Weight-Lbs.
Total of 1 Structures, Total Width of 45 Inches

Structure	1					
Ship-Inches	45.00					
Ship-MM	1143					
Width-Inches	45.00					
Width-MM	1143					
Depth(Inner)-In.	18.00					
Depth(Inner)-MM	457					
Depth(Outer)-In.	18.00					
Depth(Outer)-MM	457					
Height-Inches	90.00					
Height-MM	2286					
Weight-Lbs.(Est.)	795					
Weight-Kg.(Est.)	360					

The information on this document is created by Eaton Corporation. It is disclosed in confidence and it is only to be used for the purpose in which it is supplied.	PREPARED BY	DATE	Eaton SumterSC			
	RICHARD VILLASENOR	7/14/2025	Phelan Pinon Hills CSD			
	APPROVED BY	DATE	JOB NAME	CC-DB		
			DESIGNATION			
NEG-ALT Number	VERSION		TYPE		DRAWING TYPE	
	9.0.36.4		Switchboards		CustAppr	
S19E0709X5K1-0000	REVISION	DWG SIZE	G.O.	ITEM	SHEET	
	0	DwgA			2 of 4	

Switchboard Units Information

Str#	Unit	Description/Modifications	Nameplate
1			
	1	PXE2 Meter, 1200 Amp CTs, with Display, Standard (Modbus RTU)	
	2	Feeder Breaker - Chassis Mtd-200A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 200A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	3	Feeder Breaker - Chassis Mtd-200A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 200A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	4	Feeder Breaker - Chassis Mtd-200A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 200A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	5	Feeder Breaker - Chassis Mtd-200A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 200A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	6	Main Breaker - Chassis Mtd-1000A, 3P PDG53M Breaker, [1200A Frame], Trip(Ir) 1000A., PXR20 LSI w/ ARMS, None ARMS Operation - Local using breaker interface, Trip Unit Sensor Rating(In): 1200A Terminals, Mechanical, (3) 500-750 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (3) 3/0-750 kcmil	

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PREPARED BY		DATE	Eaton SumterSC		
RICHARD VILLASENOR		7/14/2025			
APPROVED BY		DATE	JOB NAME Phelan Pinon Hills CSD		
			DESIGNATION CC-DB		
VERSION 9.0.36.4		TYPE Switchboards		DRAWING TYPE CustAppr	
REVISION 0	DWG SIZE DwgA		G.O.		SHEET 3 of 4

NEG-ALT Number
S19E0709X5K1-0000

Switchboard General Information

Pow-R-Line Xpert - Specifications

Quantity: 1

Alignment: Front Access/ Front and Rear Align

Service: 208Y/120V 3-Phase 4-Wire

Minimum Interrupt Rating: 65 kA

Bus Specifications

Bus Amps: 800

Bus Bracing Rating: 65kA

Neutral Amps: 800

Bus Material: Copper

Heat Test

Ground Bus Material: Copper Ground Bus Bolted To Frame, (1)

#6-350 kcmil Ground Lug

Incoming/Outgoing Information

Incoming Entry: Bottom

Incoming Qty & Size: Terminals, Mechanical, (2) 500-750 kcmil,
Bottom

Structure Specifications

Non Service Entrance

Enclosure Type: Type 3R (nonwalk-in) Flat Roof

Enclosure: Outdoor Enclosure Configuration Per EUSERC Dwg
354

Seismic Label (IBC/CBC Seismic Qualified) - Freestanding

Refer to seismic installation data sheet TD01508002E
and drawing 1A32497 for details.

Special Notes / Common Mods

Qty Description

Catalog Number

Enclosure properties

Struct #

1

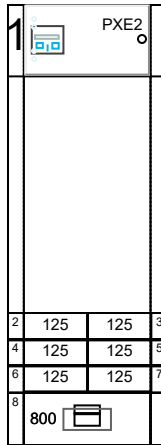
Description/Modifications

Bottom incoming chassis mounted main device (Incoming Main
Device/MLO Section)

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PREPARED BY		DATE	Eaton SumterSC		
RICHARD VILLASENOR		7/14/2025			
APPROVED BY		DATE	JOB NAME Phelan Pinon Hills CSD		
			DESIGNATION DB		
VERSION 9.0.36.4		TYPE Switchboards		DRAWING TYPE CustAppr	
REVISION 0	DWG SIZE DwgA		G.O.	ITEM	SHEET 1 of 4

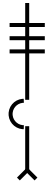
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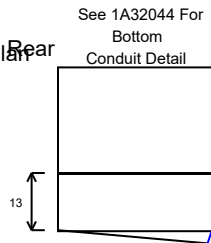
Front View

Struct	1	*
Depth	24	
Width	36	

Power Flow



Rear Floor Plan



Total of 1 Structures, Total Weight of 695 Weight-Lbs. with Front Hinged Doors.
Total of 1 Structures, Total Width of 36 Inches with Front Hinged Doors.

Structure	1					
Ship-Inches	36.00					
Ship-MM	914					
Width-Inches	36.00					
Width-MM	914					
Depth(Inner)-In.	24.00					
Depth(Inner)-MM	609					
Depth(Outer)-In.	37.00					
Depth(Outer)-MM	939					
Height-Inches	90.00					
Height-MM	2286					
Weight-Lbs.(Est.)	695					
Weight-Kg.(Est.)	315					

The information on this document is created by Eaton Corporation. It is disclosed in confidence and it is only to be used for the purpose in which it is supplied.

PREPARED BY		DATE	EatonSumterSC		
RICHARD VILLASENOR		7/14/2025			
APPROVED BY		DATE	JOB NAMEPhelan Pinon Hills CSD		
			DESIGNATIONDB		
VERSION9.0.36.4		TYPESwitchboards		DRAWING TYPECustAppr	
REVISION0	DWG SIZEDwgA		G.O.		SHEET2 of 4

NEG-ALT Number
S19E0709X5K1-0000

Switchboard Units Information

Str#	Unit	Description/Modifications	Nameplate
1			
	1	PXE2 Meter, 800 Amp CTs, with Display, Standard (Modbus RTU)	
	2	Feeder Breaker - Chassis Mtd-125A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 125A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	3	Feeder Breaker - Chassis Mtd-125A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 125A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	4	Feeder Breaker - Chassis Mtd-125A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 125A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	5	Feeder Breaker - Chassis Mtd-125A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 125A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	6	Feeder Breaker - Chassis Mtd-125A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 125A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	7	Feeder Breaker - Chassis Mtd-125A, 3P PDG23G Breaker [225A Frame], Trip(Ir) 125A., Thermal Mag Terminals, Mechanical, (1) #4-4/0 Neutral Terminal, (1) #6-350 kcmil	
	8	Main Breaker - Chassis Mtd-800A, 3P PDG43M Breaker [800A Frame], Trip(Ir) 800A., Thermal Mag Terminals, Mechanical, (2) 500-750 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (2) 3/0-750 kcmil	

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PREPARED BY		DATE	Eaton SumterSC		
RICHARD VILLASENOR		7/14/2025			
APPROVED BY		DATE	JOB NAME Phelan Pinon Hills CSD		
			DESIGNATION DB		
VERSION 9.0.36.4		TYPE Switchboards		DRAWING TYPE CustAppr	
REVISION 0	DWG SIZE DwgA		G.O.		SHEET 3 of 4

NEG-ALT Number
S19E0709X5K1-0000

Switchboard General Information

Commercial Metering - Specifications

Quantity: 1

Alignment: Front Access/ Front and Rear Align

Service: 208Y/120V 3-Phase 4-Wire

Minimum Interrupt Rating: 65 kA

Bus Specifications

Bus Amps: 4000

Neutral Amps: 4000

Bus Material: Copper

Bus Bracing Rating: 65kA

Heat Test

Ground Bus Material: Copper Ground Bus Bolted To Frame, (1)

#6-350 kcmil Ground Lug

Incoming/Outgoing Information

Terminals, Mechanical, See Utility Specifications, Bottom

Incoming Entry: Bottom

Structure Specifications

Service Entrance

Enclosure Type: Type 3R (nonwalk-in) Flat Roof

Enclosure: Outdoor Enclosure Configuration Per EUSERC Dwg 354

Seismic Label (IBC/CBC Seismic Qualified) - Freestanding

Refer to seismic installation data sheet TD01508002E and drawing 1A32497 for details.

Special Notes / Common Mods

Qty Description

Catalog Number

Utility Specifications

Struct # 4

800 Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)

Utility Service Requirements Page References:

Lug Drillings Per Dwg. : 347

CT Compartment Per Dwg. 320

Meter Door per Dwg. 333

15J Meter Socket(s)

Drillings

None

Utility Specifications

Struct # 5

600 Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)

Utility Service Requirements Page References:

Lug Drillings Per Dwg. : 347

CT Compartment Per Dwg. 320

Meter Door per Dwg. 332

15J Meter Socket(s)

Drillings

None

Utility Specifications

Struct # 6

1000 Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)

Utility Service Requirements Page References:

Lug Drillings Per Dwg. : 347

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RICHARD VILLASENOR		7/14/2025			
APPROVED BY		DATE	JOB NAME	Phelan Pinon Hills CSD	
			DESIGNATION	MS-4000	
VERSION		TYPE	DRAWING TYPE		
9.0.36.4		Switchboards	CustAppr		
REVISION	DWG SIZE		G.O.	ITEM	SHEET
0	DwgA				1 of 9

CT Compartment Per Dwg. 320
Meter Door per Dwg. 333
15J Meter Socket(s)
Drillings
None

Utility Specifications
Struct # 7

1000 Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)
Utility Service Requirements Page References:
Lug Drillings Per Dwg. : 347
CT Compartment Per Dwg. 320
Meter Door per Dwg. 333
15J Meter Socket(s)
Drillings
None

Utility Specifications
Struct # 8

600 Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)
Utility Service Requirements Page References:
Lug Drillings Per Dwg. : 347
CT Compartment Per Dwg. 320
Meter Door per Dwg. 332
15J Meter Socket(s)
Drillings
None

Utility Specifications
Struct # 1

4000 Amps Util. Pull Sect. - SOUTHERN CALIFORNIA EDISON (SCE)
4000 Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)
Utility Service Requirements Page References:
UGPS Per Dwg. 345
10 Drillings
(10) EUSERC Press Bolts

Utility Specifications
Struct # 3

Amps Util. Mtr. Compt. - SOUTHERN CALIFORNIA EDISON (SCE)

Enclosure properties

Struct #
1

Description/Modifications
Incoming Utility Structures (Incoming Utility Section)
Vertical isolating barrier

2

Main device (Main Structure)
Vertical isolating barrier

3

Arranged for cable exit Top

4

Bussed Wireway (Commercial Metering West Coast)

5

Utility Structures (Utility Structure)
Horizontal isolating barrier
Utility Structures (Utility Structure)
Horizontal isolating barrier

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APPROVED BY	DATE	JOB NAME Phelan Pinon Hills CSD	DESIGNATION MS-4000		
VERSION 9.0.36.4		TYPE Switchboards		DRAWING TYPE CustAppr	
NEG-ALT Number S19E0709X5K1-0000	REVISION 0	DWG SIZE DwgA	G.O.	ITEM	SHEET 2 of 9

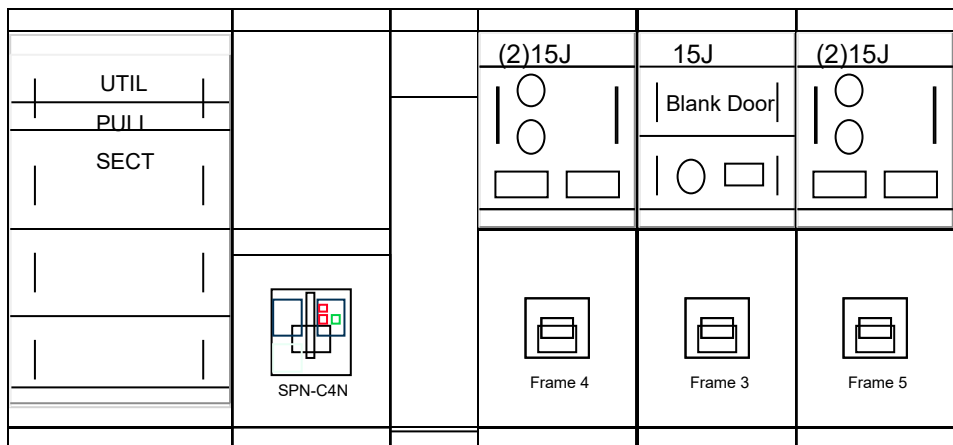
- 6

Utility Structures (Utility Structure)
Horizontal isolating barrier
- 7

Utility Structures (Utility Structure)
Horizontal isolating barrier
- 8

Utility Structures (Utility Structure)
Horizontal isolating barrier

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	RICHARD VILLASENOR		7/14/2025			
	APPROVED BY		DATE	JOB NAME		
				Phelan Pinon Hills CSD		
				DESIGNATION		
				MS-4000		
	VERSION		TYPE			DRAWING TYPE
	9.0.36.4		Switchboards			CustAppr
NEG-ALT Number	REVISION	DWG SIZE		G.O.		SHEET
S19E0709X5K1-0000	0	DwgA				3 of 9

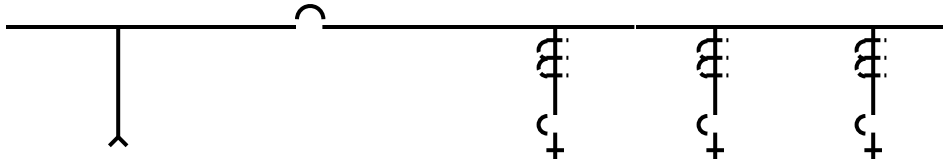


Front View

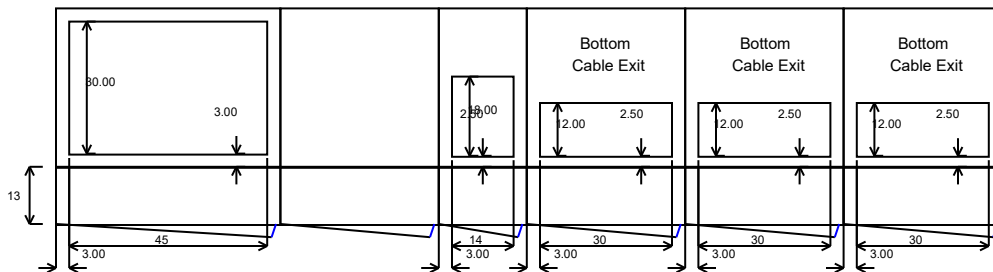
Struct
Depth
Width

	1	*	2	*	3	4	*	5	*	6	*
Depth	36		36		36	36		36		36	
Width	51		36		20	36		36		36	

Power Flow



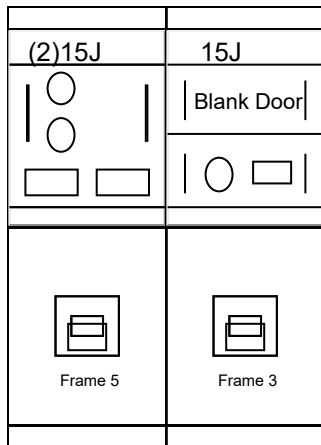
Floor Plan Rear



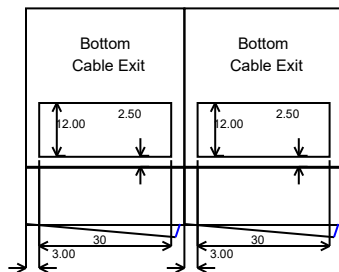
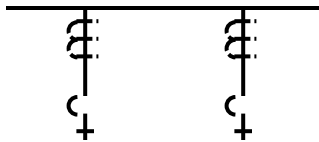
Structure	1	2	3	4	5	6
Ship-Inches	51.00	36.00		56.00	36.00	36.00
Ship-MM	1295	914		1422	914	914
Width-Inches	51.00	36.00	20.00	36.00	36.00	36.00
Width-MM	1295	914	508	914	914	914
Depth(Inner)-In.	36.00	36.00	36.00	36.00	36.00	36.00
Depth(Inner)-MM	914	914	914	914	914	914
Depth(Outer)-In.	49.00	49.00	49.00	49.00	49.00	49.00
Depth(Outer)-MM	1244	1244	1244	1244	1244	1244
Height-Inches	90.00	90.00	90.00	90.00	90.00	90.00
Height-MM	2286	2286	2286	2286	2286	2286
Weight-Lbs.(Est.)	1200	1198	1050	1480	1462	1495
Weight-Kg.(Est.)	544	543	476	671	663	678

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APPROVED BY	DATE	JOB NAME Phelan Pinon Hills CSD	DESIGNATION MS-4000
VERSION 9.0.36.4	TYPE Switchboards	DRAWING TYPE CustAppr	
REVISION 0	DWG SIZE DwgA	G.O.	ITEM
NEG-ALT Number S19E0709X5K1-0000			SHEET 4 of 9



Struct	7	*	8	*
Depth	36		36	
Width	36		36	



Total of 8 Structures, Total Weight of 10842 Weight-Lbs. with Front Hinged Doors.
Total of 8 Structures, Total Width of 287 Inches with Front Hinged Doors.

Structure	7	8				
Ship-Inches	36.00	36.00				
Ship-MM	914	914				
Width-Inches	36.00	36.00				
Width-MM	914	914				
Depth(Inner)-In.	36.00	36.00				
Depth(Inner)-MM	914	914				
Depth(Outer)-In.	49.00	49.00				
Depth(Outer)-MM	1244	1244				
Height-Inches	90.00	90.00				
Height-MM	2286	2286				
Weight-Lbs.(Est.)	1495	1462				
Weight-Kg.(Est.)	678	663				

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REVISION 0	DWG SIZE DwgA		G.O.		SHEET 5 of 9

Switchboard Units Information

Str#	Unit	Description/Modifications	Nameplate
1		4000A Pull Section - SOUTHERN CALIFORNIA EDISON (SCE)	
2		Main Breaker - Ind Mtd-4000A 3P Power Defense SB Brkr SPN-C4N [Fixed-Manual], Trip(Ir) 4000A., PXR20 LSIG w/ARMS and Modbus RTU, 100 % rated ARMS Operation - Local using breaker interface Auxiliary Switch: 4 Form C Pre Wired	
3			
4		Feeder Breaker - Ind Mtd-800A, 3P PDG43M Breaker [800A Frame], Trip(Ir) 800A., Thermal Mag Terminals, Mechanical, (2) 500-750 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (2) 3/0-750 kcmil 800A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)	
5		Feeder Breaker - Ind Mtd-600A, 3P PDG33G Breaker [600A Frame], Trip(Ir) 600A., Thermal Mag Terminals, Mechanical, (2) #2-500 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (2) #4-500 kcmil 600A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)	
6		Feeder Breaker - Ind Mtd-1000A, 3P PDG53M Breaker [1200A Frame], Trip(Ir) 1000A., PXR20 LSI w/ ARMS, None ARMS Operation - Local using breaker interface, Trip Unit Sensor Rating(In): 1200A Terminals, Mechanical, (3) 500-750 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (3) 3/0-750 kcmil 1000A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)	
7		Feeder Breaker - Ind Mtd-1000A, 3P PDG53M Breaker [1200A Frame], Trip(Ir) 1000A., PXR20 LSI w/ ARMS, None ARMS Operation - Local using breaker interface, Trip Unit Sensor Rating(In): 1200A Terminals, Mechanical, (3) 500-750 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (3) 3/0-750 kcmil 1000A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)	
8		Feeder Breaker - Ind Mtd-600A, 3P PDG33G Breaker [600A Frame], Trip(Ir) 600A., Thermal Mag Terminals, Mechanical, (2) #2-500 kcmil, Bottom Lockoff devices: Padlockable Hasp Neutral Terminal, (2) #4-500 kcmil 600A Utility Metering - SOUTHERN CALIFORNIA EDISON (SCE)	

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NEG-ALT Number S19E0709X5K1-0000	VERSION		TYPE		DRAWING TYPE	
	9.0.36.4		Switchboards		CustAppr	
REVISION		DWG SIZE		G.O.		SHEET
0		DwgA				6 of 9

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

- 1.01 This Section describes the methods of measurement and payment for the specific bid items. All other provisions of the Contract Documents which relate to measurement and payment are applicable, except that where conflicts occur between this section and other provisions of the technical specifications or reference specifications, this measurement and payment section shall prevail.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 GENERAL

- A. All work shown, described, or otherwise required by the Contract Documents, shall be included within the given bid items.
- B. Payment for all bid items shall include full compensation for all equipment, materials, labor, tools, trucking, and all other incidental work necessary to construct complete and operational systems which conform to the Contract Documents.

3.02 MEASUREMENT AND PAYMENT FOR BID ITEMS

- A. All lengths shall be measured in a horizontal plane (plan view dimensions), unless otherwise specified. All areas measured shall be based on the specified measurement definition included in each bid item description.
- B. All work shown, described, or otherwise required by the Contract Documents, shall be included within the given bid items.
- C. Basis for the submitted bid shall be on the quantities shown for the items on the Bid Sheet, where applicable.
- D. Unit definitions of Measurement and Payment
 - 1. "Lump Sum", or "LS", shall mean a single Lump Sum Payment for the identified bid item. Partial payments may be made, based on the Engineer's estimate of the percent completion of the specified item. Provide schedule of values for all lump sum bid items on the bid schedule
 - 2. "Each" shall mean the actual number of identified bid items provided. Payment for the identified bid item will be based on providing each item, complete and in place in accordance with the contract documents.
 - 3. Measurable units of quantity expressed in "Linear Feet" or "LF"; "Cubic Yard or CY"; "Ton"; "SF" or "SY" shall mean the number of indicated measurable quantities of the bid item. Payment for the identified bid item will be based on

actual and measured quantities of the bid item complete and in place in accordance with the contract documents.

4. For extra work, and quantity changes for unit price work, refer to the General Conditions.

3.03 SCHEDULE OF VALUES

- A. The Contractor shall submit to the Owner for acceptance, in the form directed by or acceptable to the Owner, a complete schedule of the values of ALL of the various portions of the Work, including quantities and unit prices if required by the Owner, aggregating the Contract Lump Sum Price (except in cases and to the extent that accepted unit prices form the basis for payment). The schedule shall subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction and to coordinate with the progress schedule required for this Work, and shall be supported by such data to substantiate its correctness as the Owner may require, particularly as it relates to those items that are funded by federal grant monies. Each item in the schedule of values shall include its proper share of overhead and profit. An unbalanced breakdown providing for overpayment to the Contractor on items of Work which would be performed first will not be approved. The schedule of values, when accepted by the Owner, shall be used only as a basis for the Contractor's applications for payment and not for additions to or deductions from the Contract Price. The initial submittal for the schedule of values shall be provide at the preconstruction conference or within 10 days of the Notice to Proceed, whichever comes sooner.
- B. Contractor's attention is directed to the specific grant-funded items of Work that will require SOV breakdown of costs:
 1. Emergency Backup Generator and Switchgear Package (installation cost; District has pre-purchased this equipment)
 2. Communications Equipment, Audio Visual Systems specifically related to the Emergency Operations Center (EOC).
 3. Site Work
 4. 3,592 SF Emergency Operations Center (component of 14,034-SF Civic Center). Do not included communications/audio visual systems related to the EOC if included in item 3.02.B.2 above.
- C. Off-site Work (in public right of way) shall be a separate item in the SOV, not included with Site Work.

BASE BID

The base bid is a single lump sum item for the 14,034-SF Civic Center Development Phase 1 Project in its entirety, including the Civic Center building (and Emergency Operations Center (EOC) component within the building), site work, off-site improvements, all as shown on the contract drawings and specified herein, for a complete and operational Project.

END OF SECTION

SECTION 01 26 13

REQUESTS FOR INTERPRETATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Administrative and procedural requirements for making clarifications to the contract documents via Contractor's Request for Interpretation (RFI).
- B. Related work:
 - 1. Procedures for contract modification are outlined in the General Conditions of the Contract for Construction.
 - 2. Procedures for submittals are specified elsewhere in Division 01.
 - 3. Procedures for substitutions are specified elsewhere in the General Conditions of the Contract for Construction.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Submit RFIs to the Architect for the following.
 - 1. When clarification of Contract Document design intent, or supplementary information about design intent apparently not contained in the Contract Documents, is necessary.
 - 2. When interpretation of the Contract Documents is necessary, including that of apparent conflicts, discrepancies or inconsistencies between portions of the Contract Documents.
 - 3. When design direction is requested to address an unforeseen field condition or circumstance that occurs, which is neither described in, nor reasonably inferable from, the information contained in the Contract Documents.
 - 4. When questions arise regarding apparent conflict between design intent, Contractor's coordination or proposed construction means and methods.-
- B. Keep the number of RFIs to a minimum.
 - 1. Whenever possible, request information either verbally or in writing at the next scheduled Project meeting prior to issuing a formal RFI.
 - 2. When urgency of need, or complexity of an item makes verbal clarification or clarification at the next scheduled Project meeting impractical, properly prepare and submit a written RFI to the Architect immediately upon discovery and without delay.
- C. Do not submit RFIs to the Architect for the following.
 - 1. As a means of tracking construction issues other than those indicated in Paragraph 1.02A herein.
 - 2. To request an alternate design or to propose a re-work of the original design intent communicated in the Contract Documents.

3. To request information that is evident, or reasonably inferred, upon Contractor's thorough review of Construction Documents.
 4. To request a modification to the Contract for Construction or to confirm action taken by the Contractor for requested Contract modifications.
 5. To request review or approval of non-conforming or defective work items.
 6. To request review or approval of Contractor's coordination items, or of Contractor's means and methods of construction.
 7. To request review or approval of submittals.
 8. To request substitutions.
 9. To re-state a question asked in a previously submitted RFI.
- D. Format RFIs using Contractor's standard RFI form, or form approved in advance by the Architect. Include the following.
1. Project name, as listed on the Contract Documents, and Architect's project number or other identifying number, if any.
 2. RFI number.
 3. Date of RFI submittal.
 4. Name, address, telephone and email address Contractor.
 5. Drawing sheet and detail numbers, if applicable to the question.
 6. Specification Section Number and Title, and article, paragraph and subparagraph numbers, if applicable to the question.
 7. Clear, concise explanation of information or clarification requested.
 8. Contractor's suggested response or solution to the request.
 9. Blank space for Architect's written response.

1.03 PROCEDURAL REQUIREMENTS

- A. Carefully study the Contract Documents to ensure requested information is not available therein.
1. Before submitting RFIs to the Architect, verify the information requested cannot be determined or otherwise reasonably inferred from a careful review of the Contract Documents.
 2. RFIs requesting information available in the Contract Documents will be returned to the Contractor without review, with a notation indicating the submitted RFI is clearly presented in the Contract Documents.
- B. Review RFIs generated by subcontractors or material suppliers prior to submittal of such to the Architect. RFIs received by the Architect directly from a subcontractor or material supplier will not be received by Architect, and thus will be returned to Contractor without review.
- C. Prepare RFIs in writing and address to the Architect.
1. Numerically number RFIs consecutively, in regular succession without gaps, with each page of every attachment to the RFI also bearing the RFI number. Follow RFI numeric number with upper-case, sequential alphabetic suffix as necessary for each resubmission of the original numerically numbered RFI.
 2. Limit each RFI to a singular and complete subject. Do not submit multiple-subject, incomplete or inaccurate RFIs.

3. Where field conditions dictate apparent solutions, provide assessment of the potential problem and a suggested solution with the initial RFI submittal.
 - a. RFIs failing to include a suggested solution may be returned to the Contractor without review.
 - b. If no apparent solution is obvious, provide a statement to that effect on the RFI.
 4. Where an RFI is issued to request clarification impacting Contractor coordination issues (for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items), provide coordination drawings or sketches for Architect's reference, drawn to scale, and submit them with the RFI.
 - a. Architect will only review such RFIs that include Contractor coordination information along with the request.
 - b. RFIs failing to include contractor coordination information will be returned to the Contractor without review.
 5. If Contractor believes an RFI may result in additional cost, identify in the text of the RFI the basis of the Contractor's bid as it relates to the specific RFI.
- D. Deliver RFIs to the Architect via hand carry, mail, overnight shipping, facsimile, messenger, email/PDF or otherwise as appropriate.
1. Submit RFIs within a reasonable time frame so as not to interfere with or impede the progress of the Work, or otherwise delay the Contract Schedule, while simultaneously allowing for full response time described below.
 2. It shall be the Contractor's responsibility to verify the Architect has received the RFI, with all pages and attachments complete and legible.
- E. Allow for a minimum [5] [10] [other] business day review period in the construction schedule for Architect's RFI review and response.
1. RFI review period begins on the date of receipt of the RFI by Architect and extends to mailing date of return to the Contractor.
 2. If the Architect requires additional information or clarification to respond to an RFI, the period of time required for Architect's response will begin when requested information is received from the Contractor.
 3. When the RFI, additional information, or clarification is received by the Architect before noon, the review period begins that day; when received by the Architect after noon, the review periods begins on the next business day.
- F. Architect's minimum review period shall be increased by the Architect for the following:
1. When additional information or clarification from the Contractor is requested by the Architect.
 2. When an RFI is submitted out-of-phase with the sequence of construction.
 3. When more than 5 RFIs are submitted during a single business day and more than 10 RFIs are submitted during a period of [5] consecutive business days.

4. When, in the opinion of the Architect, more time is needed to respond to the RFI.
- G. If, in the opinion of the Architect, an RFI will require an extended review period, Architect will endeavor to notify Contractor with 48 hours of receipt of RFI.
1. Alert Architect, in writing, to the time available before an extended review period will cause a demonstrably negative impact to the Contract time.
 2. Work performed before receipt of an RFI response from the Architect may be considered defective work.
- H. Responses from the Architect shall not modify any requirement of the Contract Documents.
1. RFI responses shall not be construed by the Contractor as an approval or direction to perform additional work.
 2. If the Contractor believes a response provided by the Architect may result in a change to the Contract sum or time, Contractor shall not proceed with Work related to the RFI until a Change Order, or other tracking method acceptable to the Owner and Architect, is prepared and approved by the Owner and Architect.
- I. Prepare and maintain an RFI log.
1. As a minimum, record RFI number, brief description of content or subject discussed, date submitted, and date answered.
 2. Keep log current and furnish copy to the Architect, when so requested.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Pre-installation meetings.
- G. Cutting and patching.
- H. Special procedures.

1.02 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual and the Drawings to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- G. Coordinate and cooperate with Construction Manager and Owner for all special inspections, stakeholder/agency site visits, meetings and general access and coordination items through the Construction Period.

1.03 FIELD ENGINEERING

- A. Refer to Special Provisions, Article 5.C, for requirements for preservation and restoration of survey monuments.
- B. Contractor shall be responsible for surveying services and staking required for construction. Employ Land Surveyor registered in State of California and acceptable to Architect/Engineer.
- C. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- D. Control datum for survey is that shown on Drawings.
- E. Verify set-backs and easements; confirm drawing dimensions and elevations.
- F. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- G. Submit copy of site drawing and building pad certificate signed by Land Surveyor certifying building pad elevations and locations of the Work are in conformance with Contract Documents.
- H. Maintain complete and accurate log of control and survey work as Work progresses.
- I. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- J. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- K. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- L. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.04 PRECONSTRUCTION MEETING

- A. Owner's Representative will schedule meeting after Notice of Award.

- B. Attendance Required: Owner, Owner's Representative, Architect, Engineer, FEMA representatives as appropriate, County of San Bernardino representatives, Contractor, and Subcontractors as appropriate.
- C. Agenda:
1. Execution of Owner-Contractor Agreement.
 2. FEMA Grant Administration requirements.
 3. Submission of executed bonds and insurance certificates.
 4. Distribution of Contract Documents.
 5. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
 6. Designation of personnel representing parties in Contract, Owner, Owner's Representative, and Architect/Engineer.
 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Scheduling.
 9. Scheduling activities of Geotechnical Engineer, and special construction inspections, including County of San Bernardino Inspectors.
 10. Contractor's safety and training program, and designation of the Contractor's Safety Officer and his qualifications, Contractor's emergency contact information.
 11. Construction permit requirements, procedures, and posting.
 12. Public notice of starting Work.
 13. Access and rights-of-way furnished by the Owner.
 14. Inspections and Inspectors provided by Owner and Contractor.
 15. Testing laboratory or agency, and testing procedures.
 16. Procedures for payroll and labor cost reporting by the Contractor.
 17. Procedures to ensure nondiscrimination in employment on and for the Work.
 18. Other general and administrative items as required.
- D. Owner's Representative will Record minutes and distribute electronic copies within two working days after meeting to participants.

1.05 SITE MOBILIZATION MEETING

- A. Owner's Representative will schedule meeting at Project site prior to Contractor mobilization onto site.

- B. Attendance Required: Owner, Owner's Representative, Architect/Engineer, Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Construction Job Trailer.
 - 3. Owner's requirements and partial occupancy.
 - 4. Construction facilities and controls provided by Owner.
 - 5. Temporary utilities provided by Owner.
 - 6. Survey and building layout.
 - 7. Security and housekeeping procedures.
 - 8. Schedules.
 - 9. Application for payment procedures.
 - 10. Procedures for testing.
 - 11. Procedures for maintaining record documents.
 - 12. Requirements for start-up of equipment.
 - 13. Inspection and acceptance of equipment put into service during construction period.
- D. Owner's Representative will Record minutes and distribute electronic copies within two working days after meeting to participants, and those affected by decisions made.

1.06 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at weekly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Coordinate such meetings with Owner's Representative.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Owner's Representative, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.

7. Maintenance of progress schedule, schedule update, 3-week look-ahead schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Coordination of projected progress.
 11. Maintenance of quality and work standards.
 12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to Work.
- E. Contractor shall Record minutes and distribute copies within two working days after meeting to participants, and those affected by decisions made.

1.07 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections or indicated on the drawings, convene pre-installation meetings at Project site (Construction Trailer) prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Owner's Representative 5 working days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 1. Review conditions of installation, preparation and installation procedures.
 2. Review coordination with related work.
- E. Contractor shall Record minutes and distribute electronic copies within two days after meeting to participants, and those affected by decisions made.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 CUTTING AND PATCHING

- A. Employ skilled and experienced personnel to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 1. Structural integrity of element.
 2. Integrity of weather-exposed or moisture-resistant elements.

3. Efficiency, maintenance, or safety of element.
 4. Visual qualities of sight exposed elements.
 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
1. Fit the several parts together, to integrate with other Work.
 2. Uncover Work to install or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing. Sawcut at neat, uniform right-angles to make a neat appearance of cut.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids per penetration details on the drawings. Notify AOR in advance of completion of penetration to allow for on site inspection, if desired.
- J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.02 SPECIAL PROCEDURES

- A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.
- B. Employ skilled and experienced personnel to perform alteration work.
- C. Work in the County of San Bernardino Right of Way shall require County inspection as required by the Encroachment Permit. Contractor shall cooperate and coordinate closely with County staff during construction in the right of way.

- D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- F. Remove debris and abandoned items from area and from concealed spaces.
- G. Prepare surface and remove surface finishes to permit installation of new work and finishes.
- H. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- I. Remove, cut, and patch Work in manner to minimize damage and to permit restoring products and finishes to [original] [or] [specified] condition.
- J. Refinish existing visible surfaces to remain in renovated rooms and spaces, to [specified] [renewed] condition for each material, with neat transition to adjacent finishes.
- K. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- L. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.
- M. Where change of plane of $\frac{1}{4}$ inch or more occurs, submit recommendation for providing smooth transition; to Architect/Engineer for review.
- N. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- O. Finish surfaces as specified in individual product sections.

END OF SECTION

SECTION 01 32 16.13
NETWORK ANALYSIS SCHEDULES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References.
- B. Quality assurance.
- C. Format.
- D. Schedules.
- E. Submittals.
- F. Review and evaluation.
- G. Updating schedules.
- H. Distribution.

1.02 REFERENCES

- A. CPM in Construction Management - Project Management with CPM, O'Brien, McGraw-Hill Book Company, New York.

1.03 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel specializing in CPM scheduling with two years minimum experience in scheduling construction work of complexity comparable to this Project, and having use of computer facilities capable of delivering detailed graphic printout within two working days following request.
- B. Contractor's Administrative Personnel: Two years minimum experience in using and monitoring CPM schedules on comparable projects.

1.04 FORMAT

- A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable specification section number.
- B. Diagram Sheet Size: 11 x 17 inches print-out for meetings, and in electronic PDF format.
- C. Scale and Spacing: To allow for notations and revisions.

1.05 SCHEDULES

- A. Prepare network analysis diagrams and supporting mathematical analyses using Critical Path Method, under concepts and methods outlined in AGC's "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".
- B. Illustrate order and interdependence of activities and sequence of work; how start of given activity depends on completion of preceding activities, and how completion of activity may restrain start of subsequent activities.
- C. Illustrate complete sequence of construction by activity, identifying work of separate stages and floors, with clear task items identified for the Emergency Operations Center, for same tasks and subtasks identified for the Civic Center. Indicate dates for submittals and return of submittals; dates for procurement and delivery of products; and dates for installation and provision for testing. Include legend for symbols and abbreviations used.
- D. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 working day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; accrue float time to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and recomputation of scheduled dates and float.
- F. Required Sorts: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By longest float, then in order of early start.
 - 3. By responsibility in order of earliest possible start date.
 - 4. In order of latest allowable start dates.
 - 5. In order of latest allowable finish dates.
 - 6. Contractor's periodic payment request sorted by Schedule of Values listings.
 - 7. Listing of basic input data generating report.
 - 8. Listing of activities on critical path.

- G. Coordinate contents with schedule of values in Section 01 30 00, Submittal Requirements.

1.06 SUBMITTALS

- A. Within 10 working days after date of Owner-Contractor Agreement, or at the time of the pre-construction meeting, whichever occurs earliest, submit proposed preliminary network diagram defining planned operations for first 60 working days of Work, with general outline for remainder of Work.
- B. Participate in review of preliminary and complete network diagrams jointly with Engineer.
- C. Within 10 working days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram for review. Include written certification that Subcontractors have reviewed and accepted proposed schedule.
- D. Within 10 working days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
- E. Submit updated network schedules (electronic PDF) with each Application for Payment.

1.07 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of network diagrams and analysis with Architect/Engineer at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise network diagrams and analysis incorporating results of review, and resubmit within 10 working days.

1.08 UPDATING SCHEDULES

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update diagrams to graphically depict current status of Work.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Indicate changes required to maintain Date of Substantial Completion.
- E. Submit sorts required to support recommended changes.

- F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate contractors.

1.09 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect/Engineer, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 GENERAL

1.01 GENERAL

- A. This section includes requirements for storm water pollution control in accordance with Caltrans Standard Specifications 2023 Sections 13-1 General and 13-3 Storm Water Pollution Prevention Plan.
- B. Delete the 4th paragraph in Section 13-3.01A in its entirety, and replace with "Discharges of storm water from the project must comply with NPDES General Permit for "Storm Water Discharges Associated with Construction and Land Disturbance Activities" (Order No. 2009-0009-DWQ, NPDES No. CAS000002) hereinafter called the "Permit.""
- C. The Risk Level for this Project is [xxxx].

1.02 MEASUREMENT AND PAYMENT

- A. Delete Section 13-3.04, Payment, Caltrans 2010 Section 13-3 Storm Water Pollution Prevention Plan, and replace with the following: "Payment for preparing and implementing Storm Water Pollution Prevention Plan shall be included in the lump sum bid item for the Work including controlling stormwater, monitoring storm water discharges, preparing and submitting the Storm Water Annual Plan, and complying with all Permit conditions."
- B. This item specifically excludes groundwater dewatering which shall be paid for under a separate bid item, with no additional compensation allowed therefor.

1.03 SUPPLEMENTAL DEFINITIONS TO CALTRANS SECTION 13-1 AND 13-3

- A. "Department" shall also mean "Owner" and "District".
- B. Construction phase: Construction phases are (1) Construction including work activities for building lift station, piping, site improvements, and all other improvements shown on the drawings; (2) Plant Establishment including maintenance on vegetation installed for final stabilization, if applicable; and (3) Suspension where work activities are suspended and areas are inactive.
- C. LRP: Legally Responsible Person
- D. NOT: Notice of Termination
- E. QSD: Qualified SWPPP Developer.
- F. QSP: Qualified SWPPP Practitioner.
- G. PRDs: Permit Registration Documents

- H. SMARTS: Stormwater Multi Application Reporting and Tracking System
<https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp>

1.04 SUBMITTALS

- A. Comply with Caltrans Section 13-3.01B, Submittals, with the following clarifications:
1. SWPPP submittal shall be within 21 calendar days of contract approval.
 2. Engineer's initial review period of SWPPP will be within 14 calendar days of receipt.
 3. Contractor's re-submittal of SWPPP shall be within 7 calendar days of receipt of Engineer's comments.
 4. In addition to the SWPPP copies specified, provide one additional copy of SWPPP to Owner's Representative, for submission to Region 3 Regional Water Quality Control Board.
 5. Contractor shall anticipate review comments from the RWQCB upon submission of SWPPP. Update and amend SWPPP within 14 calendar days of receipt of RWQCB comments to SWPPP.
 6. All SWPPP revisions shall be included in the lump sum bid price, and no additional compensation shall be allowed therefor.
- B. Prior to starting work, submit the following:
1. The name and qualifications of the QSD, QSP and WPC
 2. Complete PRDs including, but not limited to, the NOI, SWPPP, Risk Determination, and CSMP for review by Engineer. Upon Engineer's approval of the submittal, Contractor shall be responsible for uploading the PRDs to SMARTS. Contractor shall notify LRP within 8 hours of successfully upload of the PRDs.
- C. BMP Status Report
1. Upon completion of construction, Contractor must submit the NOT and supporting documentation for review by the Engineer/Owner's Representative. Upon Engineer's approval of the submittal, Contractor is responsible for uploading the NOT to SMARTS. Contractor shall notify LRP within 8 hours of successfully upload of the NOT.

PART 2 - PRODUCTS

- A. Products used for Water Pollution Control are described in the SWPPP and on the Drawings and in related Specifications.

PART 3 - EXECUTION

3.01 OTHER PERMITS

- A. Contractor shall obtain any and all permits required for this Project. Lack of listing any specific permit by the Department shall not relieve the Contractor of the obligation of obtaining and complying therewith.

- 3.02 Comply with the requirements of this Section 01 57 23, Temporary Storm Water Pollution Control, and Caltrans Standard Specification 2010 Sections 13-1 and 13-3.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This section provides the requirements for product substitution. The procedure for requesting substitution approval applies to products defined in the Contract Documents by reference to one or more of the following:
1. Name of manufacturer
 2. Name of vendor
 3. Trade name
 4. Catalog number
- B. Requests for Substitution - General:
1. Base all bids on materials, equipment, and procedures specified.
 2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are capable of accomplishing the same tasks as the products specifically indicated.
 3. Other types of equipment and kinds of material may be acceptable.

1.02 QUALITY ASSURANCE

- A. In making request for substitution or in using an approved product, Contractor represents:
1. He has investigated proposed product, and has determined that it is equal or superior in all respects to that specified, and that it will perform function for which it is intended.
 2. He will provide same guarantee for substitute item as for product specified.
 3. He will coordinate installation of accepted substitution into work, to include building modifications if necessary, making such changes as may be required for work to be complete in all respects.
 4. He waives all claims for additional costs related to substitution which subsequently arise.

1.03 DEFINITIONS

- A. Product: Manufactured material or equipment.

1.04 PROCEDURE FOR REQUESTING SUBSTITUTION

- A. Considered after award of Contract.
- B. Written requests through Contractor only.
- C. Transmittal Mechanics:
 - 1. Follow the transmittal mechanics prescribed for shop drawings in [Section 01330]. Describe the deviation and justifications on the transmittal form. Include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in paragraph D below.
- D. Transmittal Contents:
 - 1. Product identification:
 - a. Manufacturer's name.
 - b. Telephone number and representative contact name.
 - c. Specification section or drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.
 - 2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.
 - 3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
 - a. Size.
 - b. Composition or materials of construction.
 - c. Weight.
 - d. Electrical or mechanical requirements.
 - 4. Product experience:
 - a. Location of past projects utilizing product.
 - b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
 - c. Available field data and reports associated with proposed product.
 - 5. Data relating to changes in construction schedule.
 - 6. Data relating to changes in cost.
 - 7. Samples:
 - a. At request of Engineer.
 - b. Full size if requested by Engineer.
 - c. Held until substantial completion.
 - d. Engineer not responsible for loss or damage to samples.

1.05 APPROVAL OR REJECTION

- A. Written approval or rejection of substitution given by the Engineer.
- B. Engineer reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.
- C. In event substitution results in a change of Contract price or time, provisions in Special Provisions-General Conditions will be applied for adjustment.
- D. Substitutions will be rejected if:
 - 1. Submittal is not through the Contractor with Contractor's approval.
 - 2. Requests are not made in accordance with this Section.
 - 3. In the Engineer's opinion, acceptance will require substantial revision of the original design.
 - 4. In the Engineer's opinion, substitution is not equal to original product specified or will not perform adequately the function for which it was intended.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Closeout Procedures.
- B. Project Record Documents.
- C. Operation and Maintenance Data.
- D. Guaranties, Warranties and Bonds.
- E. Spare Parts and Maintenance Materials.
- F. Certification of Recycled Content.
- G. Waste Management Report.

1.02 CLOSEOUT PROCEDURES

- A. Comply with procedures in the General Conditions for inspection and acceptance of the Work, payment and retention procedures.
- B. When Contractor considers Work has reached substantial completion, submit written certification that Work is ready for inspection.

1.03 INSPECTION PROCEDURES

- A. When each phase is in the opinion of the contractor, substantially complete, the Contractor shall call for a punch list inspection.
- B. Inspection Procedures: On receipt of a written request for inspection, the Owner's Representative will schedule the inspection. If in the judgment of the Owner's Representatives the project is not substantially complete, the Owner's Representative will so advise the Contractor and discontinue the inspection.
 - 1. The Owner's Representative will repeat inspection when requested and assured that the work has been completed.
 - 2. Results of the completed inspection will form the basis of requirements for final acceptance of the Work.
- C. Final cleaning shall be completed prior to Owner's inspection and acceptance.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain, on current basis, record drawings showing field installed conditions of project; subject to monthly review by Owner Representative. The Owner will furnish reproducible sepia mylars to Contractor, who shall transfer installed locations to prints and submit prints for review by the Owner. Upon receipt of prints, identify each of the documents with a title "RECORD DOCUMENTS-JOB SET". Accuracy of records shall be such that future search for items shown in the Contract Documents may reasonably rely on information obtained from the accepted record documents. Monthly pay estimates will not be processed without review and approval of record drawings by the Owner. Written confirmation that the as-builts have been properly updated shall be submitted with each pay application request. Final Acceptance of Work will not take place until record drawings are turned over to the Owner's Representative.
- B. Store Project record documents separate from those used for construction. Protect from deterioration and loss in a secure, fire-resistive location; provide access to the Owner's Representatives during normal working hours. In the event of loss of recorded data, use means necessary to again secure the data to the Owner's acceptance; such means shall include, if necessary in the opinion of the Owner, removal and replacement of concealing materials and in such case, replacements shall be to the standards originally specified.
- C. Before commencing backfilling of utilities or any other underground pipes, ducts, conduits, or structures, take photographs showing relationship of below ground utilities to structure(s) or other physical reference point. Photos are to be in compliance with Section 01 35 13, Special Project Procedures, categorized by locations and indicating utilities and progress of Work, as specified. Provide photo(s) of all connections, crossings, stubs, or other critical points. If the Contractor neglects to take such photographs, Contractor shall uncover, at the Contractor's expense, the area(s) so neglected in order to provide the requisite photos.
- D. Provide a sepia-mylar composite Utility Site Plan with the number of each photograph placed on the plan at the location the photo was taken from, and a mark indicating which way the camera was pointed. All numbers and marks shall be in ink, and shall be clear, legible, and neatly done. Photo binder and photo plan shall be considered part of the record documents.
- E. Record Drawings: Maintain a clean, undamaged set of sepia mylar prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately. At time of installation, installed locations of work relating to aboveground and underground utilities, architectural, structural, heating, ventilation, air conditioning, plumbing, electrical, and other scopes of work as may be required, shall be recorded on sepia mylar prints by Contractor, and reviewed with Owner Inspector. Timing of entries shall be within 24 hours after receipt of information. Do not conceal work until required information is recorded.
 - 1. Information entered on sepia mylar prints shall be neat, legible, and emphasized by drawing "clouds" around changed items. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work. Date entries.
 - 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

3. At a minimum, the following information shall be inserted and dimensioned on record documents where applicable:
 - a. The exact horizontal and vertical location of all installations in their finished condition, including all electrical, plumbing and mechanical installations;
 - b. All changes in construction, materials and installed equipment;
 - c. Adequate dimensional data, both horizontal and vertical, to allow location of covered installations;
 - d. The identification of changes authorized by Change Order and the number of that Change Order;
 - e. All Requests for information and the number of that Request for Information;
 - f. All Field Clarifications and the number of that Field Clarification;
 - g. All the Architect's Supplemental Instruction/Architect's Field Memos and the number of that Architect's Supplemental Instruction/Architect's Field Memos where applicable.
 4. Design of future modifications of the facility may require accurate information as to the final physical arrangement of items and location of utilities which are shown only schematically on the Drawings. Convert schematic layouts as follows:
 - a. Show on the job set of record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as described in the description above. Clearly identify the item by accurate note such as "cast-iron drain", "galvanized water pipe", etc. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed", etc.). Make identification sufficiently descriptive that it may be related reliably to the Specifications.
 - b. The Owner may waive the requirements for conversion of schematic layouts here, if in the Owner's judgment as advised by the Owner's Representatives, such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Owner.
 5. Symbols and designations used in preparing record drawings shall match those used in Contract Drawings.
 6. Locate and dimension work, including stubs for future connections, with reference to permanent landmarks or buildings and indicate approximate depth below finish grade.
 7. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
- F. Prior to final Acceptance of Work, submit Project record documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents and signature of Contractor.
- G. The contractor shall have no responsibility for recording changes in the work subsequent to acceptance of the Work by the Owner, except for changes resulting

from replacements, repairs, and alterations made by the Contractor as a part of their guarantee. No changes will be allowed without approval of the Owner.

1.05 OPERATION AND MAINTENANCE DATA

- A. Provide O&M data and warranty information for all OFCI equipment, OFOI equipment, and Contractor-provided equipment requiring operation and maintenance, including electrical equipment/systems, mechanical equipment/systems, EOC communications equipment, utility systems such as septic tank/system as required by the Contract Documents.
 - 1. Compile draft O&M and warranty information in an organized PDF electronic document, for review and approval by Owner.
 - 2. Provide final O&M and warrant information in final PDF electronic format, plus one 3-ring binder with durable plastic covers; with identification on, or readable through, front cover stating general nature of manual.
 - 3.
- B. Provide table of contents and index tabs and including all material neatly typewritten; each volume containing:
 - 1. Part 1: Directory, listing names, addresses and telephone numbers of Architect, Owner Inspector and Contractor; and index furnishing complete information as to location in manual of emergency data regarding installation.
 - 2. Part 2: Operation and maintenance instructions, arranged by system. For each system, give names, addresses and telephone numbers of subcontractors and suppliers; and include the following:
 - a. Appropriate design criteria.
 - b. List of equipment.
 - c. Parts list; including complete nomenclature, current costs, and names and address of nearest vendor of parts.
 - d. Detailed operating instructions in a logical sequence for each procedure. Include proper procedures in event of failure.
 - e. Maintenance instructions, equipment, including routine maintenance cards with time frequency of routine maintenance noted.
 - f. Maintenance instructions, finishes. Provide manufacturer's recommendation for types of cleaning agents and methods, cautions against agents and methods that are detrimental to the product and a recommended schedule for cleaning and maintenance.
 - g. Copy of each Material Safety Data Sheet (MSDS) received with products or materials delivered to the site for incorporation into the Project, for Owner future reference.
 - h. Shop drawings and product data, including changes made during construction. Illustrate relations of component parts of equipment and systems and control and flow diagrams.
 - i. Copies of Guaranties/Warranties. Note instances that might affect validity of warranties or bonds.
- C. Extraneous Data: Where contents of manuals include manufacturers' catalog pages, clearly indicate precise items included in this installation and delete, or otherwise

clearly indicate, manufacturer's data with which this installation is not concerned. Include catalog number, size and composition, color and texture designations and information required for re-ordering special manufactured products.

- D. Final Acceptance of the Work will not take place until operation/maintenance manuals are delivered to the Owner Representative as required by this Section.

1.06 GUARANTIES, WARRANTIES AND BONDS

- A. Standard Guaranty: Guarantee Work executed under this Contract to be free of defects of workmanship and materials for a period of one year after completion and acceptance by the Owner. Refer to General Conditions Section 00700 of the Contract for Construction, Paragraph 3.5. Submittal not required for standard one year guaranty for Work of this project.
- B. Additional Guaranties/Warranties: Provide additional guaranties/warranties (in excess of one year) where specifically required by pertinent Specification Sections.
 - 1. Provide duplicate, notarized copies. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.
- C. Submit guaranties/warranties prior to final payment.
 - 1. For equipment put into use with Owner's permission during construction, submit guaranties/warranties within 10 days after first operation.
 - 2. For items of work delayed beyond date of substantial completion, provide updated guaranty/warranty submittal within 10 days after acceptance, listing date of acceptance as start of guaranty/warranty period.

1.07 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, and maintenance materials in quantities specified in each Section, in addition to that used for construction of work. Coordinate with Owner's Representative and deliver to Project site. Provide with a detailed transmittal and obtain receipt prior to Final Acceptance of Work.

1.08 DISPOSAL REPORT

- A. Upon completion of Work, and prior to final payment, submit a Disposal Report. If using certified hauler and facility, submit copies of all receipts. If using other than certified facility, summarize the waste generated, sent to landfill, reused, and recycled which is attributed to Work of this Project, including copies of all receipts.
- B. Refer to Section 01 93 16, Recycling Programs

- C. Final payment will not be made until the Disposal Report is received and approved by the Owner.

1.09 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting certification of final Acceptance of the Work, complete the following:
 - 1. Submit a certified copy of the Owner Representative's list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance for final inspection.
- B. Final Inspection: The Owner's Representative will re-inspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, "(punch-list)", has been completed, except items whose completion has been delayed because of circumstances acceptable to the Owner.
 - 1. Upon completion of final inspection, the Owner's Representative will prepare and submit to the Owner, a certificate of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 - 2. If after the inspection, the Owner determines that the Work is complete, the Owner will accept the Work per the General Conditions.

END OF SECTION

DIVISION 03 - CONCRETE
03 11 00 - CONCRETE FORMING

1.00 GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

Principal items of work include:

- A. Furnishing and erection of forms.
- B. Shoring and bracing.
- C. Stripping.
- D. Setting of embedded items.
- E. Clean-up and disposal.

1.02 GENERAL REQUIREMENTS

A. Verification of Conditions: Prior to installation of formwork, Contractor shall inspect all surfaces to receive said work and correct all defects in workmanship and/or materials that could affect the work specified herein.

B. Protection: Provide and be responsible for protection and repair of adjacent surfaces and areas which may become damaged as a result of work of this Section. Protect work performed here under until completion and final acceptance of project by Architect and Structural Engineer. Repair or replace all damaged or defective work to original specified condition, at no additional cost to the Owner.

2.00 PRODUCTS

2.01 MATERIALS

A. Forms: Non-grain-raising type that will not leave residual matter on surface of concrete or adversely affect bonding to concrete of paint, plaster, mortar, or other applied materials. Coatings containing mineral oils or other non-drying ingredients will not be permitted. Submit manufacturer's data to Architect prior to use, for written review prior to use.

B. Softwood: Construction Grade, 2" nominal S1S2E for footings, foundation walls, and concealed surfaces, to be covered by other materials.

C. Plywood: PS-1, B-B Plyform, Class I, each piece bearing grade mark. When forming studs are not over 12" o. c., 5/8" thickness shall be used; when 16" o. c., 3/4" thickness shall be used. Use on formwork for exposed surfaces or as a substitute at concealed surfaces. Plywood thicknesses as noted above are minimums.

D. Form ties: Prefabricated, rod, flat band or wire type, or threaded internal disconnecting type, of sufficient tensile strength to resist all imposed loads of fresh concrete and with external holding devices of adequate bearing area. Ties shall permit tightening and spreading of forms and leave no metal closer than 1" from surfaces. Use no cones on exposed concrete.

3.00 EXECUTION

3.01 DESIGN

A. General:

1. Provisions for Other Trades: Provide all openings for mechanical and electrical work, placing items incorporated in concrete accurately and supported on formwork.

2. Design: Forms and falsework shall be adequate for imposed live and dead loads which shall include, but not be limited to, the following: weight of moving equipment on formwork; height of concrete drop; foundation pressures; stresses; lateral stability and other safety factors during construction.

3. Reuse: Materials used for formwork may not be used in the finished work.

4. Concrete Surface Finishes: Use various form types as specified below.

B. Shoring and Falsework:

1. Loads: Distribute loads properly over base area on which shoring is erected (either concrete slabs or ground); if on ground, protect against undermining or settlement.

2. Alignment: Design and construct or provide necessary rigidity to support loads, to produce in finished structure all lines, grades, and camber as required. Set vertical shores for multi-floor forms plumb and in alignment with lower tiers to transfer loads directly to them.

3. Camber: Provide suitable jacks, wedges, or similar means to induce camber, to take any settlement in formwork, either before or during placing of concrete.

4. Time of Removal: Do not remove forms until concrete has attained sufficient strength to support its own weight and all imposed loads, and removal is approved. Minimum times for removal after concrete placement are as follows:

- a. Forms for slabs, etc., but not for shoring.... 7 days
- b. One-half of shoring for roof slabs..... 14 days

5. Reshoring: In lieu of shore removal as specified above, provide equivalent approved reshoring at end of 14 day period, permitting form re-use. Install this shoring BEFORE removing original shoring.

6. Record: Maintain form and shoring removal records.

7. Re-use: Clean and recondition form material before re-use.

C. Form Types:

1. For concealed surfaces: Use boards or plywood as specified herein before.

2. For Exposed Surfaces: Use plywood as specified herein before. Tape and fill all joints.

D. Construction:

1. Build forms to exact shapes, sizes, lines, and dimensions as required to obtain accurate alignment, location, and grades, and level and plumb work in finished structure. Provide for openings, offset, keyways, recesses, bulkheads, anchorages, and other required features. Make screeds wherever required. Make forms easily removable without hammering or prying against concrete.

2. Use metal spreaders to provide accurate spreading at corners which are to remain exposed.

3. Provide 3/4 by 3/4 inch chamfer strips for all corners which are to remain exposed.

4. Provide for recesses, rebates, drips, and profiles as detailed.

5. Forms shall be of materials and construction adequate to support the loads safely, so that no sagging, leakage, or displacement occurs during and after pouring concrete.

E. Reglets and Rebates: Properly form all required reglets and rebates to receive flashing, frames, and other equipment. Dimensions, details, and precise positions of all such reglets and rebates shall be ascertained from the trades whose work is related to or contingent upon same, and the concrete work formed in accordance therewith.

F. Embedded Piping and Rough Hardware:

1. All trades which require openings for the passage of pipes, conduits, ducts, and other inserts shall be consulted and the necessary pipe sleeves, anchors, or other required inserts shall be properly and accurately installed by respective trades. Openings in the floors and walls required by other trades shall be reinforced as required.

2. Conduits or pipes shall be located so as not to reduce the strength of the construction. In no case shall pipes, other than conduits, be placed in a slab 3 1/2 inches or less in thickness. Conduit buried in a concrete slab shall not have an outside diameter greater than 33 percent of the thickness of the slab nor be placed below bottom reinforcing steel.

3. Pipe sleeves may pass through slabs or walls, provided that they are not exposed to rusting or other deterioration and are of uncoated or galvanized iron or steel. Sleeves shall be large enough to pass any hub or coupling on the pipe line.

4. Conduits may be embedded in walls provided they are not larger in outside diameter than 1/3 the thickness of the wall, are not spaced closer than 3 diameters on center, and do not impair the strength of the structure.

G. Coordination of openings:

All trades which require openings for the passage of pipes, conduits, ducts, and other inserts shall be consulted and the necessary pipe sleeves, anchors, or other required inserts shall be properly and accurately installed by respective trades. Openings in the floors and walls required by other trades shall be reinforced as required.

END OF SECTION

DIVISION 03 - CONCRETE
03 20 00 – CONCRETE REINFORCING

03 21 00 REINFORCEMENT BARS

PART 1 - GENERAL

The requirements of the Conditions of Contract apply to the work of this Section.

1.01 DESCRIPTION

Provide reinforcing steel work as indicated and specified, complete.

- A. Furnishing and placing reinforcing steel work and mesh for all concrete work as applicable.
- B. Providing reinforcing steel for all masonry work.
- C. Inspection during concrete placing.
- D. Cleanup and disposal.

1.02 GENERAL REQUIREMENTS

- A. Verification of Conditions: Prior to installation of reinforcing steel, Contractor shall inspect all surfaces to receive said work and correct all defects in workmanship and/or materials that could affect the work specified herein. Installation of any reinforcing steel work or materials on any surface shall constitute acceptance by the Contractor of such surfaces as being in proper condition to receive herein specified materials.
- B. Protection: Provide and be responsible for protection and repair of adjacent surfaces and areas which may become damaged as a result of work of this Section. Protect work performed hereunder until completion and final acceptance of project by Architect and Structural Engineer. Repair or replace all damaged or defective work to original specified condition, at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: Deformed bars of A615, Grade 40 and Grade 60 shall be used as noted on the Drawings. Provide ASTM A706 for bars requiring welding.
- B. Supports for Reinforcing Bars: Use plastic-coated units for work exposed to view or weather so that finished surfaces will not be marred or stained. Use precast concrete only (no metal), suitable sized for load distribution, for slabs on grade or membranes. Use NO supports of wood or other cellulose materials.
- C. Tie Wire: Annealed steel, 16 gauge minimum.

D. Reinforcing Mesh: ASTM A185 except tensile strength may be reduced to 60,000 psi; mesh and gauge as shown or noted.

PART 3 - EXECUTION

3.01 TESTS AND INSPECTIONS

See Section Testing and Inspection for Procedures and Requirements.

3.02 FABRICATION AND DELIVERY

A. Bending and Forming: Fabricate bars of indicated size and accurately form to shapes and lengths indicated and required, by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not scheduled will be rejected.

B. Marking and Shipping: Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage materials. Keep sufficient supply of tested, approved, and proper reinforcement at site to avoid delays.

3.03 WELDING

Welding of reinforcing steel is not permitted unless specifically required by details shown on the Drawings.

A. Coordinate with other trades and expedite materials and labor to avoid omissions and delay. Provide additional reinforcing bars at sleeves and openings as required.

3.04 PLACING

A. Cleaning: Before placing reinforcing, and again before concrete is placed, clean reinforcement of loose mill scale, oil, or other coating that might destroy or reduce bond.

B. Securing in Place: Accurately place reinforcement and securely wire tie in precise position at all points where bars cross. Tie stirrups to bars at both top and bottom. Bend wire ties away from forms; exercise special care at surfaces to remain exposed and unpainted. Support bars in strict accordance with "Recommended Practice for Placing Bar Supports", latest edition, published by the Concrete Reinforcing Steel Institute, using approved accessories and chairs.

C. Spacing and Support of Reinforcements: Exercise particular care to maintain proper distance and clearance between parallel bars and forms. Provide metal spreaders and spacers to hold steel in position as necessary. Use precast concrete cubes to support reinforcing steel in concrete placed on earth. Support steel at proper height upon approved chairs, transverse steel bars with hangers, or in other manner, as necessary and approved. Use plastic coated chairs for work exposed to view or weather.

D. Minimum clear distance between reinforcing steel and bars of concrete shall be as indicated on the Drawings and shall conform to all applicable requirements of Specifications.

E. Splices: Do not make splices at points of maximum stress except where indicated. Lap as indicated or necessary to develop full strength or stress of bars. Maintain clear spacing between parallel bars of not less than one bar diameter, but in no case less than one inch or less than 1-1/3 times maximum size aggregate. Stagger top splices, and in horizontal wall reinforcement separate at least four feet longitudinally in alternate bars and opposite faces.

END OF SECTION

DIVISION 03 - CONCRETE
03 30 00 CAST IN PLACE CONCRETE

1.00 GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

Principal items of work include:

- A. Placing schedule and records.
- B. Coordination of reinforcing steel installation.
- C. Cast-in-place concrete slabs and footings.
- D. Equipment bases, grouting, drypack, and miscellaneous concrete work.
- E. Mix designs.
- F. Clean-up and disposal.

1.02 DEFECTIVE WORK

Consider concrete defective when it fails to meet specified strengths, when it shows cracks beyond normal tolerances, when it is out of line, level, or plumb, when it shows rock pockets, excessive air pockets, voids, spall, or exposed reinforcing.

2.00 PRODUCTS

2.01 MATERIALS

- A. Portland Cement: Standard brand of domestic Portland Cement ASTM C-150, Type II. Do not change brand of cement during progress of work without written review of the Structural Engineer.
- B. Aggregates:
 - 1. Stone (Rock-sand) Concrete
 - a. Furnish from pits free from opaline, chert, feldspar, silicious magnesium limestone, or other deleterious substances. Conform to ASTM C-33, except as modified herein. Aggregates shall be from pits approved for use by California Division of Highways. Fine aggregates shall pass a No. 4 sieve.
 - b. Course Aggregates: Clean, hard, fine-grained sound crushed rock or washed gravel which does not contain in excess of five percent

by weight of flat, chip-like, thin, elongated, friable or laminated pieces, or more than two percent by weight of shale or chalky materials. Consider any piece having a major dimension in excess of five times its average dimension to be flat or elongated.

- c. Maximum Size: Shall not exceed 3/4 of minimum clear space between reinforcing bars, nor be larger than 1/5 of the least dimension between forms. Use 1" maximum size, except at footings, where 1-1/2" maximum shall be used.

C. Water: From a domestic potable source.

D. Curing :

1. Apply curing, hardening and vapor barrier compound on all floor slabs that are not exposed and indicated to be sealed.
2. Cure concrete surfaces in accordance with ACI 301.
3. Spray apply curing, hardening and vapor barrier compound on finished slab surfaces located below grade, at grade, and above grade in two "wet on wet" flood coats at the total rate of 200 sq. ft./gallon in accordance with manufacturer's instructions.
4. Application of compound shall be by a trained applicator acceptable to compound manufacturer.
5. After application of curing, hardening, and vapor barrier compound, moist cure concrete using the following method:
 - a. Spraying: Fog spray clean, potable water over floor slab areas and maintain moist for 10 days.
 - b. Polyethylene Film: Spread over floor slab areas, lap edges and sides, maintain in place for 10 days.

E. Admixture: "Anti-Hydro" shall be added to concrete mix at the site, in proportions of 1 quart per sack of cement for all 4" thick interior building concrete slabs which are poured on grade. For concrete containing "Anti-Hydro", the water cement ratio shall be reduced so that slump remains within the limits specified.

F. Non-shrink grout and drypack shall be Master Builders Co. "Embeco", or A.C. Horn "Vitra-Foil", or Architect approved equal. Use a non-staining grout or drypack where exposed to light or weather.

3.00 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Placing Schedule: Submit for written review, details and/or sketches showing location of each proposed construction joint, and schedule of anticipated placing date for each portion of the structure.
- B. Records maintained by Contractor: Maintain an accurate record showing date and time of concrete placement in each portion of structure. Correlate placing dates with dates of removal of forms, including first and second halves of shoring. Keep records available for review at site. Upon completion, deliver two copies of each to the Architect, in approved form.
- C. Verification of conditions: Prior to installation of cast-in-place concrete work, Contractor shall inspect all surfaces for workmanship and/or material that could affect the work specified herein. Installation of any cast-in-place concrete work or materials on any surface shall constitute acceptance by the Contractor of such surfaces as being in proper condition to receive herein specified materials.
- D. Protection: Provide and be responsible for protection and repair of adjacent surfaces and areas which may become damaged as a result of work of this Section. Protect work performed hereunder until completion and final acceptance of project by Owners.
Repair or replace all damaged or defective work to original specified condition, at no additional cost to the Owner.
- E. Supervision: Perform work of this Section under the supervision of a capable foreman satisfactory to the Owner and the Structural Engineer.
- F. Continuous Inspection: Perform placing of concrete of 3000 psi strength, or greater, under continuous inspection of a Registered Deputy Inspector.
- G. Delivery, Storage and Handling: Deliver material in a timely manner to insure uninterrupted progress of work. Store materials in a manner that will preclude damage and permit ready access for inspection and identification.

3.02 TESTING OF MATERIALS AND DESIGN OF MIXES

- A. See Section Testing and Inspection for procedures.
- B. Tests of Materials: Make in accordance with applicable Building Code, and as specified herein, including concrete materials and manufactured concrete.
 - 1. Cement: Provide certification by Testing Agency of cement mill test reports.
 - 2. Aggregate for Stone Concrete: Test aggregate before concrete mix is established and whenever character or source of material is changed. Include sieve analysis to determine conformity with limits of gradation. Perform sampling and testing in accordance with Standard Methods of applicable ASTM Specifications, current issue as follows:

- a. Sampling: ASTM D75. Take samples of aggregate at source of supply or at the ready (transit) mixed concrete plant.
- C. Testing:
 - 1. Sieve Analysis: ASTM C136.
 - 2. Organic Impurities: ASTM C40. Fine aggregate shall develop a color not darker than reference standard color.
 - 3. Soundness: ASTM C88. Loss resulting therefrom after 5 cycles shall not exceed 8 percent for coarse aggregate, 10 percent for fine aggregate.
 - 4. Abrasion of Concrete Aggregate: ASTM C131. Loss shall not exceed 10 1/2 percent after 100 revolutions, 42 percent after 500 revolutions.
 - 5. Deleterious Materials: ASTM C33.
- D. Tests of Concrete:
 - 1. Compression Tests: Make one set of at least 2 standard test cylinders from each day's placing and each 50 cubic yards, or fraction thereof, of each class of concrete. Date cylinders, number and tag, and indicate location from which sample was taken. Indicate slump test result of sample. Do not make more than 2 series of tests from any one location or batch of concrete.
 - 2. Test Cylinders: Make test cylinders at the job, in accordance with ASTM C31; 24 hours after making, store cylinders under moist curing conditions, at approximately 70 degrees F., until tested. Test specimens in accordance with ASTM C39 at the age of 7 and 28 days.
 - 3. Below Strength Concrete: Should strength of concrete as indicated by tests, fall below required minimum, then additional tests of concrete, which the unsatisfactory samples represent, may be required. Make such tests in accordance with ASTM C42.
- E. Concrete Mix Designs: Testing Agency shall design concrete mixes to meet specified requirements.
 - 1. Strength Requirements: Design concrete mixes for minimum 28 day compressive strengths indicated on Structural Drawings.
 - 2. Design concrete mixes for workability of mix and durability of concrete. Concrete mixes shall be rigidly controlled in accordance with Method 2 of Section 502 Building Code requirements for Reinforced Concrete (ACI 318) of the American Concrete Institute. When it becomes necessary to increase the cement content to gain the required strength, such adjustment shall be made at the Contractor's expense.

3. Admixtures: Add to concrete design mixes, upon Architect approval. Prior to use, modify mix proportions in accordance with manufacturer's printed instructions, as approved by Architect.

3.03 EMBEDDED ITEMS

Embedded items shall be set in form work per requirements of Section Formwork.

3.04 CONCRETE MIXING

Concrete shall be transit mixed and shall conform to ASTM C94.

A. Transit-Mixed Concrete:

1. Conform to ASTM C94, except materials, testing, and mix, design shall be as specified herein. Use transit mixers equipped with automatic devices for recording number of revolutions of drum.
2. Do not deliver transit-mixed concrete to job with total specified amount of water incorporated therein. Withhold 2 1/2 gallons of water per cubic yard, then incorporate in mix before concrete is discharged from mixer truck. Adding of water shall be under supervision of Deputy Inspector. Each mixer shall arrive at the job site with its water container full. In the event the container is not full and concrete tests to a greater slump than specified, such a load will be rejected.

- B. Consistency: Do not permit quantity of water to exceed maximum quantity specified; use minimum amount necessary for workability, as required for the part of the structure being poured. Measure consistency of concrete in accordance with ASTM C143.

<u>Part of Structure</u>	<u>Maximum Slump</u>
Reinforced Concrete over 8" thick	4 inches
Reinforced Concrete 8" or less	5 inches
Reinforced Concrete Framed Slabs	4 inches
Slabs on Grade	3-5 inches
Mass Concrete not Reinforced	4 inches
Footings, Foundation Walls	4 inches

3.05 PREPARATION BEFORE PLACING

Remove excess water from forms before concrete is deposited. Divert any flow of water without washing over freshly deposited concrete. Remove hardened concrete, debris, and foreign materials from the interior of forms and form inner surfaces of mixing and conveying equipment.

- A. Reinforcement: Reinforcement shall have been secured, inspected and reviewed, under work of Section

CONCRETE REINFORCEMENT. Embedded metal shall be free of old mortar, oils, mill scale, and other encrustations or coating that might reduce bond. Wheeled concrete handling equipment shall not be wheeled over reinforcing nor shall runways be supported on reinforcing.

- B. Wetting: Wet wood forms sufficiently to tighten up cracks. Wet other materials sufficiently to reduce suction and maintain concrete workability.

3.06 JOINTS IN CONCRETE

- A. General: Locate joints in concrete where approved by the Architect. Obtain Architect's approval of points of stoppage of any pour. Slightly round top edge of joints in slabs to prevent spalling, if tooled.
- B. Construction Joints: Thoroughly wet sandblast or hydro blast, horizontal and vertical surfaces of construction joints by removing entire surface and exposing clean aggregate solidly embedded in mortar matrix. The hardened concrete shall be watered and kept wet for at least 24 hours before placing new concrete.
- C. Expansion Joints in Slabs, Walks, and Curbs: Locate at intersections of concrete planes and at intervals in straight runs where indicated or required. Fill joints to full depth and slightly below finish surface with specified materials for respective locations.
- D. Control Joints: At locations approved by Architect, control joints may be saw cut with an approved saw. Sawing of joints shall proceed as soon as possible after the concrete has obtained its initial set. Maximum spacing for control joints in exposed work shall be 10'-0".

3.07 CONCRETE CURING

Water Curing: Maintain forms containing concrete in a thoroughly wet condition until forms are removed. Maintain all concrete in a continuously wet condition for not less than 7 consecutive days after pouring. For curing of flatwork, see Section 2.01/ D above

3.08 CONVEYING AND PLACING CONCRETE

- A. General: Place no concrete until reinforcing steel and forms have been accepted by the Structural Engineer, Building and Safety Departments, and other authorities having jurisdiction.
- B. Conveying: Do not drop concrete from its point of release at mixer, hoppers, tremies, or conveyances more than 6 feet in unexposed work and 3 feet in exposed work. Deposit directly into conveyances and from conveyances to final points of rest. Do not pour concrete except under supervision of Deputy Inspector, nor outside of regular working hours. Deposit concrete so that the surface is kept level throughout, a minimum being permitted to flow from one portion of another.

- C. Placing: Pour concrete into forms immediately after mixing, in a manner that will prevent separation of ingredients and in horizontal layers not over 12 inches thick. Tamp the freshly poured concrete into place, working as continuously as possible to previously approved stopping point. Protect, by suitable devices and methods, all membranes, waterproofed surfaces, and work of other trades from damage.
- D. Compacting: Compact each layer of concrete with approved mechanical vibrating equipment. Transmit vibration directly to concrete, in no case through forms. Intensity and duration of vibration shall be sufficient to accomplish thorough compaction. Supplement vibration by forking or spading by hand, adjacent to forms on exposed faces. Compact and work concrete into all corners and angles of forms and around reinforcement and embedded fixtures.
- E. Place slabs on grade with control joints in place or sawcut @ locations directed by the Structural Engineer.

3.09 FINISHING FORMED CONCRETE

- A. Uniformly spread, screed and consolidate concrete. Do not spread concrete by vibration.
- B. Float Finish: Float with hand float or with a powered disc float. High spots to be cut down and low spots to be filled. Use as preparation for further finishing.
- C. Troweled Finish: After floating, steel trowel to smooth, mark free surface. Use for exposed floors and slabs to receive carpeting, resilient flooring, and where indicated.

3.10 GROUTING AND DRYPACKING

Grout and drypack as indicated or required except that which is specified as being accomplished by other trades.

- A. Proportions and Mixing:
 - 1. Grout: One part cement, 2 parts sand, mixed with only sufficient water to cause it to flow under its own weight.
 - 2. Drypack: One part cement, 2 parts sand, mixed with only sufficient water to bind materials together.
- B. Placing and Finishing: Place by forcing and rodding to completely fill all voids and provide complete and uniform bearing under plates. Neatly finish exposed surfaces smooth and cure with burlap at least 3 days.

3.11 CONSTRUCTION TOLERANCES

Finished surfaces of concrete shall not deviate from indicated dimensions, elevations, plumb, when it shows rock pockets, excessive air pockets, voids, spall, or exposed reinforcing.

- A. From plumb: 1/4" & 5 contacts in 20 feet; 1/2" total
- B. From line and level for horizontal edges: 1/4" & 5 contacts in 20 feet; 1/2" total.
- C. From elevation of floor slabs: + 1/8" in 10 feet, 3/8" anywhere.

3.12 FILLING AND LEVELING OF SLAB SURFACES

Concrete slabs which do not meet the requirements of Construction Tolerances above shall have surfaces repaired as follows:

- A. High spots shall be honed or ground with power driven machines to required levels. Low spots shall be filled with leveling compound or underlayment material as manufactured by Levelcrete
- B. Apply and finish fillers in strict accordance with manufacturer's printed instructions.

END OF SECTION

DIVISION 04 – MASONRY
04 22 23 – ARCHITECTURAL CONCRETE UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Architectural concrete masonry exterior wall veneer facing.
- B. Architectural concrete masonry exterior single wythe walls.

1.2 RELATED SECTIONS

- A. Section 04 05 16.26 - Engineered Masonry Grouting.
- B. Section 05 50 00 - Metal Fabrications.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim.
- D. Section 07 90 00 - Joint Protection.

1.3 REFERENCES

- A. ASTM C 33 - Standard Specification for Concrete Aggregates.
- B. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units.
- C. ASTM C 140 - Standard Specification for sampling and testing Concrete Masonry Units.
- D. ASTM C 150 - Standard Specification for Portland Cement.
- E. ASTM C 595 – Standard Specification for Standard Hydraulic Cements
- F. ASTM C 331 - Standard Specification for Lightweight Aggregates for Concrete Masonry Units.
- G. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout.
- H. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.
- I. ASTM C 1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
- J. ASTM C 1506 - Standard Test Method for Water Retention of Hydraulic Cement-Based Mortars and Plasters.
- K. ASTM D 2287 - Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
- L. ASTM E 514 - Standard Test Method for Water Penetration and Leakage Through Masonry.
- M. TMS 402 / 602-16 - Building Code Requirements and Specifications for Masonry

Structures.

- N. NCMA TEK Bulletin 3-3A - Reinforced Concrete Masonry Construction.
- O. NCMA TEK Bulletin 8-2A - Removal of Stains from Concrete Masonry Walls.
- P. NCMA TEK Bulletin 10-2B - Control Joints for Concrete Masonry Walls.
- Q. NCMA TEK Bulletin 14-4A - Strength Design of Concrete Masonry.
- R. NCMA TEK Bulletin 19-4A - Flashing Strategies for Concrete Masonry Walls.
- S. NCMA TEK Bulletin 19-5A - Flashing Details for Concrete Masonry Walls.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Concrete Unit Masonry Construction: Comply with the following:
 - 1. TMS 602-16 - Building Code Requirements and Specifications for Masonry Structures.
 - 2. National Concrete Masonry Association (NCMA) TEK Bulletins.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods including written plan for cold and hot weather construction and masonry cleaning procedures.
- C. Selection Samples: Submit three full size units of each type/color of exposed architectural concrete masonry unit for review of color and texture to verify compliance with products specified. Provide the maximum color and texture variation range expected in the finished work. Production orders may be released after submittals are approved.
- D. Manufacturer's Certificates and Test Reports: Certify products meet or exceed specified requirements. Test reports should be within 12 months of bid date.
- E. Mix Designs: For each type of grout. Include description of type and proportions of ingredients.
 - 1. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum ten years documented experience and a current member in good standing of the National Concrete Masonry Association.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience with projects of similar scope and complexity.

- C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of masonry work.
- D. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- E. Source Limitations: Provide each type of masonry unit from a single manufacturing source to ensure uniform texture and color for continuous and visually related items.
- F. Mock-Up: Prior to starting masonry work build sample wall panel(s) for Architect's inspection and acceptance. Build panel(s) on a firm foundation, in location acceptable to the Architect. Panel(s) shall be L-shaped, with long side a minimum of 5 foot 4 inches long by 4 foot 0 inches high and with one corner return at least 2 foot 0 inches long. Construct sample panel(s) full thickness, installing wall reinforcement, anchors, ties and other required accessories. Provide special features as directed for control joints, weeps, etc. Panel(s) shall show color range and texture of masonry units, bond, mortar joints and workmanship to be expected for the project.
 - 1. Build sample panels for:
 - a. Each type of exposed unit masonry construction.
 - b. Typical exterior wall.
 - c. Typical interior wall.
 - d. Typical exterior and interior walls.
 - 2. Clean one-half of each sample panel using approved masonry cleaning materials and methods to represent final cleaning. Remaining one-half to remain without final cleaning for comparison purposes.
 - 3. Retain sample panels during construction as a standard for judging completed masonry work. Do not alter, move, or destroy sample panels until work is completed or removal is authorized.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver architectural concrete masonry units to the job site on wood pallets with manufacturer's recommended unit protective covers.
- B. Inspect architectural concrete masonry units upon delivery to ensure color match with required materials and accepted samples.
- C. Stack masonry units in a dry place off the ground on pallets or a prepared plank platform. Method of stacking is acceptable. Protect with non-staining waterproof tarpaulin coverings arranged to allow air circulation around and above masonry units.
- D. Exercise care in the storage, handling and installation of masonry units. Do not build soiled or damaged masonry units into the work.

1.8 SEQUENCING

- A. Ensure that locating templates and other information required from others for built-in installation of products of this section are furnished in time to prevent interruption of construction progress.

1.9 PROJECT CONDITIONS

- A. Follow hot weather and cold weather requirements in the masonry code and specifications, TMS 402 and TMS 602.
- B. Cold Weather Procedures:
 - 1. Preparation:
 - a. If ice or snow has formed on the masonry bed, remove it by carefully applying heat not to exceed 120 degrees F until the surface is dry to the touch.
 - b. Remove any block units or mortar that is frozen or damaged.
 - 2. Work in Progress:
 - a. Air temperature 40 degrees F to 32 degrees F:
 - 1) Heat sand or mixing water to produce mortar temperatures that match air temperature.
 - b. Air temperature 32 degrees F to 25 degrees F:
 - 1) Heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F.
 - 2) Maintain temperature of mortar on boards above freezing.
 - 3) Installation in colder air temperatures will require heat sources on the wall and the use of windbreaks or tents to create a controlled environment suitable for proper bonding and curing.
 - 3. Completed Work and Work Not in Progress:
 - a. Mean daily air temperature of 40 degrees F to 32 degrees F: Protect masonry from rain and snow for 24 hours by covering with a weather-resistive membrane.
 - b. Mean daily air temperature of 32 degrees F to 25 degrees F: Cover masonry with a weather-resistive membrane for 24 hours.
 - c. Mean daily air temperature of 25 degrees F to 20 degrees F: Cover masonry with insulating blankets for 24 hours.
- C. Hot Weather Procedures:
 - 1. When ambient temperature exceeds 90 degrees F and wind exceeds 8 miles per hour:
 - a. Maintain temperature of mortar and grout between 70 degrees F and 120 degrees F.
 - b. Limit the spread of the mortar bed to 4 feet and place units within 1 minute of spreading mortar.
 - c. Control moisture evaporation in partially or newly completed walls by fog spraying with potable water, covering with opaque plastic or canvas or both.
 - 2. Protection of Work in Progress:
 - a. Covering:
 - 1) Cover tops of walls with a strong waterproof membrane at the end of each day or work shutdown. Extend the waterproof membrane cover a minimum of 24 inches down the side of each wall.
 - 2) Hold cover securely in place.
 - b. Load Application:
 - 1) Do not apply uniform floor or roof loading for at least 12 hours after completing columns and walls.
 - 2) Do not apply concentrated loads for at least 3 days after

- completing columns and walls.
- c. Staining:
 - 1) Prevent grout and mortar from staining the face of masonry.
 - 2) Remove grout and mortar that comes in contact with masonry units immediately.
 - 3) Protect sills, ledges and projections from mortar droppings.
 - 4) Protect base of wall from rain-splashed mud and mortar splatter.
 - 5) Turn scaffold boards on edge when work is not in progress to lessen splattering.
- D. Coordination: Coordinate Work to ensure top of wall is covered and remains covered until properly block openings are protected with coping or finishing system indicated on the Drawings

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - ORCO Block & Hardscape Stanton, CA www.orco.com
 - Erika Grover (909) 996-9055
 - Erika.Grover@Orco.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Aggregate:
 - 1. ASTM C 33 normal weight aggregate.
 - 2. ASTM C 331 lightweight aggregate.
- B. Cement: ASTM C 150 or ASTM C 595, Type required. Color, White/Grey as required for use with the color specified.
- C. Water Repellent Admixture: Integral polymeric water repellent admixture for concrete masonry units used in masonry exposed to the exterior shall be:
 - 1. Master Builders: MasterPel Integral Water Repellent
 - a. Water resistance: ASTM E 514
- D. Color Pigments: Lightfast, alkali-resistant, weather-resistant natural or synthetic iron oxides manufactured specifically for use in concrete masonry units.

2.3 ARCHITECTURAL CONCRETE MASONRY UNITS

- A. Hollow Load Bearing Units:
 - 1. Masonry units shall meet ASTM C 90:
 - 2. Provide unit type and size(s) indicated on the drawings.

3. Unit Color and Texture: Valley Red Orco
 4. Unit Weight: Medium weight.
 5. Unit Compressive Strength: Minimum net area compressive strength of 2,000 psi unless otherwise indicated.
- B. Special shapes:
1. Provide closures, jamb units, headers, lintels, bond beams and other special shapes as indicated.
 2. Provide standard manufactured sizes or cut full size units for fractional course height and lengths.

2.4 MASONRY ACCESSORIES:

- A. Mortar shall be ORCO Blended Products Type S or MAC pre-blended mortar, unless otherwise indicated. Preblended mortars shall meet the property specification of ASTM C 270.
1. Mortar color and type: Gray Type S
 2. Comply with manufacturer's instructions for mixing and mortar preparation.
- B. Provide water repellent admixture for exterior wall mortar.
Water Repellent Mortar Admixture: Shall be MasterPel dry mortar admixture.
1. Admixture shall be incorporated into pre-blended ORCO Blended Products Type S or Type M mortar.
 2. Comply with manufacturer's instructions for mixing and mortar preparation.
- C. Masonry Anchorage and Reinforcement: Comply with applicable portions of TMS 602 Article 2.4, and/or Section 04 05 19.29 - Stone Anchors.
- D. Fabricated Steel Lintels: Comply with Section 05 50 00 - Metal Fabrications.
- E. Sheet Metal Flashing and Trim: Comply with Section 07 62 00 - Sheet Metal Flashing and Trim.
- F. Flexible Flashing: Comply with Section 07 65 26 - Self-Adhering Sheet Flashing.
- G. Foamed-in-place insulation materials and installation: Comply with Section 07 21 29 - Spray Foam Insulation.
- H. Control Joints:
1. Vinyl: ASTM D 2287.
- I. Weeps: Weeps are to be used in conjunction with flashing materials for proper functioning of the masonry wall drainage system. Specified weep material is:
1. Weep holes, weep tubes, plastic vents or cells in veneer wall systems such as from Hohmann & Barnard, or equivalent.
- J. Masonry Cleaning Materials: Standard-strength proprietary masonry cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new concrete masonry without discoloring or damaging masonry surfaces. Provide cleaning product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units.

- K. Masonry Sealing Materials: Provide cleaning material manufacturer's compatible masonry sealer coating for all single wythe concrete masonry exterior walls.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, structure and installation conditions. Do not proceed with architectural concrete masonry work until unsatisfactory conditions have been corrected.
- B. Verify items provided by other Sections of work are properly sized and located.
- C. Verify that items to be built in are in proper location, and ready for roughing into masonry work.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean substrate surfaces thoroughly prior to installation.
- B. Establish lines, levels and coursing. Verify anchors and flashings are correctly located and installed.
- C. Furnish temporary bracing as required during installation of masonry work. Maintain in place until building structure provides permanent support.
- D. Do not wet concrete masonry units except as per TMS 402/602
- E. Prepare surfaces using the methods recommended by the manufacturer for achieving the

3.3 INSTALLATION

- A. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement type joints, returns and offsets. Whenever possible, avoid the use of less than half-size units at corners, jambs and other locations. Notify Design Professional when split masonry coursing at heads and sills of openings and cut concrete masonry coursing less than 4 inches in height not permitted.
- B. Lay walls plumb and true to comply with specified tolerances. Provide square corners, except as otherwise indicated, with courses level, accurately spaced and coordinated with other work. Use double lines at multiple wythe walls.
- C. Pattern bond: Lay exposed concrete unit masonry in running bond with vertical joint in each course centered on units in courses above and below. Bond and interlock each course of each wythe at corners. Do not use units with less than 4 inches of horizontal face dimensions at corners or jambs. Install special shape units where indicated.
- D. Lay hollow concrete masonry units with full mortar coverage on horizontal and

vertical face shells. Bed webs in mortar in starting course on footings, load bearing walls, all courses of piers, columns and pilasters and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. Maintain 3/8-inch nominal joint widths, except as necessary at first course bed joints, and except for minor variations required to maintain bond alignment

- E. Lay solid concrete masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints
- F. Compress and cut joints flush for masonry walls that are below grade, concealed or covered by other materials.
- G. Tool joints in all exposed masonry work to a concave joint when thumb print hard, unless plans indicate otherwise.
- H. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.
- I. Step back unfinished work adjoining new work. Rack back 1/2 unit length in each course; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar before laying fresh masonry.
- J. Provide interlocking masonry bond in each course at corners and intersecting walls, unless otherwise indicated on plans such as for stack bond.
- K. Load-bearing walls: If carried up separately, provide rigid steel anchors spaced not more than 2 feet on center vertically. Embed ends in mortar filled cores. Build full height of story to underside of structure. Grout juncture with structure solid with grout.
- L. Non load-bearing walls: Build full height of story to underside of structure, except as otherwise shown. Terminate full height non load-bearing walls one joint thickness below the structure to allow for deflection of the structural element without loading the wall. Provide an open joint for application of joint sealant.
- M. As the work progresses, build in items specified under this and other Sections of the specifications. Fill in solidly with masonry around built-in items.
 - 1. Bed hollow metal frame anchors in mortar. Align anchors with joint coursing. Draw anchors tight and fill space between hollow metal frames and masonry solid with fine mortar grout.
 - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath or other approved material, in the joint below and rod grout into core.
 - 3. Provide solid masonry bearing for all lintels, beams, joists, plates and load-bearing members.
 - a. Provide solid masonry units or hollow units filled solid.
 - b. Minimum one block course under steel angle lintels and steel joists not bearing on bond beams.
 - c. Minimum two block courses under steel beams and steel beam lintels. Where beams and lintels are parallel with wall, extend solid bearing to

- walls, extend solid bearing 16 inches each side of centerline of beam.
4. Take particular care to embed all conduits and pipes within concrete masonry without fracturing exposed shells and to fit units around switch, receptacle and other boxes set in walls. Where electric conduit, outlets, switch boxes and similar items occur, grind and cut units before building in services.
 5. Install anchors and reglets for flashing and related work built into masonry work.
 6. Install reinforcing steel and grout where indicated. Comply with Drawing details for reinforcing [steel size and spacing.
- N. Veneer walls:
1. Masonry walls: Tie exterior masonry veneer wythe to masonry back-up with individual metal ties built into masonry back-up walls.
 2. Concrete walls: Tie exterior masonry veneer wythe to concrete back-up with individual metal ties secured to dovetail anchor slots cast in concrete back-up.
 3. Wood framed walls: Tie exterior masonry veneer wythe to back-up with individual metal ties nailed to wood stud wall framing.
 4. Metal framed walls: Tie exterior masonry veneer wythe to back-up with individual metal ties screwed to metal wall framing.
 5. Space ties 16 inches on center vertically and horizontally.
 6. Place horizontal joint reinforcing in the masonry veneer as follows:
 - a. For nominal 4" high concrete masonry veneer units, place the horizontal joint reinforcement at no greater than 12" vertical spacing.
 - b. For nominal 8" high concrete masonry veneer units, place the horizontal joint reinforcement at no greater than 16" vertical spacing.
- O. Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:
1. Provide an open space not less than 1/2 inch width between masonry and structural member. Keep open space free of mortar or other rigid materials.
 2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to the structure. Provide anchors with adjustable tie sections. Space anchors not more than 24 inches on center vertically and 36 inches on center horizontally.
 3. Anchor veneers to concrete structural members with dovetail anchors.
- P. Control Joints: Provide control joints for exterior masonry construction.
1. Provide sash blocks with premolded shear key. Rake out mortar, if any, and form continuous vertical joints in masonry construction to receive joint sealant at the locations listed below.
 2. Locate control joints as indicated on the Drawings.
- Q. Bond Beams: Install bond beams where indicated. Comply with Drawings for reinforcing steel size and spacing. Fill bond beam masonry units solid with concrete fill or coarse mortar grout. Use smooth dowels to allow for horizontal movement at control joints unless otherwise indicated on the Drawings.
- R. Lintels:

1. Install loose steel lintels furnished under Section 05 50 00 - Metal Fabrications Metal Fabrications where shown. Set lintels in full bed of mortar.
 2. Provide minimum bearing at each jamb of 4 inches for openings for less than 6 feet and 8 inches for wider openings
- S. Flashing and weeps: Install flashing as specified in Section 07 62 00 - Sheet Metal Flashing and Trim or Section -
1. Install concealed through wall masonry flashing at all cavity and veneer wall sills, masonry openings in exterior walls with masonry above head, over all horizontal steel members built into masonry and elsewhere as indicated. Comply with SMACNA "Architectural Sheet Metal Manual" Chapter 4 Flashing recommendations and with NCMA TEK Bulletins 19-4A and 19-5A details to ensure water resistant masonry construction.
 2. Install weeps in head joints of final course of exterior masonry wythe above flashing. Space weeps maximum of 24 inches on center horizontally with exterior ends and located to avoid door openings. Install weeps at head joints with outside face of weep material held 1/8 inch from the finish face of masonry unit.
 3. Install cavity fill on top of base flashing. Install a bed of mortar, conforming to the curve of the flashing, placed under the metal flashing.
 4. Install vents in head joints of final top course exterior masonry veneer wythe. Install at head joints with outside face of vent material held 1/8 inch from the finish face of masonry unit. Space vents 24 inches on center horizontally.
 5. Install compressible joint material at lintels and horizontal steel members. Build in joint fillers and seal with joint sealant specified in Section 07 90 00 - Joint Protection.

3.4 REINFORCED CONCRETE MASONRY

- A. Fill scheduled wall and column masonry work. Fill all cores solid with concrete fill/coarse masonry grout as specified in Section 04 05 16.26 - Engineered Masonry Grouting.
1. Grouting: Comply with TMS 602 grout placement requirements. Consolidate grout at time of placement.
 - a. Low-Lift Grouting: Place concrete fill/coarse masonry grout in maximum 5-foot vertical lifts.
 - b. High-Lift Grouting (If Approved): Place concrete fill/coarse masonry grout in maximum 12 foot vertical lifts (Recommend the use of super plasticizer with hi-lift grout).
 2. Recess top of grout fill minimum 1-1/2 inches below top of course to form a key with following lift.
 3. Where vertical reinforcing is required, install reinforcing before filling operation. Wet sticking of reinforcing is not permitted. Comply with Drawing details for reinforcing steel size and spacing.
- B. Install bond beams where indicated. Install reinforcing before filling operation. Fill units solid with grout. Comply with drawing details for reinforcing steel size and spacing.

3.5 REPAIR AND POINTING

- A. Clean and point exposed architectural concrete masonry at end of each working

day. Remove and re-place masonry units that are loose, chipped, broken, stained, or otherwise damaged. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

- B. During the tooling of joints, enlarge any voids or holes, except weeps and completely fill with mortar. Point up all joints at corners, openings and adjacent work to provide a neat, uniform appearance. Remove line pins and fill all line pin holes.
- C. Wipe off excess mortar as the work progresses. Dry brush exposed masonry with bristle brushes at the end of each day's work. Remove mortar spatters and joint ridges.

3.6 QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Testing Prior to Construction: One set of tests.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- D. Concrete Masonry Unit Test: ASTM C 140 for compressive strength.
- E. Mortar Test (Property Specification): For each mix provided, according to ASTM C 270,
- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.7 CLEANING

- A. Cut out defective mortar joints and holes in exposed masonry and re-point with mortar of matching color and texture. Commence cleaning of the masonry walls as soon as the mortar is thoroughly set and cured. After mortar has cured for a period of 7 days (and no later than 14 days after completion of installation), the cleaning process can begin.
- B. Demonstrate the cleaning procedure on the sample panel at the job site prior to commencing cleaning on the building. When the sample panel is cleaned to the approval of the Architect, and the walls are complete, clean the building with the approved cleaning method.
- C. Protect adjacent and surrounding surfaces not intended to be cleaned from exposure to the cleaning chemical to prevent damage.
- D. Prevent cleaning chemical from coming into contact with people, motor vehicles, landscaping and other building materials that could be harmed by such contact. Follow Masonry cleaner Manufacturers' recommendations for personal protection.

- E. Clean the exposed masonry surfaces of stains, efflorescence, mortar, grout dropping and debris using methods that do not damage the masonry. Do not use high pressure cleaning or aggressive scrubbing after cleaner application.
- F. The results of the cleaning process shall be inspected by the project Architect or authorized owner representative for acceptance after the walls have dried. For cleaning results to be accepted, the walls must comply with the standard set for the cleaning results on the sample panel, and the walls shall be free from mortar or efflorescence stains, and the color and texture of the finished walls shall not show damage, discoloration or staining from the cleaning process. If such damage or stains are present, then the walls must be cleaned and color corrected, as needed, to remove any such stains, discoloration or damage prior to the application of Coatings
- G. After cleaning allow units to dry and when specified apply a sealer as provided in Section 3.8.

3.8 COATING:

- A. After the results of the cleaning process have been fully accepted by the Architect, apply a colorless, non-staining, non-yellowing, breathable, penetrating water repellent. Water repellent shall be applied to the exterior exposed surface of the concrete masonry walls. Water-repellents must be capable of performing over hairline cracks and small voids less than 1/16". "Film Forming" Acrylic sealers will not be allowed. The water-repellent must not alter the color or texture of the wall after the material has fully cured. Water-repellent must be low VOC water or solvent based. Follow manufacturer's application recommendations.

3.9 PROTECTION

- A. Protect installed products until completion of project.
 - 1. Protect top of wall until covered or capped to a waterproof condition by subsequent construction.
 - 2. Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that comes in contact with such masonry
 - 3. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 - 4. Protect sills, ledges, and projection from mortar splatter and dropping.
 - 5. Protect surfaces of windows and door frames; as well as similar products with painted and integral finishes from mortar splatter and dropping
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

DIVISION 04 – MASONRY
04 73 00 – SIMULATED MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mortared manufactured concrete masonry veneer.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 20 00 - Unit Masonry.
- C. Section 06 10 00 - Rough Carpentry.
- D. Section 06 16 36 - Wood Panel Product Sheathing.
- E. Section 07 10 00 - Damp proofing and Waterproofing.
- F. Section 07 60 00 - Flashing and Sheet Metal.
- G. Section 07 90 00 - Joint Protection.
- H. Section 04 05 23.19 Masonry Cavity Drainage, Weepholes and vents.

1.3 REFERENCES

- A. American National Standards Institute (ANSI): ANSI A118.4 Specification for Latex-Portland Cement Mortar.
- B. ASTM International (ASTM):
 - 1. ASTM A641 - Standard Specification for Zinc-Coated. (Galvanized) Carbon Steel Wire.
 - 2. ASTM C 39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 3. ASTM C 140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - 4. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
 - 5. ASTM C 150 - Standard Specification for Portland Cement.
 - 6. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 7. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
 - 8. ASTM C 348 - Standard test Method for Flexural Strength of Hydraulic-Cement Mortars.
 - 9. ASTM C 482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
 - 10. ASTM C 1032 - Standard Specification for Woven Wire Plaster Base.
 - 11. ASTM D1761 - Mechanical Fasteners
 - 12. ASTM D 3498- Construction Adhesive

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Cleaning instructions and maintenance data.
- C. Shop Drawings: Indicate layout, show profiles and product components, including but not limited to anchorage, accessories, finish colors, patterns, textures, edge conditions and relationships with adjacent construction or surfaces.
- D. Qualification Data: Safety and quality documentation for manufacturer and installer.
- E. Test Reports: Certified test reports indicating compliance with specified performance requirements and conformance with specified physical properties.
- F. Verification Samples: For each product specified, two sample boards, representing colors, patterns, textures, finishes and mortar to be installed.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain primary manufactured concrete veneer and veneer bonding mortars from a single manufacturer.
- B. Manufacturer Qualifications:
 - 1. Shall have a minimum of 50 years' experience in producing concrete masonry units.
 - 2. Shall provide documentation attesting to compliance with industry manufacturing standards.
- C. Installer Qualifications:
 - 1. Shall have a minimum of 10 years' experience installing concrete masonry units.
 - 2. Shall provide documented field quality control and installation procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver architectural concrete masonry unit veneers to the job site on wood pallets.
- B. Inspect architectural concrete masonry units upon delivery to ensure color match with required materials and accepted samples.
- C. Stack masonry units in a dry place off the ground on pallets. Protect with non-staining waterproof tarpaulin coverings arranged to allow air circulation around and above masonry units.
- D. Exercise care in the storage, handling and installation of masonry unit veneers.

Do not build soiled or damaged masonry units into the work.

1.7 SEQUENCING

- A. Ensure that locating templates and other information required from others for built-in installation of products of this section are furnished in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS

- A. Follow hot weather requirements in the masonry code and specifications, TMS 402 and TMS 602.
- B. Hot Weather Procedures:
 - 1. When ambient temperature exceeds 90 degrees F and wind exceeds 8 miles per hour:
 - a. Maintain temperature of mortar between 70 degrees F and 120 degrees F.
 - b. Limit the spread of the mortar bed to 4 feet and place units within 1 minute of spreading mortar.
 - c. Control moisture evaporation in partially or newly completed walls by fog spraying with potable water, covering with opaque plastic or canvas or both.
 - 2. Protection of Work in Progress:
 - a. Covering:
 - 1) Cover tops of walls with a strong waterproof membrane at the end of each day or work shutdown. Extend the waterproof membrane cover a minimum of 24 inches down the side of each wall.
 - 2) Hold cover securely in place.
 - b. Staining:
 - 1) Prevent grout and mortar from staining the face of masonry.
 - 2) Remove grout and mortar that comes in contact with masonry units immediately.
 - 3) Protect sills, ledges and projections from mortar droppings.
 - 4) Protect base of wall from rain-splashed mud and mortar splatter.
 - 5) Turn scaffold boards on edge when work is not in progress to lessen splattering.
- C. Coordination: Coordinate Work to ensure top of wall is covered and remains covered until properly block openings are protected with coping or finishing system indicated on the Drawings

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: ORCO Block & Hardscape Riverside, CA 951-685-1521
Email: Erika.Gover@orco.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 CONCRETE MASONRY VENEER

- A. Product: Concrete Masonry Unit Veneers manufactured by ORCO Block & Hardscape.
- B. Properties:
 - 1. CMU Veneers manufactured in accordance with ASTM C90 and containing integral color.
 - 2. Linear shrinkage: Not to exceed 0.065 percent, ASTM C 90.
 - 3. Maximum thickness: 1-5/8" thick
 - 4. Width and Height: 7-5/8" x 15-5/8".
 - 5. Weight: Maximum of 15 lbs / ft²
 - 6. Density: Light Weight per ASTM C-90
 - 7. Color / Texture: Orco Valley Red. Mortar Color should be matched.

2.3 MATERIALS

- A. Aggregate:
 - 1. ASTM C 33 normal weight aggregate.
 - 2. ASTM C 331 lightweight aggregate.
- B. Cement: ASTM C 150, Type required. Color, White/Grey as required for use with the color specified.
- C. Color Pigments: Lightfast, alkali-resistant, weather-resistant natural or synthetic iron oxides manufactured specifically for use in concrete masonry units.
- D. Mortar: ORCO VBM Veneer Bonding Mortar.

PART 3 EXECUTION

3.1 PREPARATION

- A. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

- B. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Commencement of installation constitutes acceptance of conditions.

3.2 MORTARED VENEER INSTALLATION

- A. Install over prepared weather resistant backing:
 - 1. Backing:
 - a. Shall provide a continuous, moisture-resistant surface to receive the adhered veneer. Backing is permitted to be masonry, concrete, or metal lath and Portland cement plaster applied to masonry, concrete, steel framing or wood framing.
 - b. Adhesion developed between adhered veneer units and backing shall have a minimum shear strength of 50 psi based on gross unit surface area when tested with ASTM C482, or shall be adhered in compliance with Article 3.3 C or TMS 602.
 - c. Limit deflection to L/600.

3.3 CLEANING AND PROTECTION

- A. Cleaning: Clean veneer in accordance with manufacturer's recommendations.
- B. Protection:
 - 1. Protect in-progress and finished work from rain for 48 hours following installation.
 - 2. Protect finished work from damage until the date of Substantial Completion. Repair damaged components.

END OF SECTION

DIVISION 05 - METALS
05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

Include all labor, materials, equipment, transportation, etc., necessary for furnishing and installing completely and properly all structural steel work and related items.

Items of work covered by this Section shall include, but are not limited to the following:

- A. Shop and erection drawings.
- B. Structural steel framing and related items.
- C. Plates, anchor bolts, templates, connection devices and fastenings.
- D. Shop painting and field touch-up.
- E. Punching's, drilling and tapping's for connection of work of other trades.
- F. Galvanizing.
- G. Clean-up and disposal.

1.02 GENERAL REQUIREMENTS

A. Verification of Conditions: Verify at site all conditions affecting the work of this Section and take field measurements as required. Report any major discrepancies between Drawings and field dimensions to the Architect prior to commencing with work.

B. Shop Drawings and Erection Diagrams: Submit shop drawings and erection drawings prior to fabrication details, showing materials, construction and fabrication details, layout and erection diagrams as required, and method of anchorage to adjacent construction. Shop drawings and their submittal will comply to the requirements of the General Conditions.

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

The following is a list of the principal items of work not included in this Section.

- A. Sheet Metal Work.
- B. Miscellaneous Iron and Steel

- C. Field Painting, except touch ups on prime coats.
- D. Drypack, grouting and setting of embedded items.
- E. Shear Connectors and Deformed Bar Anchors.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural Steel: ASTM A-36, ASTM A992.
- B. Bars, Flats, Rounds, Sheets and Miscellaneous Items: STM A-36.
- C. Threaded Bolts and Nuts (Machine Bolts): ASTM A-307
- D. Steel Pipe: ASTM A-53, Types E or S, Grade B.
- E. Structural Tubing: ASTM A-5001 Grade B, (Fy = 46 Ksi).
- F. Welding Electrodes: ASTM A-233, of classification required for intended use. Use E70 series electrode or better.
- G. High Strength Bolts: ASTM A-325, Friction Type 1.
- H. Primer: Zinc Chromate, Fed. Spec. TT-P-645 or Tnemec No. 99.
- I. Galvanizing: ASTM A-123, A-525 or A-526.

ART 3 - EXECUTION

3.01 STANDARDS

- A. Building Code: Work shall conform to requirements of the California Building Code, latest edition, with latest revisions and amendments, and to other Codes having jurisdiction.
- B. Trade Standards: Current rules and practices set forth in "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction (AISC), latest edition, shall govern, except as noted or specified, or required by governing Building Codes. Welding shall conform to "Standard Code Arc and Gas Welding in Building Construction" of the American Welding Society.

3.02 TESTING AND INSPECTION

Refer to Section - TESTING AND INSPECTION, for procedures and requirements.

- A. Test Specimens: Test specimens shall be taken under the direction of the Testing and Inspection Agency and shall be machined to dimensions as required by the related applicable Standard ASTM Specifications. All tests shall be made in accordance with applicable Building Codes and as specified herein.
- B. Tests: Test all unidentified structural steel.
- C. Inspection: Continuous inspection by a Registered Deputy Building Inspector shall be provided for all field welding and for the installation of all high strength bolts.

3.03 PROTECTION

Exercise all reasonable precautions to protect finished concrete floor surfaces and adjacent work from damage. Green concrete floors shall not be overloaded. All mobile equipment used in placing steel shall have pneumatic tires. Prior to erection, place NO steel members directly on floor; pads of timber or other material for cushioning shall be placed under steel.

3.04 SUBSTITUTIONS

Substitutions of materials and sections for those indicated or specified will not be permitted except by specific approval in advance of fabrication. The sections, shapes, thicknesses, weights, and the details of construction indicated for the structural steel work on the Drawings shall be furnished; provided, however, the Contractor, because of his stock or shop practices, may suggest changes therein, which the Architect may approve, provided the net area of the shape or section is not thereby reduced, and the section moduli and radii of gyration are at least equivalent. The overall dimensions shall not be exceeded, except upon written permission from the Structural Engineer.

3.05 WORKMANSHIP

Contractor for structural steel shall be an approved Fabricator, as defined in the CBC, approved by the local agency or Building Department. Contractor shall fabricate and erect the structural material with workmen skilled in those branches of the structural steel industry.

3.06 FABRICATION

Contractor shall detail, fabricate and erect work in accordance with drawings and specifications, and approved shop drawings. If not indicated or specified, Contractor shall detail, fabricate and erect work in accordance with the previously specified Standards, and all safety regulations prescribed by the State of California. Design of minor connections and fastenings not specifically indicated on drawings or specified, shall be completed by fabricator to meet required conditions and shall be shown in detail in the shop drawings.

3.07 ERECTION

A. General: Structural Steel shall be erected plumb, square, and true to line and level, and in positions indicated. Insofar as possible, work shall be fitted and shop-assembled, ready for erection. Jointing and intersections shall be accurately made, tightly fitted and made in true plane with adequate fastenings. Defective workmanship in shop or in field will not be accepted.

B. Holes: Do not make or enlarge holes by burning. Holes shall be provided in members to permit connection of work of other trades who will furnish necessary templates and information required. Drill or punch holes for bolts, unless otherwise noted.

C. Connections:

1. Field Connections: Unless otherwise indicated, field connections shall be in accordance with AISC Standards, using machine bolts, high strength bolts, and the AWS Standards for welding. High strength bolts shall be tightened by either the "turn of nut" method or by a calibrated wrench.

2. Shop Connections: As shown and subject to approval of the Architect.

3. Bolted Connections: Unless otherwise indicated, in accordance with AISC Standards. One-sided or other types of eccentric connections will not be permitted unless shown in detail on approved drawings.

D. Welding: Welds shall be as noted and shall be done by the electric-arc process. Shop welding shall be performed on the premises of the fabricator. All welding shall be done by Certified Welders.

E. Welding Inspection: Continuous inspection of all field welding is required. The Owner will select and pay for the services of a Registered Deputy Inspector who will be on continuous duty during execution of all field welding.

F. False Work: Provide all necessary guys, braces or false work for temporary support of any part of work. Remove temporary supports at such time as work is erected to a point where structural members are self-supporting, and work has been inspected and approved. Approval of temporary bracing shall be secured from Building Department.

G. Bearing plates and bases shall be shimmed where required, to line and grade, ready to receive grouting. Shims shall consist of steel wedges of sufficient size to properly support members.

H. Drift pins may be used only to bring several parts together; they shall not be used to enlarge holes or in a manner to distort or damage the material.

I. Leveling: All structural steel framing shall be vertical of level, within limits specified in AISC Specification and Standards, unless in specific locations finer tolerances are required to receive work of other trades.

END OF SECTION

DIVISION 05 - METALS
05 51 33 – METAL LADDERS

1. PART 1 GENERAL

1.1 WORK INCLUDED

- A. Prefabricated aluminum roof access ladders.

1.2 REFERENCES

- A. AWS D1.2 - Structural Welding Code - Aluminum.
- B. OSHA - Standards of Occupational Safety and Health Administration.
- C. ANSI - ANSI A-14.3 Standards.
- D. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

1.3 FIELD MEASUREMENTS

- A. Verify actual dimensions on site prior to fabrication.
- B. Contractor shall be responsible for a complete installation of all components required.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. O'Keeffe's Inc., www.okeeffes.com.
- B. Alaco Aluminum Ladders, www.alacoladder.com.
- C. Dur-Red Products, www.dur-red.com.
- D. Lapeyre Stair, Inc., www.lapeyrestair.com.
- E. Precision Ladders, LLC, www.precisionladders.com.
- F. Substitution: Under provisions of Section 01 25 13.

2.2 MATERIALS

- A. Rungs shall be round or square and a minimum of 1-1/8 inch in section, formed from aluminum extrusion, ASTM B221 alloy 6061-T6, and shall be deeply serrated on all sides to provide maximum foot grip and traction. Rungs shall be able to withstand a 250 pound loading without failure. Space rungs 12 inches o.c. as indicated.

- B. Channel side rail shall be minimum 3 inch x 1 inch x 1/8 inch aluminum extrusions, ASTM B221 alloy 6061-T6.
- C. Welding Materials: AWS D1.2.
- D. Finish:
 - 1. Clear natural anodized finish for all interior ladders.

23 ` ACCESSORIES

- A. Anchorage devices and bolts necessary for installation as required by manufacturer's recommendations,

24 FABRICATION

- A. Materials used shall be new stock, straight within industry tolerances and free of any defects in finish or structure.
- B. Cutting of stock shall be by mechanical means to assure a smooth square and true working edge.
- C. Mechanical Connections: Bolted connections shall be made with cast aluminum connectors and stainless steel anchorage devices.
- D. Welded Connections: In accordance with AWS D1.2 requirements.
- E. Protection of aluminum from dissimilar materials:
 - 1. Dissimilar metals except stainless steel, white bronze, and solid zinc, shall be painted with a heavy brush coat of zinc-chromate primer and one coat of aluminum paint.
 - 2. Aluminum surfaces in contact with mortar, concrete, plaster or other masonry materials shall be given one heavy brush coat of bituminous paint.

3. PART 3 EXECUTION

3.1 PREPARATION

- A. Verify proper timing for ladder installation to prevent undue delay in job progress.
- B. Installation of ladder units shall be considered as acceptance by the Contractor afthe adjacent construction as substantially conforming to the intended details and capability of supporting the ladder unit.

3.2 INSTALLATION:

- A. Secure ladders in position as indicated on the Drawings and as required by manufacturer's specifications.

END OF
SECTION

DIVISION 05 – METALS
05 52 00 – METAL RAILINGS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Steel tube handrails, balusters, and fittings.

1.2 REFERENCES

- A. 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ASTM A36 - Specifications for Structural Steel.
- C. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- E. ASTM E985 - Permanent Metal Railing Systems and Rails for Buildings.
- F. AWS D1.1 - Structural Welding Code - Steel.
- G. NAAMM - Metal Finishes Manual.
- H. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- I. SSPC - The Society for Protective Coatings.

1.3 DESIGN REQUIREMENTS

- A. Design, engineer, fabricate and install railing assembly, wall rails, and attachments to resist force of 200 lbs applied in any direction at any point on the rail without damage or permanent set.
- B. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 and the 2010 ADA Standards for Accessible Design for accessibility requirements.
- C. Fabricate railing assembly, wall rails, and attachments to ASTM E985 requirements.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.

- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Craneveyor Corp., www.craneveyor.com.
- B. R and B Wagner, Inc., www.rbwagner.com.
- C. Other acceptable manufacturers offering equivalent products. Substitutions per 01 60 00.
- D. Substitutions: Under provisions of Section 01 25 13.

2.2 STEEL RAILING SYSTEM

- A. Rails and Posts: ASTM A500, Grade B, 1-1/4 inch steel round tubing, 3/16 inch wall thickness, welded joints with steel inserts for casting in concrete.
- B. Structural Plates, Shapes, and Bars: ASTM A36.
- C. Fittings: Elbows, T-shapes, flanges, escutcheons; machined steel.
- D. Wall Brackets: Julius Blum No. 1378, www.juliusblum.com.
- E. Splice Connectors: Steel welding collars.
- F. Welding Materials: AWS D1.1.

2.3 FABRICATION

- A. Fit and shop assemble components in largest practical sizes, for delivery to site.
- B. Fabricate components with joints tightly fitted and secured.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located consistent with design of component, except where specifically noted otherwise.

- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Continuously seal joined pieces by continuous welds in accordance with AWS requirements
- F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- G. Accurately form components to suit ramps, stairs and landings, to each other and to building structure.

2.4 FINISHES

- A. Apply bituminous paint to separate dissimilar metals and metal surfaces in contact with cementitious materials.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Do not prime surfaces in direct contact with concrete or where field welding is required.
- D. Galvanizing: 1.25 oz/sq ft zinc coating in accordance with ASTM A123.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC 20.
- F. Finish: Site paint under provisions of Section 09 90 00.
- G. Stainless Steel: No. 4 finish.

3. PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive working of installation means elector accepts existing conditions.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete and embedded in masonry with setting templates, to appropriate Sections.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.

- C. Provide anchors required for connecting railings to structure. Anchor railing to structure.
- D. Field weld anchors as indicated on Drawings. Grind welds smooth. Touch-up welds with primer.
- E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- F. Install wall mounted handrail brackets to bottom of handrail.
- G. Install wall mounted handrails with a 1-1/2 inch space between wall and inside face of handrail.
- H. Install wall mounted handrails with a 1-1/2 inch space between wall and inside face of handrail.
 - Extend handrail at top of stairs a minimum of 1'-0" past face of riser. Extend handrail at bottom of stairs a minimum distance of 1'-0" plus depth of one stair tread. The 1'-0" handrail extensions to be level and parallel with the landing surface.
- J. Extend handrails at top and bottom of ramps a minimum of 1'-0". The 1'-0" handrail extensions to be level and parallel with the landing surface.

END OF SECTION

DIVISION 06 – WOOD, PLASTIC & COMPOSITES
06 10 00 ROUGH CARPENTRY

PART 1 - GENERAL

The requirements of the Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

The work of this Section shall include all labor, materials, equipment, and transportation to complete all rough and finish woodwork and related work. The following items of work covered by this Section shall include, but not be limited to, the following:

- A. All rough hardware, bolts, angle clips, nails, lag screws, anchors, etc., required to properly connect parts to each other or to other materials shall be supplied and installed.
- B. Install all finish hardware and equipment not specifically specified as being installed by other trades.
- C. Miscellaneous rough and finish wood and related work.
- D. Temporary dust stop partitions and barricades.
- E. Concrete form work shall be installed as specified under Concrete.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Framing Lumber: All framing lumber used shall be new with "Standard Grading and Dressing Rules", No. 16 of the West Coast Lumbermen's Association. Lumber shall be fire retardant tested as specified.
- B. Plywood where required shall be new "Douglas Fir" thickness as noted). Plywood shall be fire retardant treated as specified.
- C. Sizing and Dressing: All lumber shall be sized to widths. All lumber that remains exposed shall be mill dressed on all exposed surfaces.
- D. Rough Hardware shall be standard type. All nuts and bolt heads shall have metal washers between them and the wood.
- E. Fire Retardant Treatment: Where indicated, all lumber and plywood used in rough and finish carpentry work shall be fire retardant pressure treated with J.H. Baxter & Co. "BASCO-PYRESOTE" or Koppers Company, Inc. "NON-COM" Treatment shall be in accordance with the Underwriter's Laboratories, Inc. requirements for a flame spread of not over 25 and no evidence of progressive combustion in a test of 30 minutes duration. Each piece shall bear the Underwriter's Laboratories, Inc. label. All fire retardant treatments shall be acceptable to agencies with environmental control jurisdiction.

F. Caulking: Where noted on drawings and/or where require to water and dust seal all trades construction joints between similar and dissimilar materials, caulking mastic shall be "Tremco Mono" non-hardening flashing compound. Colors will be selected and scheduled by the Architect.

PART 3 - EXECUTION

3.01 CARPENTRY

A. All work shall be accurately and skillfully installed, with all true to line, level and plumb.

B. The Contractor shall check at the job all measurements, openings, etc., and shall report to the Architect all errors and variations so that allowances may be made when Shop Drawings are checked. No claims for extra work due to errors in existing work or faulty measurement will be allowed.

3.02 BARRICADES AND DUST STOP PARTITIONS

A. The site shall be protected with all required barricades, canopies, fences, safety lights, and similar items as and where required by the Building Code, and public authorities having jurisdiction.

B. The above barricade materials shall become the property of the Contractor and shall be removed and disposed of by him when no longer required by public authorities or the Owner.

C. Temporary dust stop partitions shall be installed in all locations within the existing building where required to protect personnel and equipment from dust and debris created by the Contractor's work.

D. Temporary dust stop partition materials shall be incombustible to flameproof wood. Flameproof and waterproof curtains may be used to provide the required protection around existing equipment only at locations where plywood dust partitions would not allow sufficient access or workspace for personnel. These curtains shall extend from floor to slab above, and from partition to partition, or other structure to exclude all possible dust and/or weather from equipment and/or occupied areas. Heavy duty flameproof and waterproof "GRIFFOLYN 75", or "FR-TUF SKIN" by Mission Construction Service Corp. of San Fernando, may be used for this purpose. Fabric or polyethylene materials will not be permitted. All joints and connections to surrounding construction must be sealed with similar waterproof and flameproof tape.

3.03 FINISH HARDWARE

Install all finish hardware not installed by others as specified under Finish Hardware Section. Hardware shall be accurately fitted and with exception of butts, all surfaced hardware shall be removed before painting. After painting all hardware shall be replaced in permanent settings.

3.04 WOOD DOORS

A. Wood doors shall be of size, thickness, and type as designated in the door schedule on the drawings. Doors shall meet or exceed Commercial Standards CS 171 as amended, complete with paint grade hardwood surfaces.

B. All doors shall operate freely without sticking or binding and shall have all hardware properly adjusted and functioning.

C. Contractor shall guarantee for one year minimum that no door will warp or twist out of straight in any part, shrink or open at any joint, that no veneer will buckle, crack or become loose. Any door having any of these defects will be removed from the site and replaced at the Contractor's expense.

3.05 FINISH CARPENTRY AND MILLWORK

A. No interior wood finish, millwork, or doors will be permitted in the building until moisture is out of the structure.

B. Prime all woodwork surfaces not scheduled for natural finish, immediately after delivery with one coat of wood primer.

C. All interior finish shall be smoothly dressed and belt sanded on the job and shall be turned over to the painter in perfect condition.

3.06 MISCELLANEOUS

Provide and install any other miscellaneous items of rough and finish carpentry work, including all necessary cutting, patching, and touch up work required to complete and join all parts of the new building as indicated or required to the true intent of the drawings.

END OF SECTION

DIVISION 06 – WOOD, PLASTICS, & COMPOSITES
06 20 00 – FINISH CARPENTRY

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items, other than shop prefabricated casework.
- B. Hardware and attachment accessories.

1.2 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. AWPA - American Wood Preservers Association.
- C. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.
- D. UL - Underwriters' Laboratories, Inc.
- E. WI - Woodwork Institute: North American Architectural Woodwork Standards 3.0.

1.3 QUALITY ASSURANCE

- A. Manufacture millwork and finish carpentry items in accordance with quality standards of the North American Architectural Woodwork Standards of the Woodwork Institute.
- B. All millwork and the installation of millwork shall be monitored for compliance under the scope of the WI Monitored Compliance Program (MCP).
- C. Fees charged by the Woodwork Institute for their monitored compliance service are the responsibility of the millwork manufacturer.
- D. Provide WI Certified Compliance Labels on all items of millwork.
- E. Provide WI Inspection Service at the job site prior to installation. Provide to Architect a written report showing results of the reinspection.
- F. Upon completion of the installation, provide a WI Monitored Compliance Certificate.
- G. Accredited certification bodies shall be one of the following:
 - Rainforest Alliance, www.rainforest-alliance.org.
 - SCS Global Services, www.scsglobalservices.com.

1.4 REGULATORY REQUIREMENTS

- A. Conform to CBC and UL requirements for fire ratings.
- B. Conform to Flame Spread Classifications of Interior Millwork for flame spread ratings as tested according to ASTM E84.

1.5 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Indicate materials, component profiles, fastening methods, jointing details, finishes, and accessories to a minimum scale of 1-1/2 inch to one foot. Provide WI Certified Compliance label on first page of each set.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 6 x 12 inch in size illustrating wood grain, species, and specified finish.
- E. Submit two samples 18 inch long of wood trim.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01 61 00.
- B. For interior applications conform to Section 2 of the North American Architectural Woodwork Standards for a climate controlled application.
- C. Store materials in ventilated, interior locations under constant minimum temperatures of 60 degrees F and maximum relative humidity of 25 to 55 percent.

2 PART2 PRODUCTS

2.1 FABRICATORS

- A. Active member of the Woodwork Institute, licensed by WI to provide the WI certified Compliance Certificates and Labels for the products and materials specified in this section, www.woodworkinstitute.com.
- B. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

- A. Materials specified under the North American Architectural Woodwork Standards Section Numbers refer to lumber grades as follows: Section 3, Lumber - Hardwood/Softwoods; Section 4, Plywood - Hardwood/Softwood; Section 6, Exterior Trim; and Interior Trim; Section 7, Stair Work.

2.3 INTERIOR TRIM

- A. FabriGate in accordance with Section 6 of the North American Architectural Woodwork Standards.

<u>Item</u>	<u>Species</u>	<u>Grade</u>	<u>Intended finish</u>
Base, Casing & trim	Red Oak	Custom	Transparent

2.4 MISCELLANEOUS INTERIOR MILL WORK

- A. Fabricate in accordance with Section 6 of the North American Architectural Woodwork Standards.

<u>Item</u>	<u>Species</u>	<u>Grade</u>	<u>Intended Finish</u>
1x6 T&G Vee joint Wainscot	Read Oak	Custom	Transparent

2.5 ADHESIVE

- A. Adhesives: Type 1 adhesive recommended by WI to accommodate application in accordance with the Appendix A to the North American Architectural Woodwork Standards.
- B. WallAdhesive: Solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.

2.6 WOOD TREATMENT PROCESS

- A. Fire Retardant Type: Listed by Underwriters' Laboratories, Inc. (UL).; capable of providing a maximum flame -----d/smoke development rating of 20/25 in accordance with ASTM E84.
- B. The following items are to be treated:
1. 1 x 6 T6G Vee Joint Wainscot.

2.7 ACCESSORIES

- A. Nails: Size and type to suit application, galvanized finish for interior use, stainless steel for exterior use.
- B. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application; galvanized finish for interior use, stainless steel for exterior use.
- C. Lumber for Shimming and Blocking: Softwood lumber of Douglas Fir species.
- D. Primer: Alkyd primer sealer.
- E. Wood Filler: Solvent base, tinted to match surface finish color.

2.8 FABRICATION

- A. Fabricate work in accordance with WI Custom grade standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

3 PART 3 EXECUTION

3.1 EXAMINATION

- 3.2 Verify that surfaces and openings are ready to receive work and field measurements are as instructed by the fabricator.
- 3.3 Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.
- 3.4 Verify adequacy of backing and support framing.
- 3.5 Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials or that will be permanently concealed from view.

3.3 INSTALLATION

- A. Install work in accordance with the WI North American Architectural Woodwork Standards Custom quality standard.
- B. Install fire rated door frames in accordance with NFPA 80.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 PREPARATION FOR FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

3.6 FINISHING

- A. Site finish under provisions of Section 09 90 00.

3.7 PROTECTION

- A. Protect finished installation under provisions of Section 01 61 00.

END OF SECTION

DIVISION 06 – WOOD, PLASTICS & COMPOSITES
06 41 16 – PLASTIC- LAMINATE-CLAD ARCHITECTURAL CABINETS

1.1 INSTALLATION

- A. Set and secure casework in place rigid, plumb, and level.
- B. Install casework in accordance with Section 10 of the North American Architectural Woodwork Standards.
- C. Install casework items in accordance with the Woodwork Institute's Certified Seismic Installation Program (CSIP)
- D. Install countertops in accordance with Section 11 of the North American Architectural Woodwork Standards.

1.2 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF
SECTION

DIVISION 07 – THERMAL & MOISTURE PROTECTION
07 50 00 – MEMBRANE ROOFING

PART 1 - GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

A. Work Included: The work of this Section shall include all labor, materials, equipment, and the performance of all operations required to complete all roofing work, including installation of Densdeck and rigid insulation board, as indicated on the Drawings and as specified herein.

B. Work Not Included: Wood roof deck.

1.02 DEVIATIONS

In the event these Specifications deviate from the manufacturers' current Specifications, these Specifications prevail, except where they conflict with the manufacturer's requirements for the specified guarantee.

1.03 CONTRACTOR'S ACCEPTANCE

Prior to the project start, Contractor shall ascertain that all aspects of these Specifications and possible modifications are workable and do not conflict with the manufacturer's requirements for the specified guarantee. Upon commencement of the work, it will be presumed that these Specifications, Drawings, Addenda, and modifications (as applicable) are satisfactory to the Contractor and to the manufacturer in their entirety.

The Contractor, accompanied by the manufacturer's representative, shall inspect all surfaces over which these materials are to be applied. He shall assure himself that no defects of any type are present which will jeopardize the proper installation of these materials. Any such defects found shall be reported to the Architect. The absence of any written report from the Contractor shall constitute the acceptance of all undersurfaces and he will be completely responsible for a first-class watertight installation.

Upon completion of the roof and parapet deck framing and prior to installation of new roofing materials, a Certificate of Compliance shall state that the roofing applicator is a certified applicator approved by the manufacturer of the accepted products and that all subsurfaces were prepared and accepted in accordance with these Specifications and the written specifications of the manufacturer of the products used. The manufacturer and applicator shall state the finished surface is ready to receive the roofing system. The Certificate shall be jointly signed by the certified roofing applicator and the insulated board and densdeck installers.

1.04 REFERENCE STANDARDS

References in these Specifications to standards, test methods, codes, etc., are implied to mean the latest edition of each such standard adopted.

1.05 BASIC DESCRIPTION OF THE WORK

The basic work description, components, layering and attachment methods required in this Specification are as follows:

Project Type: New Construction

Roof Deck: Plywood substrate

Roof Deck 1st layer = 1/2" Densdeck mechanically fastened per FM 1-90 requirements and in accordance with manufacturer's written specifications.

Roof Field System: Soprema – Base Sheet- Colvent SA
Self Adhered- peel and Stick

Final Sheet- Single Ply Roof

Parapet walls: Plywood substrate

Parapet Walls 1st layer = 1/2" Densdeck mechanically fastened.

Wall System: Soprema – Base Sheet- Sopralene Flam Stick
Self Adhered

Final Sheet- Sopralene Flam 180 FRGR
Torch applied.

Approvals: UL Class listed, FM Approved (products shall bear seals of approval)

Specified Guarantee: Twenty Year Roof Membrane Guarantee

Fabricate and install metal edge and gutter as specified herein.

1.06 QUALITY ASSURANCE

A. Provide primary roofing products including each type of sheet, all manufactured in the United States, supplied by a single manufacturer which has successfully been producing the specified types of primary products for not less than ten years. Provide secondary or accessory products which are acceptable to the manufacturer of the primary roofing product.

B. The roof system shall conform to the Underwriters Laboratories Class A roofing and flashing membrane system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.

C. The Roofing Contractor shall have a minimum of two years' experience in successfully installing the same, or similar, roofing materials and shall be certified in writing by the roofing materials manufacturer to install the primary roofing products. The Contractor shall have installed successfully a minimum of five jobs using the membrane manufacturer's specification and the guarantee shall have been issued to the Owner.

D. Submit a complete manufacturer's application for roof guarantee form along with Shop Drawings of the roofs showing all dimensions, penetrations, and details. The form shall contain all the technical information applicable to the project including deck types, insulation, roof slopes, base sheet and manufacturer's membrane assembly proposed for installation. The form shall also contain accurate and complete information requested including names and addresses. The project must receive review through this means, prior to shipment of the materials to the project site.

E. Application practice shall comply with the requirements and conditions contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractors Association, amended to include the acceptance of a phased roof system installation.

5. All work shall conform to the regulations of public agencies, including any requirements of the City and/or State of jurisdiction.

G. Manufacturer's technical representative must be available to visit the job site a minimum of two times during the duration of the project. Manufacturer's sales personnel nor their agents will be considered as technical representatives. Factory trained technical representatives with field experience in roofing mechanics are required. This same technical representative must be present during the final inspection for the issuance of the Guarantee. In addition to the guarantee, furnish to the Owner (via the Architect) manufacturer's printed recommendations for proper maintenance of the new roof, including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures. Guarantee shall be for Soprema twenty year Roof Membrane, term type, without deductibles or limitations on coverage amount.

1.07 REQUIREMENTS PRIOR TO JOB START

Before starting the work, surfaces shall be smooth, firm, thoroughly set, dry, and swept broom clean.

Drainage connections, metal aprons, metal edging, flashing, and counter flashing, collars, and sleeves for pipes passing through the roof shall be set, or shall be on the job site if they are to be built into the roof.

1. ENVIRONMENTAL REQUIREMENTS: Do not apply roofing during precipitation or in the event there is a probability of precipitation.

2. TEMPERATURE RESTRICTIONS: At ambient temperatures of forty (40) degrees and below, special precautions must be taken to ensure that the specified Type IV asphalt maintains a minimum 400 degrees F temp. at the point of sheet application. The asphalt must not be overheated to compensate for cold conditions. The use of insulating handling equipment is strongly recommended. Hot luggers, mop carts, and kettle to roof supply lines should be insulated. Hand mops should be constructed with a smaller yarn head to facilitate short mopping's. Luggers and mop carts should never be more than half full at all times.

1.08 PROTECTION REQUIREMENTS

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout the project.

2. Torch Safety: Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas of the roof construction. Continue fire watch for one hour after roofing application has been suspended for the day.

3. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

PART 2 - PRODUCTS

2.01 MATERIALS

1. Densdeck – Gypsum fire barrier board – ½” over roof deck and ½” over parapet sheathing.

2. Tapered Insulperm Board shall be tapered expanded polystyrene (EPS) rigid, closed cell foam insulation. Insulation meets ASTM C 578 requirements (Supersedes Federal Spec. HH-1 524C). Thermal Resistance R- value shall meet 4.17 per 1.00 inch thickness. Slope min 1/8” : 12” or as indicated on the drawings. Maximum board size = 4’ x 4’.

3. Soprema Roofing products – field plies

- a. Colvent SA Base Sheet (self-adhered Base)
- b. Elastophene flam FR GR (torch applied)

4. Soprema Roofing products – wall plies

- a. Sopralene Flam Stick (Self-adhered base flashing)
- b. Sopralene Flam 180 FRGR (torch applied)

5. Soprema Adhesive – HV #3

6. Fasteners: Provide densdeck fasteners as approved by FM and the manufacturer of the primary roofing products. Over plywood decks use units that comply with FM 1-90, fastened at a rate per manufacturer’s written specifications, corrosive resistant.

All materials shall be delivered to the job site in manufacturer's original sealed packages and containers and stored out of direct exposure to the elements. All materials shall be stored in accordance with the manufacturer's written specifications regarding handling. Any materials stored on the roof overnight shall be on pallets, with rolls stored per manufacturer's requirements. Store solvents, asphalts, adhesives, etc., away from open flames, sparks, or excessive heat. Cover all materials. Polyethylene materials will not be allowed to be used to cover materials. Distribute loads evenly across the roof surface. Do not concentrate loads by stockpiling materials.

2.02 RELATED COMPONENTS

A. Lumber: Provide lumber used for nailers, curbs, cants, etc., that is No. 2 kiln dried (19% max. moisture content after treatment) grade marked and surfaced on four sides. Lumber shall be

salt treated with Wolmans Salts (wood shall retain .25 lbs. dry salt per cubic foot of wood.) All wood nailers shall be fastened in accordance with a resistance to a 300 lb. wind uplift force.

B. Lead Pipe Flashings: Wherever required by the new materials used in any of the construction procedures up on the roof, provide new lead pipe flashings which shall be pre formed from solid stock weighing a minimum of four pounds per square foot, and soldered with a minimum four inch perimeter flange with a sleeve opening fabricated to fit closely around the penetration without forcing; complying with Fed Spec No. QQ-L-201. Provide lead sleeve length of sufficient height to allow a min. of 1" to be crimped inside of the pipe stack.

C. Fabricated Metal: Fabricate all metal components to be used in conjunction with the roof system of 24 ga. galv. steel, unless otherwise noted on the Drawings, meeting ASTM A-526.

1. Metal edge fascia shall be prefabricated with a four inch perimeter flange having a minimum 1/4" gravel stop rise. The fascia shall be of sufficient width to adequately cover the roof assembly/wall juncture. The bottom edge of the fascia shall have a minimum 1/2" drip edge, hemmed and formed at 30 degrees and shall be fabricated for attachment to a continuous cleat at the outside base of the nailer. Fabricate metal fascia in maximum ten foot sections. Fabricate corner pieces of metal edge fascia with one foot sections in either direction from the corner. Fabricate cover plates and accessory components in accordance with SMACNA guidelines.

2. Metal pipe flashings: shall consist of a metal roof jack having a min. 4" perimeter flange, and a sleeve opening to fit closely around the penetration without forcing with a min. 6" height. Fasten and solder laps. Provide metal watertight umbrella, fabricated to be mechanically secured tightly around the roof penetration and extend beyond the roof jack opening by a min. radius of 3". Caulk top edge of the watertight umbrella using approved sealant.

3. Solder Compound: shall be 50% tin, 50% lead, complying with ASTM D 32-70 Alloy Grade 58.

4. Solder flux: shall conform to FED SPEC No. O-F-50C, Type I, Form A or Form B.

PART 3 - EXECUTION

3.01 PREPARATION:

Prepare new roofs and parapet walls to receive new roofing materials. Inspect decking and make necessary repairs or replace sections that cannot be repaired. Repair minor cracks, surface irregularities, open joints, etc., in masonry walls using a quick dry grout mix to ensure a smooth, even surface for application of the roofing/ flashing membranes.

3.02 SUBSTRATE PREP.

Prepare in strict accordance with roofing manufacturer's written specifications.

3.03 INSTALLATION

1. Mechanically attach ½” Densdeck to parapet walls and ½” Densdeck to Plywood Roof substrate in accordance w/ manufacturer’s written Specifications.

3.04 ROOF MEMBRANE INSTALLATION

1. Membrane application: Apply all roofing materials in strict accordance with manufacturer's written specifications.

2. Priming: Prime metal flanges and concrete and masonry surfaces as required by the roofing manufacturer.

3.05 ROOFING APPLICATION

1. Apply all layers of roofing free of wrinkles, creases, or fish mouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Lap seams in the base ply layer should not coincide with the lap seams of the finish ply layer. Courses shall be staggered to ensure this.

2. Apply all roofing perpendicular to the slope of the deck. Fully bond and lap as required by manufacturer’s specifications. The manufacturer shall provide acceptable lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.

Field Plies:

A. Soprema Colvent SA shall be self adhered to the EPS Board, or Densdeck Board, depending on the condition. Prime Densdeck with Elastocol 400 prior to the base ply installation

B. Soprema Elastophene Flam FR GR shall be attached in strict accordance with manufacturer’s written specifications and in accordance with FM 1-90 requirements.

Wall Plies:

A. Sopralene Flam Stick shall be self-adhered to the or Densdeck Board. Prime Densdeck with Elastocol 400 prior to the base ply installation

B. Sopralene Flam 180 FR GR shall be torch applied and attached in strict accordance with manufacturer’s written specifications and in accordance with FM 1-90 requirements. Plie shall extend up and over top of Parapet to exterior wall face.

3. Water Cut-off: At the end of each day’s work, or if precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt cement and roofing felts constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to resuming roofing work.

4. Patching existing Roofing materials: All patching of existing roofing materials to provide for new construction shall be compatible with the existing roofing materials and Soprema products required for a first-class installation.

5. Install edge metal, lead pipe flashings, and metal pipe flashings in accordance with manufacturers written specifications.

6. Sealants: Caulk all exposed finish ply edges at gravel stops, waste stacks, vent stacks, etc., with a continuous smooth bead of approved sealant.

Upon completion of work, all excess materials resulting from the work of this Section shall be cleared from the job site, leaving it in a clean and acceptable condition to the Owner.

PART 4 - GUARANTEE:

The Contractor shall provide a guarantee as outlined previously. In addition, the General Contractor shall contact the manufacturer during the 90 day period immediately preceding the two year anniversary of the guarantee date to arrange for a mandatory two year inspection. The inspection shall be attended by the Contractor and the manufacturer's representative. A two year inspection punch list shall be compiled by the manufacturer and submitted to the Contractor for completion. Upon completion sign, and mail to manufacturer's headquarters to verify that all items are in accordance with the manufacturer's recommendations. Mail finalized copy to Architect and to Owner.

END OF SECTION

DIVISION 07 – THERMAL & MOISTURE PROTECTION
07 60 00 – FLASHING & SHEET METAL

Part 1 - General

- Require submittal of shop drawings and details of each condition and joint.

Part 2 - Products

- Specify minimum 24-gauge thickness for galvanized metal and identify specific heavier gauges where the project requires.

-OR-

- Use only minimum 16 ounce copper for masonry through-wall, lintel, or other similar embedded flashings.
- Use only 4 pound lead for roof drain sump pans.
- When necessary, use 4 pound lead for flashings involving compound curves or where sheet metal cannot be adequately formed. This application requires a galvanized sheet metal protective cover.
- Where 2-piece reglets are required, describe the specific shape and substrate conditions, but do not reference proprietary manufacturer's products.
- Do not use roof jacks or boots which utilize integral neoprene seals.
- Use only galvanized structural steel tube or pipe for downspout sections which are subject to impact and abuse.
- Use only 50/50 tin/lead solder when applicable.
- Use only non-corrosive fasteners, same material as metal being fastened, with matching finish on exposed heads. Specify neoprene-backed washers for screw fasteners.

Part 3 - Execution

- Specifically describe requirements for expansion and contraction joints, and for sealing joints in running flashings. Do not rely on generic "provide expansion joints as required" notes.
- Joints shall allow for removal and reinstallation of flashings during re-roofing. Two-piece reglets are preferred.
- Specifically describe requirements for separating dissimilar metals.

End of Section 07600

DIVISION 07 – THERMAL & MOISTURE PROTECTION
07 90 00 – JOINT PROTECTION

1.00 GENERAL

The General Conditions and Division 1 requirements shall apply to this Section of the Specifications.

1.01 DESCRIPTION

- A. Furnish all labor, material, equipment, appliances, and service necessary for Caulking and Sealing water and weather-tight all exterior joints as indicated on the drawings and/or as specified herein.
- B. Typical locations include, if part of overall work to be performed, but are not limited to all exterior doors, wood, metal, concrete, or masonry adjoining dissimilar materials. The work of this section shall be coordinated with the work of various trade sections requiring caulking and all applicable requirements of this Section shall be included as part of each Section where work requires caulking. Sheet metal caulking to part of the "Sheet Metal Section of these Specifications.
- C. The Contractor shall thoroughly acquaint himself with all conditions of the project before submitting his bid and shall perform all Caulking and Sealant Work required whether each item is specifically shown or not.

1.02 GENERAL REQUIREMENTS

- A. Applicators shall specialize in the installation of sealants. All applications shall conform with the manufacturer's written directions.
- B. Sealant applicator shall examine all other work and surfaces to receive the work of this section and report to the General Contractor and the Architect all conditions not acceptable.
- C. Apply sealant under pressure with hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. All joint surfaces shall be neatly pointed or tooled to provide the contact as indicated on the drawings.
- D. For application of sealant when air temperature is below 40 degrees F., consult sealant manufacturer for recommendations.

2.00 PRODUCTS

2.01 MATERIALS

- A. Sealant shall be of a liquid polysulfide polymer type manufactured by "Thiokol Chemical Corporation" and bearing "Thiokol Chemical Corporations" Tested and Approved" seal. Sealant shall be delivered to the job site in sealed containers.

- B. Two-part Sealant shall conform to "Thiokol's" Building Trade Performance Specifications, as follows:
- Class A (Self -Leaving): For joints in horizontal surfaces.
- Class B (Non-sag): For joints in vertical surface
- Type I (hardness: 20-35 Shore A): For caulking, glazing, and sealing vertical surfaces, and non-traffic bearing horizontal surfaces.
- Type II (hardness: 35-45 Shore A): For caulking and sealing horizontal surfaces subject to foot and light vehicular traffic or abrasion.
- C. One part Sealant shall conform to "Thiokol's" Building Trade Performance Specification, as a non-sag compound for caulking, sealing and glazing joints in vertical and horizontal non-traffic bearing surfaces.
- D. Primer, where required, shall be used as recommended by the manufacturer of the sealant, having been tested for staining and durability on samples of actual surfaces to be sealed.
- E. Backup materials and preformed joint filters shall be non-staining, compatible with sealant and primer, and a resilient foam, sponge rubber, or of a supporting type, such as closed cell rigid foam, cork, or non-impregnated fiberboard. Materials impregnated with oil, bitumen or similar materials shall not be used Sealant shall not adhere to back-up material and shall be as recommended by the Sealant Manufacturer.
- F. Bond Breakers, where required, shall be polyethylene tape or other materials as recommended by the Sealant Manufacturer.
- G. Solvents, cleaning agents and other accessory materials shall be as recommended by the Sealant Manufacturer.
- H. Approved suppliers: Presstite Division, Inter-Chemical Corp., El Segundo; BFC Division, Essex Chemical Corp., La Mirada; H.B. Fred Kuhl's, Inc., or Sonneborn Building Products, Inc.
- I. Firestop Sealing around Ductwork: Provide firestop caulking seal material around all new a.c. ducts through fire-rated walls and partitions. Material shall be 3M Brand Fire Barrier CP 25WB Caulk, which is an intumescent endothermic, water- base, paintable one-part sealant. The caulk shall be capable of expanding a minimum of three times. The material shall be thixotropic and be applicable to overhead vertical and horizontal firestops. The material shall meet the criteria of ASTM E 814, Fire Test, tested under positive pressure.

3.00 EXECUTION

3.01 PREPARATION

- A. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied paint or primer must allow the sealant to adhere permanently or be entirely removed.
- B. Porous materials, such as concrete, shall be cleaned where necessary by grinding, blast-cleaning, mechanical abrading, acid washing or combination of these methods as required to provide clean, sound base surface for sealant adhesion.
- C. Latency shall be removed by acid washing, grinding or mechanical abrading.
- D. Form oils shall be removed by blast-cleaning.
- E. Loose particles present or resulting from grinding, abrading, or blast-cleaning shall be removed by blowing out joints with compressed air, oil free, or vacuuming joints prior to application of primer or sealant.
- F. Non-porous surfaces, such as metal shall be cleaned either mechanically or chemically. Protective coatings on metallic surfaces shall be removed by a solvent that leaves no residue. Solvent shall be used with clean white cloths or lintless paper towels. Do not allow solvent to air dry without wiping. Joint areas shall be protected with masking tape or strippable films and be cleaned as above after removal of tape.
- G. All joints to receive sealant shall be clean. Do not seal joints until they are in compliance with the drawings and specification requirements.
- H. Joints to receive sealant shall be a minimum of 1/4" wide by 1/4" deep, unless otherwise approved
- I. For joints in concrete, depth of the sealant may be equal to the width in joints up 1/2" wide. For expansion and other joints 1 to 2 inches wide; depth shall not be greater than 1/2 of the applied sealant width. For joints exceeding 2 inches in width; depth shall be as directed by sealant manufacturer.
- J. For joints in metal, and other non-porous surfaces; sealant depth shall be a minimum of 1/2 the applied sealant width and shall in no case exceed the applied sealant width.

- K. Joints to receive sealant, back-up material or preformed joint filler shall be cleaned and/or raked to 1 1/2 inch width and depth as required.
- L. Joints shall be of sufficient width and depth to accommodate specified back-up material or preformed joint filler and sealant. Concrete shall be fully cured and free of laitance, loose aggregate, form release agents, curing compounds, water repellents, and other surface treatments. If surface treatments are present, test for adhesion before proceeding with sealant work.

3.02 APPLICATION

- A. Install back-up material or joint filler, of type and size required at proper depth in joint to provide sealed dimensions as detailed. Back-up material shall be of suitable size and shape so that, when compressed (35% to 50%), it will fit in the joint as required. Sealant shall not be applied without back-up material, and, if necessary, bond breaker strip. When using back-up of hose or rod stock, roll the material into the joint to avoid lengthwise stretching. Hose or rod stock shall not be twisted or braided. Use specified bond breaker strip between sealant and supporting type back-up material. Bond breaker shall be used in all joints where sufficient room for back-up does not exist.
- B. Apply masking tape, where required, in continuous strips in alignment with joint edge. Remove tape immediately after joints are sealed.
- C. Prime surfaces, where required, with primer as recommended by the Sealant Manufacturer.
- D. Follow sealant manufacturer's instructions regarding mixing & surface preparation, priming, application life and application procedure.
- E. Apply tool and finish sealant as required. When tooling white or light colored sealant, use clean water or tooling solution recommended by the Sealant Manufacturer.
- F. Clean adjacent surfaces free of sealant or soiling resulting from this work, as the work progresses. Use solvent or cleaning agent as recommended by the Sealant Manufacturer. All finished work shall be left in a neat, clean condition.

END OF SECTION

DIVISION 08 - OPENINGS
08 10 00 – DOORS & FRAMES

PART 1- GENERAL

The requirements and Conditions of Contract and Division 1 apply to the work of this Section.

1.01 WORK INCLUDED

The work of this Section shall include all labor, materials, tools, transportation and services required to furnish and install all metal doors and frames, complete with all trim, and related work including but not limited to new units in new openings, the removal of existing units, where new units are scheduled, and the preparation of existing openings to receive new units. Provide shop drawings for Architect and City Project Manager's written review prior to ordering any Doors or frames. Section includes hinged or pivoting doors and fixed panels with stile and rail construction and doors with fixed panels with flush panel construction; solid or hollow cores; metal veneers, fire-rated and doors without fire rating, steel doors, and steel frames.

1.02 FIELD VERIFICATION

Contractor shall field verify all existing dimensions at the job site prior to ordering any door or frame unit. Contractor shall insure new units will fit within new openings. Contractor shall report to the Architect any discrepancies and or variations so that doors and frames can be ordered in the appropriate sizes. No claims for extra work or faulty measurements or reliance on drawing dimensions will be allowed. Contractor is responsible for a first class workmanlike installation.

1.03 REFERENCES

American National Standards Institute (ANSI) 250.6 – Hardware on Standard Steel Doors (Reinforcement-Application).

ANSI 250.7 – Nomenclature for Standard Steel Doors and Steel Frames.

ANSI 250.8 – Recommended Specifications for Standard Steel Doors & Frames.

ANSI/DHI (Door Hardware Institute) A115.IG – Installation Guide for Doors and Hardware.

NFPA (National Fire Protection Association) 80 – Standard for Fire Doors and Hardware.

1.04 QUALITY ASSURANCE

Requirements of Regulatory Agencies: Where fire-rated doors are shown or required, provide doors bearing Underwriters' Laboratories or Warnock-Hersey, conforming to manufacturer's standard procedures filed with and approved by the labeling agency. Make no changes to labeled doors in the field, which could cause labels to become void.

Installer Qualifications: Experienced in performing work of this section who have specialized in installation of work similar to that required for this project.

1.05 SUBMITTALS

Product Data: Submit manufacturer's specifications for all wood and metal doors.

Certificate: Submit certificate by door manufacturer that doors supplied conform to or exceed requirements of these specifications.

1.06 DELIVERY, STORAGE AND HANDLING

Comply with manufacturer's instructions for on-site storage and handling or refer to WDMA instructions.

1.07 WARRANTY

Manufacturer's standard warranty document executed by an authorized company official will be submitted to the city. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract documents.

Warranty shall include all re-hanging and refinishing costs.

PART 2 – PRODUCTS

2.01 MATERIALS

Metal Doors and frames shall be Steelcraft, UL Rated and labeled as scheduled. Refer to drawings for doors and frames that require a fire rating.

Certification: Submit certification by manufacturer that doors and frames provided meet or exceed the requirements of these Specifications

- A. All metal doors shall be type L-18, 18 gauge. Double leafs shall have one active, and one inactive leaf with overlapping astragal.
- B. Steel door frames shall be F16, 16 gauge, for use with drywall, masonry, or concrete construction.

PART 3- EXECUTION

3.01 INSTALLATION

- A. Templates for hardware shall be provided by the Finish Hardware Contractor. Cut-outs, tapping, and drilling shall not be performed until these templates are received from the hardware contractor and shall be made in strict accordance therewith.
- B. Set all hollow metal frames to dimensions and elevations as applicable to the condition and as indicated on the drawings. Set plumb, square, true, without twist at correct elevation and symmetrically place in all openings. Frames and doors shall be set and hung in such a manner so as to ensure the bottom of the doors being perfectly level at any position of the swing. comply with Door and Hardware Institute (DHI) installation standards.
Fire Doors and Frames: Install in accordance with NFPA 80, current edition, unless specified otherwise.
- C. Provide anchors suitable to match the condition of the installation and in quantities per frame unit to achieve stability and the required fire rating.
- D. Make no changes in the field which could void the required fire ratings.
- E. Comply with Door and Hardware Institute (DHI) installation standards. Fire doors and frames shall comply with NFPA 80, current edition.

- F. Finish exposed welds to present a smooth, uniform surface, and touch-up with a rust inhibitive primer.
- G. Protect all installed products and finished surfaces from damage during construction.
- H. Touch-up exposed surfaces scratched or marred during shipment, installation, or handling. Paint final finish doors and frames. Colors to be selected by the City Project Manager.
- I. Coordinate installation of glass and glazing, as req'd. Install glazing materials and silencers.

3.02 ADJUSTING

Adjust hinge sets, locksets, and other hardware. Lubricate using a suitable lubricant compatible with door and frame coatings. Adjust door for smooth and balanced door movement. Remove temporary covering and protection from adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions before owner's acceptance.

3.03 PROTECTION

Protect installed product and finished surfaces from damage during construction.

END OF SECTION

DIVISION 08 – OPENINGS
08 51 13 – ALUMINUM WINDOWS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Extruded aluminum windows with fixed and operating sash.
- B. Glass and glazing.
- C. Operating hardware and insect screens.
- D. Perimeter sealant.

1.2 REFERENCES

- A. AAMA 101 - Voluntary Specifications for Aluminum Prime Windows and Sliding Glass Door.
- B. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- C. ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.
- D. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- E. ASTM E331 - Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- F. ASTM E547 - Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
- G. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 6.
- H. CEC - California Energy Commission.
- I. FS RR-W-365A - Wire Fabric (Insect Screening).
- J. NFRC - National Fenestration Rating Council.
- K. NAAMM - National Association of Architectural Metal Manufacturers.
- L. SIGMA - Sealed Insulating Glass Manufacturers Association.
- M. UFC 4-010-01, October 2013 Update - DoD Minimum Antiterrorism Standards for Buildings
- N. ASTM F2248 - Standard Practice for Specifying an Equivalent 3-

Second Duration Design Loading for Blast Resistant Glazing
Fabricated with Laminated Glass.

- O. ASTM F1642 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.
- P. ASTM F2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings.

1.3 PERFORMANCE REQUIREMENTS

- A. Comply with air infiltration, water penetration and structural performance requirements indicated in AAMA 101 for the type, grade and performance class of window units required.
- B. Provide current certified AAMA test report that reflects the window configuration and type specified.
- C. Test each type and size of required window unit through a recognized testing laboratory or agency, in accordance with ASTM E330 for structural performance, with ASTM E283 for air infiltration and with both ASTM E331 and ASTM E547 for water penetration. Provide certified test results.
- D. Thermal Performance: Overall U-value of 1.02 as rated in accordance with the National Fenestration Rating Council's (NFRC) 100 Rating Procedure or in accordance with default table method approved by the California Energy Commission (CEC). Provide certified test results.
- E. Air Leakage: Infiltration rates shall not exceed 0.3 cfm/ft. squared of window area when tested according to The National Fenestration Rating Council's (NFRC) 400 Rating Procedure or ASTM E283 at a pressure differential of 6.24 pounds/ft. squared. Provide certified test results.
- F. Solar Heat Gain Coefficient (SHGC): The SHGC shall be rated in accordance with The National Fenestration Rating Council's (NFRC) 200 Rating Procedure or in accordance with the default table method approved by the California Energy Commission (CEC). Provide certified test results.
- G. Exterior windows must be tested or analyzed to provide an acceptable Level of Protection from blast loading in accordance with Standard 10 of the October 2013 update of UFC 4-010-01. Systems and anchorage to supporting structural elements must provide adequate resistance to the project-specific design blast loads provided in Section 08 39 53 - Blast-Resistant Windows and Doors.
- H. Per UFC 4-010-01, monolithic glass and acrylic is not allowed for

exterior windows as a single lite or the inner lite in an insulating glass window. Polycarbonate or other glazing systems that can be shown to provide the response required in UFC 4-010-01 are allowed because they limit fragment hazards during a blast event.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Include wall opening and component dimensions; wall opening tolerances required; anchorage and fasteners; affected related work; installation requirements.
- C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- D. Submit samples under provisions of 01 33 00.
- E. Submit two samples 12 x 12 inches in size illustrating window frame sections, corner section, mullion section, screen and frame.
- F. Submit two samples of operating hardware.
- G. Submit manufacturer's certificate under provisions of 01 33 00 that window units meet or exceed specified requirements.
- H. Submit blast test data and/or calculations showing conformance with UFC 4-010-01 and an acceptable Level of Protection from the design blast loads.

1.5 QUALITY ASSURANCE

- A. Label to be permanently affixed to frame listing certified U-value, certifying organization and rating procedure.
- B. Label to be temporarily affixed to frame certifying that U-value, SHGC, and air infiltration requirements of California Building Code (CBC), California Code of Regulations (CCR), Title 24, Part 6, Section 110 have been met.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect window units under provisions of Section 01 61 00.
 - le wrapping or strippable coating to protect prefinished aluminum surfaces.

1.7 WARRANTY

- A. Provide five year manufacturer's and SIGMA warranty under provisions of Section 01 77 00.
- B. SIGMA Warranty: Include coverage of insulated glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Manufacturers Warranty: Include coverage for materials and finish.

2. PART 2 PRODUCTS

21 ACCEPTABLE MANUFACTURERS

- A. Horizontal Sliding Windows: HS-HC40 type, grade, and performance class.
 - 1. EFCO Corporation, 3500 Series, www.efcocorp.com.
 - 2. Graham Architectural Products, 200 Series, www.grahamarch.com.
 - 3. Kawneer Company, Inc., 8400 Series, www.kawneer.com.
 - 4. Moduline Window Systems, 54P Series, www.vistawall.com.
 - 5. TRACO, 6800 Series, www.traco.com.
- B. Substitutions: Under provisions of Section 01 25 13.

22 MATERIALS

- A. Extruded Aluminum: ASTM B221, 6063 alloy, T5 or T6 temper.

23 FABRICATED COMPONENTS

- A. Frames: Nominal 2 inches wide x 1 inches deep profile, of non-thermally broken, flush glass stops of snap-on type with capped sill ends.
- B. Horizontal Sliding Window: Sash verticals to telescope into sash horizontals; corners to be of screw spline construction. Aluminum extrusion wall thickness for frame sections; 0.062 inch, sill; 0.094 inch. Locking device; Continuous interlock at meeting rail.
- C. Fasteners: Stainless steel.

24 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: Specified in Section 08 80 00.
- B. Glass: Clear, tinted, single pane, sealed insulated units of tempered laminated glass.

25 SEALANT MATERIALS

- A. Sealant and Backing Material: As specified in Section 07 92 00.

26 FABRICATION

- A. Fabricate windows allowing for minimum installation clearances and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit joints and corners. Accurately fit and secure corners tight. Make corner joints flush, hairline, and weatherproof. Seal corner joints with sealant.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Provide internal reinforcement in mullions to maintain rigidity,
- G. Shop glaze window units in accordance with manufacturer's instructions.

27 FINISHES

- A. Clear Anodized Finish: NAAMM AA-MIZ-C22-A41.
- B. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

3. PART 3 EXECUTION

3.1 INSPECTION

- A, Verify wall openings are ready to receive Work of this Section.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install window frames, glass, glazing, and hardware in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely attach frame to structure.
- C. Align window frame plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.

D. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier.

E. Install sealant and backing materials

as specified in Section 07 92 00. F,

Adjust operable hardware for

smooth operation and tight fit of sash.

3.3 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Wash down exposed surfaces using a solution of mild detergent in warm water. Rinse with clean water, and wipe dry with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

DIVISION 09 - FINISHES
09 20 00 – PLASTER & GYPSUM BOARD

PART 1 - GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

A. Field Conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to the Architect all conditions which prevent proper execution of this work.

B. Codes: Materials and work shall conform to the governing Building Code. In case of conflict between these Specifications, the Reference Specifications, and the Building Code, the more stringent shall govern.

C. Reference Specifications: Except as may be modified by these Specifications and applicable laws and ordinances at the place of building, this work shall be installed in conformance with the requirements of "Standard Specifications for Gypsum Wallboard Interior Finishes" as approved by the American National Standards Institute, ANSI #A97.1.

D. Acceptable manufacturers: United States Gypsum Co., Genstar Building Materials Company, Gold Bond Building Productions, and/or Domtar.

1.01 DESCRIPTION

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified, and as necessary to complete the Contract, including, but not limited to these major items:

- A. Gypsum wallboard (drywall) construction for walls, ceilings, furring, and patchwork (as applicable), where and as shown on drawings.
- B. Joint and corner reinforcing, adhesive, tape, and finishing.
- C. Drywall accessories.
- D. Multiple layer application.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Gypsum wallboard for walls, ceiling, soffits, furring, patchwork, etc. shall conform to requirements of ASTM C840 (GA-214-M-96). Tapered edge sheets shall conform to ASTM C36; thicknesses as indicated. Use Type "X" one hour gypsum board where noted and where required by code and water resistant gypsum board in restrooms, beverage service areas, and potentially wet areas.
- B. Joint reinforcing tape, adhesive, metal corner reinforcement and metal edge trim. Standard products recommended by the manufacturer of the gypsum drywall shall be used in the work.

- C. Fasteners: Self-drilling, self-tapering, countersunk drywall screws, shall be used for attachment of wallboard to wood studs. Screw lengths shall be as recommended by the manufacturer for the wallboard thicknesses used.

PART 3 - EXECUTION

3.01 WALLBOARD APPLICATION

- A. Perform all wallboard installation and finishing in accordance with ASTM C840 and the wallboard manufacturer's specifications. Cutting and installing: Cut gypsum wallboard by scoring and breaking or by sawing, working from the face side. Sand cut edges and ends where necessary to obtain neat joining when wallboard is erected. Score cutouts or small openings in wallboard in outline before knocking out or cut out with a saw; do not punch. Neatly scribe wallboard meeting projecting surfaces.
- B. Fasteners: Space fasteners at 12" o.c. in the field and 8" o.c. staggered along abutting edges, or closer where required by fire resistive construction code. While fasteners are being driven, hold the wallboard in firm contact with the underlying support. Proceed from the central portion of the wallboard toward ends and edges, using power screwdriver recommended by the wallboard manufacturer to drive screws. Drive home with heads slightly below wallboard surface in a dimple formed by the fasteners head. Take care to avoid breaking the paper face. Place fasteners not closer than 3/8" from ends or edges of wallboard. Space screws according to code approvals. Use Type W screws for attaching wallboard to wood supports per ASTM C954. Nails will not be permitted. Screws shall be corrosion resistant, self tapping, bugle head, spiral threaded, minimum length 3 times the wallboard thickness. Do not install wallboard until building is weather tight. Conform to fire rating requirements, building code approvals, and requirements herein. Apply 1/8" continuous beads of adhesive on faces of studs and joists to receive wallboard. Adhesive shall be Miracle DSA-20 Structural Drywall Adhesive. Temperature: Maintain temperature between 55 degrees F. and 70 degrees F. within building during installation. Furnish ventilation to eliminate excessive moisture.
 - a) Openings: Accurately cut and fit the wallboard at openings. At door and other openings, cut wallboard to continue across area above opening head; do not cut wallboard to both jambs and fill in area over openings with separate pieces. Make the dimension from the joint over head of an opening to jamb of openings 6" minimum. Stagger joints on opposite side of partition.
 - b) Single Layer Walls: Place wallboard horizontally with the long dimension across the studs or in one-piece vertical heights, vertical joints centered on supports and staggered on walls so as not to occur at the same location on opposite sides of the same stud. To minimize end joints, use wallboard sheets of maximum practical lengths. Arrange joints on opposite sides of partition to occur on different studs. Secure to each stud and plate with screws keeping screws 3/8" from edges. Where required to accommodate deflection, or where required by building code, omit screws on top plate.
 - c) Place corner beads at external corners. Place "L" edge trim where gypsum board abuts dissimilar materials. Metal trim and corner beads shall conform

to ASTM C1047, hot dipped galv. steel w/ taping flanges, and corner beads at outside corners.

3.02 FINISHES

A. Gypsum wallboard finish shall conform to requirements of ASTM C840 (GA-214-M-96).

1. Levels used on the project are described as follows:

- a) Level 0: No taping, finishing, or accessories required.
- b) Level 1: All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
- c) Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
- d) Level 3: All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Note: The prepared surface shall be coated with a drywall primer prior to the application of final finishes. See Section 09900 – Paints and Coatings specification in this regard.
- d) Level 4: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Note: The prepared surface shall be coated with a drywall primer prior to the application of final finishes. See Section 09900 – Paints and Coatings specification in this regard.
- e) Level 5: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound or a material manufactured especially for this purpose shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: The prepared surface shall be coated with a drywall primer prior to the application of final finishes. See Section 09900 – Paints and Coatings specification in this regard.

B. Joint Treatment and Finishing

- 1. All Levels: Apply tape bedding compound, tape, and finishing compound on joints in wallboard as required for specified levels of finish.

2. Levels 3 through 5: Apply joint bedding compound and finishing compound over screw heads. Treat all inside corners with joint bedding compound, tape, and finishing compound. Treat outside corners with corner beads, bedding compound and finishing compound. Provide metal casing beads at all edges of gypsum wallboard that abut ceiling, wall, or column finish, and elsewhere as required, such as openings, offsets, etc. Make all exposed joints, trims, and attachments non-apparent following application of paint or other finishes; if the joints and fasteners are apparent, correct defects as directed with no additional contract cost. Seal the raw edges of plumbing openings and of boards that have been cut to fit with sealing compound brushed on. When entire installation is completed and prior to installation of finish materials by other trades, correct and repair broken, dented, scratched, or damaged wallboard.
3. Levels 3 through 5: Apply one coat of high solids primer over entire surface.

C. Required Levels of Finish

1. Unless otherwise indicated or specified, levels of finish required shall be as follows:
 - a) Level 1: Plenum areas above ceilings, insides of shafts, and other concealed areas.
 - b) Level 2: Where water resistant gypsum backing board (ASTM C 630) is used as a substrate for tile; use also where surface appearance is not of primary concern.
 - c) Level 3: Where appearance areas are to receive heavy or medium texture (spray or hand applied) finishes before final painting, or where heavy grade wallcoverings are to be applied as the final decoration. Not recommended where smooth painted surfaces or light to medium wallcoverings are used.
 - d) Level 4: Where flat paints, light textures, or wallcoverings are to be applied. Not to be used in areas where sheer gloss, semi-gloss, and enamel paints are to be used.
 - e) Level 5: Where gloss, semi-gloss, enamel, or non-textured flat paints are used or where severe lighting conditions occur.

D. Air Sealing

Seal connections between shaft walls, ducts, plenums, and building structure airtight with specified sealant compound or tape and cement, including vertical shafts.

E. Textured Finish

1. Textured finish material shall be applied to wallboard-covered walls in the Stage room areas. Finishing material shall be delivered in dry form in its original, sealed container showing proper mixing instructions.
2. Gypsum wallboard surfaces shall be inspected for defects prior to applying texture coat and all surfaces to be covered with texture material shall be free of dust, dirt and foreign substances. All open circuit breaker panels, all exposed electrical devices and all other similar mechanical and electrical equipment close enough to become contaminated by texture material overspray shall be masked off. Wallboard joints shall be taped and all outlet boxes and nails shall be spackled with joint finishing compound. After joint finishing compound is thoroughly dry, apply one coat of high solids primer over all wallboard surfaces prior to applying texture.

3. Texture material shall be mixed in a clean mechanical mixer or large tank with a portable drill motor. At first, finishing material shall be power-mixed with water in ratio recommended by texture material manufacturer. Then an additional 2 to 3 gallons of water per bag shall be added to mixer and mixing shall be continued for an additional 5 minutes. Should consistency be too heavy for spray equipment after mixing, a slight amount of water may be added to yield desired viscosity. Appropriate precautions shall be taken to avoid excess water.
4. Finishing texture shall be applied by a suitable spray gun capable of developing at least 36 psi air pressure at nozzle. Gun orifice shall be sized depending upon pressure developed and be in accordance with texture material manufacturer's instructions. Spraying shall be performed with standard procedures to assure complete coverage of areas indicated on drawings to receive textured finish. Finished appearance of material shall be light orange peel. Submit four (4) 8"x 10" samples of texture coat for written review and acceptance by the Architect and City Project Manager, prior to any texture coating application.

Windows and all other adjacent surfaces not scheduled to receive this textured finish shall be protected from water or texturing materials. All damaged and defective areas shall be repaired to match their condition before having become damaged.

3.03 MECHANICAL AND ELECTRICAL WORK

Coordinate with Mechanical and Electrical trades in the location and installation of their work. Provide bridging, bracing, and backing to support their work installed in or on drywall construction. Do not close both faces of walls until their installations have been inspected and approved.

3.04 FIRE-RESISTIVE CONSTRUCTION

Construct walls and ceilings in accordance with the requirements of the governing Building Code for the time rating indicated or required.

3.05 CLEANING

Inspect the completed installation. Fill all cracks or depressions with compound and finish smooth and flush with adjacent surfaces. Check all trim for accurate alignment, neat joints between trim and other materials, and repair all defects.

END OF SECTION

DIVISION 09 - FINISHES
09 30 00 – TILE SETTING MATERIALS & ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface Preparation Products: Backerboards, Self-Leveling Underlayments, Waterproofing, Uncoupling and Crack Isolation Membranes, Pre-formed Shower Pan, Sound Reduction Mat Underlayments.
- B. Setting Materials: Architecturally Engineered Mortar Systems, Thin-Set Mortars, Large and Heavy Tile Mortars (formerly Medium Bed), Rapid Setting Mortars, Chemical Resistant Mortars, Ceramic Tile Adhesives.
- C. Colored Tile Grouts: Sanded, Non-Sanded, High-Performance, Single Component, and Epoxy Grouts.
- D. Tile and Stone Care and Maintenance Products.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 07 14 00 - Fluid-Applied Waterproofing.
- C. Section 07 90 00 - Joint Protection.
- D. Section 09 26 00 - Veneer Plastering.
- E. Section 09 28 13 - Cementitious Backing Boards.
- F. Section 09 21 16.23 - Gypsum Board Shaft Wall Assemblies.
- G. Section 09 30 00 - Tiling.
- H. Section 10 28 13.13 - Commercial Toilet Accessories.

1.3 REFERENCES

- A. ANSI A108 Series - American National Standards for Installation of Ceramic Tile.
- B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile,
- C. ANSI A118 Series - American National Standards for Installation of Ceramic Tile.
- D. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
- E. TCNA - Handbook for Ceramic Tile Installation.
- F. TTMAC - Terrazzo, Tile and Marble Association of Canada.
- G. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- H. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products of this section with minimum ten years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.
 - 1. Installer shall be a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
 - 2. Installer's on site supervisor shall hold the International Masonry Institute's Foreman Certification.
 - 3. Installer shall employ Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
 - 4. Installer shall be a member in good standings with the Terrazzo, Tile and Marble Association of Canada.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Locate mock-ups on site in locations and size directed by Architect.
 - 2. Finish areas designated by Architect.
 - 3. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 4. Refinish mock-up area as required to produce acceptable work.
 - 5. Retain and maintain mock-ups during construction in undisturbed condition as a standard for judging completed unit of Work.
 - 6. Obtain Architect's acceptance of mock-ups before start of final unit of Work.
- D. Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage and contamination to materials by water, freezing, foreign matter and other causes.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. 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.

- B. Environmental: Install mortar, set and grout tile when surfaces and ambient temperature is minimum 50 degrees F (10 degrees C) and maximum 90 degrees F (32 degrees C). Consult with manufacturer for specific requirements.
- C. Do not install mortar, set or grout tile exterior when inclement weather conditions are expected within 48 hours after work is completed unless properly protected.
- D. Protection: Protect adjacent work surfaces during tile work. Close rooms or spaces to traffic of all types until mortar and grout has set.
- E. Safety: Observe the manufacturer's safety instructions including those pertaining to ventilation.

1.8 WARRANTY

- A. Products shall be provided with the manufacturers standard warranty as follows:
 - 1. Installation Systems Limited Warranty:
 - a. _____.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Custom Building Products, which is located at: 5 Concourse Pkwy. Suite 1900; Atlanta, GA 30328; Toll Free Tel: 800-282-8786; Fax: 800-200-7765; Email: [request info \(jackiel@cbpmail.net\);](mailto:request info (jackiel@cbpmail.net);) Web: <http://www.custombuildingproducts.com/architects.aspx>
 - 1. USA Email: request info michael.micalizzi@cbpmail.net.
 - 2. Canada Email: request info John.Alley@cbpmail.net.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 MATERIALS

- A. Waterproofing and Crack Isolation Membrane: Where indicated on the Drawings, and elsewhere as required for thin-set tile installations and complying with ANSI 118.15 for waterproof membranes.
 - 1. Custom Building Products RedGard Waterproofing and Crack Prevention Membrane. For more information visit <https://www.custombuildingproducts.com/TDS/TDS-104.pdf>
 - 2. Custom Building Products RedGard Fabric Membrane. For more information visit <https://www.custombuildingproducts.com/TDS/TDS-104.pdf>
- B. Cementitious Tile Adhesives:
 - 1. ANSI A118.4, Modified Dry-Set Cement Mortars: Where indicated on the Drawings, and elsewhere as required for setting tile as specified by ANSI A108.5, Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar, over substrates prepared accordingly.
 - a. For Installing Large Format Ceramic or Natural Stone Tile (Tile with one edge greater than 15 inches), utilizing a Medium bed Mortar System.
 - 1) Custom Building Products ProLite Premium Large Format Tile Mortar. With Shear Bond Strengths greater than 400 psi, per ANSI A118.4 sec. 5.2.4. Excellent non-sag and non-slump qualities for wall application; also floors. For more information visit <https://www.custombuildingproducts.com/TDS/TDS-114.pdf>

- C. Tile Grout: Where indicated on the Drawings, and elsewhere as required for filling the joints between tiles. Complies with ANSI A108.10 Installation of Grout in tile work.
 - 1. Polymer-Modified Portland Cement Grout:
 - a. Custom Building Products Prism Ultimate Performance Grout, ANSI A118.7, for joints 1/8 inch (3 mm) - 1/2 inch (13 mm). Standard cement grout for wide joints. For more information visit <https://www.custombuildingproducts.com/TDS/TDS-128.pdf>
- D. Ceramic and Natural Stone Tile Care and Maintenance: Required for proper maintenance of the completed tile assembly.
 - 1. Aqua Mix Sealer's Choice Gold: Water-based, penetrating sealer to provide maximum stain protection. Ready for use in as little as 4 hours. For more information visit <https://www.custombuildingproducts.com/TDS/TDS-158.pdf>

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces, which are to receive tile.
- B. Do not proceed with work until defects or conditions which would adversely affect quality, execution and permanence of finished tile work are corrected (ANSI A108.3).
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Condition of surface to receive tile.
 - 1. Assure that surfaces to receive tile are stable, flat, firm, dry, clean and free of oil, waxes and curing compounds, must meet ANSI A108.1 requirements and be suitable for the specific project usage.
 - 2. Deflection of substrate not to exceed 1/360th of the span 1/2 inch (12 mm) in 15 feet (4.6 m) in accordance with ANSI A108.01-2.3. Allow for live and impact load as well as dead load weight of tile and setting bed.
 - 3. Protect adjacent surfaces prior to beginning tile work.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Surface Preparation for Tile and Stone Work.
 - 1. General:
 - a. All supporting surfaces shall be structurally sound, solid, stable, level, plumb, and true to a tolerance in plane of 1/4 inch (6 mm) in 10 feet 0 inch (3 m) for walls, 1/4 inch (6 mm) in 10 feet (3 m) for floors when specified for thin-set method. When installing large format tile with one side greater than 15 inches or 38 cm, the tolerance is reduced to 1/8 inch in 10 feet (3 mm in 3 m). ANSI A108.01 section 2.6.2
 - b. Surfaces shall be clean and free of dust, oil, grease paint, tar, wax, curing compound, primer, sealer, form release agent, laitance, loosely bonded topping, loose particles and deleterious substance and debris which may prevent and reduce adhesion.

- c. Mechanically sand and scarify the substrate to completely remove all paint, loosely bonded topping, loose particles and construction debris.
 - d. Neutralize any trace of strong acid and alkali.
 - e. All substrates shall be dry. The moisture content shall not exceed 50 percent.
 - f. Turn off all forced ventilation and radiant heating systems and protect work against drafts during installation and for a period of at least 72 hours, at 70 degrees F / 21 degrees C, after completion. Use indirect auxiliary heaters to maintain the temperatures in the area at the recommended workable level. Vent temporary heater to exterior to prevent damage to tile work from carbon dioxide build-up.
 - g. Presswood, particleboard, chipboard, masonite, gypsum floor patching compounds, asbestos board, Luan and similar dimensionally unstable materials are not acceptable substrates.
 - h. Before work commences examine the areas to be covered and report any flaw or adverse condition in writing to the architect and to the general contractor. Do not proceed with work until surfaces and conditions comply with the requirements indicated in ANSI A108 specifications.
2. Concrete and Masonry:
 - a. Concrete and Masonry surfaces must comply with ANSI A108.01 Section 3.2.
 - b. All concrete substrates shall be at least 28 days old, completely cured and free of hydrostatic conditions, and/or excessive moisture problems.
 3. Plywood:
 - a. Plywood subfloor and underlayment must comply with ANSI A108.01 section 3.4.
 4. OSB Panels:
 - a. OSB panel is not a suitable surface for direct bonding ceramic tile. OSB is to be coated with Custom Building Products Multi-Surface Bonding Primer or RedGard Waterproofing and Anti-fracture membrane prior to the installation of ceramic tile.
 5. Backerboard Units Installation of Floors, Decks or Countertops:
 - a. Cementitious Backerboard shall be installed per the guidelines in ANSI A108.11.
 6. Wall and Ceiling Installation
 - a. Wall and Ceiling surfaces must comply with ANSI A108.01 Section 2.5.
 7. Gypsum surfaces:
 - a. Gypsum underlayment must have 2000 psi (13.8 MPa) compressive strength and be sealed prior to covering. For areas subject to water exposure, a waterproofing membrane is required.
 - b. Gypsum Board shall be installed per the guidelines of ANSI A108.01 Section 3.5.
 8. Steel:
 - a. Steel substrates shall be rigid, solidly fixed, dry, well sanded and free of dust, oil, grease, primer and all deleterious substances, which may prevent or diminish the bond. Consult with steel substrate manufacturer for acceptable cleaning methods. Mechanical scarification may result in loss of protective coatings and result in oxidation of steel substrates and is not an acceptable means of preparation.
 9. Tiling over old substrates:
 - a. Old cement terrazzo, ceramic tile paver, quarry tile, vinyl and vinyl composition floor coverings other than cushion vinyl shall be sound, solidly in place, flawless, stripped or sanded, clean, free of dust, wax, grease, sealers, soap residue and all other deleterious substances which may prevent or reduce the adhesion. For further details, ANSI A108.01, Section 2.6.2.
- C. Install tile in accordance with appropriate ANSI A108 specifications and the installation material manufacturer's most recently published instructions.

- D. Expansion joints, control joints, insulation joints, etc., must be located in and filled with appropriate materials.
 - 1. Joints must be carried through all layers of installation materials including tile, setting bed, mortar bed and reinforcing wire. Refer to TCNA Handbook, EJ171 and ANSI AN-3.8 for details on placement, size and specifications of materials.
- E. Expansion joints, control joints, insulation joints, etc., must be located in compliance with TTMAC 301MJ and filled with appropriate materials.
 - 1. Joints must be carried through all layers of installation materials including tile, setting bed, mortar bed and reinforcing wire. Refer to TTMAC Handbook 301MJ and ANSI AN-3.8 for details on placement, size and specifications of materials.
- F. Install grout in accordance with Grout ANSI A108.10 specifications and the installation material manufacturer's most recently published instructions.
- G. Install elastomeric tile sealant around sinks, tubs and showers and where tile meets tile or another surface. Surfaces should be clean, dry and free of all contamination. Maximum joint width and depth should not exceed 1/4 inch (6 mm).
- H. Pre-Seal or use grout release on tile when required. Seal grout, stone and unglazed tile with an appropriate sealer 48 - 72 hours after grout application at 70 degrees Fahrenheit (21 degrees C) as needed.

3.4 PROTECTION

- A. Protect finished installation under provisions of Section 01 50 00. To avoid damage to finished tile work, schedule floor installations to begin only after all structural work, building enclosure, and overhead finishing work are completed.
- B. Keep all traffic off finished tile floors until they have fully cured. Builder shall provide up to 3/4 inch (19 mm) thick plywood or OSB protection over non-staining, breathable covering to protect floors after installation material has cured. Covering the floor with polyethylene or plywood in direct contact with the floor may adversely affect the curing process of grout and latex/polymer fortified Portland cement mortars.
- C. Due to the slow rate of Portland cement hydration and strength development at low temperatures, protect installations exposed to these conditions from traffic for longer than normal periods. Protect newly installed exterior adhered veneer installations from direct exposure to rain for 7 days at 70 degrees F (21 degrees C). Protection applies to the substrate, the installation of adhesives and joint grouts, post-installation rain and temperature protection until suitable cure, and the storage and handling of the cladding material. Extend period of protection of tile work at lower temperatures, below 60 degrees F (15 degrees C), and at high relative humidity greater than 70 percent relative humidity (R.H.) due to retarded set times of mortar/adhesives. For every 18 degrees F (10 degrees C) below 70 degrees F (21 degrees C) installation materials will take twice as long to cure. Large format tiles require longer curing periods in cooler temperatures. Keep all traffic off the finished work until full cure. Suitable protection is to be included in the scope of work. Each component must reach a proper cure prior to installing the subsequent installation product.
- D. Tent / shade and heat areas that will be subjected to the elements or freezing temperatures during installation and cure periods.
- E. Keep floors installed with epoxy adhesive closed to traffic for 24 hours at 70 degrees F (21 degrees C), and to heavy traffic for 48 hours at 70 degrees F (21 degrees C) unless instructed differently by manufacturer. Use kneeling boards, or equivalent, to walk/work on newly tiled floors.

- F. To Replace or restore work of other trades damaged or soiled by work under this section.

3.5 SCHEDULES

- A. Install tile using TCNA methods indicated on the Drawings.
- B. Install tile using TCNA methods indicated on the Drawings.
1. Floor Tile at _____: Install in accordance with TCNA method _____.
 2. Wall Tile at _____: Install in accordance with TCNA method _____.
 3. Tile on Ceilings and Soffits at _____: Install in accordance with TCNA method _____.
 4. Tile Countertops: Install in accordance with TCNA method _____.
 5. Tile in Showers and Tub Surrounds: Install in accordance with TCNA method _____.
 6. Tile in Pools and Water Features: Install in accordance with TCNA method _____.
 7. Tile in Refrigerated Rooms: Install in accordance with TCNA method _____.
 8. Tile in Steam Rooms: Install in accordance with TCNA method _____.
 9. Tile on Stairs: Install in accordance with TCNA method _____.
- C. Install tile using TTMAC methods indicated on the Drawings.
- D. Install tile using TTMAC methods indicated on the Drawings.
1. Floor Tile at _____: Install in accordance with TTMAC method _____.
 2. Wall Tile at _____: Install in accordance with TTMAC method _____.
 3. Tile on Ceilings and Soffits at _____: Install in accordance with TTMAC method _____.
 4. Tile Countertops: Install in accordance with TTMAC method _____.
 5. Tile in Showers and Tub Surrounds: Install in accordance with TTMAC method _____.
 6. Tile in Pools and Water Features: Install in accordance with TTMAC method _____.
 7. Tile in Refrigerated Rooms: Install in accordance with TTMAC method _____.
 8. Tile in Steam Rooms: Install in accordance with TTMAC method _____.
 9. Tile on Stairs: Install in accordance with TTMAC method _____.

END OF SECTION

DIVISION 09 - FINISHES
09 30 14 – PORCELAIN TILE FLOOR FINISHING

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Porcelain tile floor finish using the full bed application method.
- B. Porcelain tile base.
- C. Threshold at door opening.

1.2 REFERENCES

- A. ANSI/TCA A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- B. ANSI/TCA A108.11 - Interior Installation of Cementitious Backer Units.
- C. ANSI/TCA A118.1 - Dry-Set Portland Cement Mortar.
- D. ANSI/TCA A118.4 - Latex-Portland Cement Mortar.
- E. ANSI/TCA A118.7 - Polymer Modified Ceramic Tile Grouts.
- F. ANSI/TCA A118.9 - Test Methods and Specification for Cementitious Backer Units.
- G. ANSI/TCA A118.12 - Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
- H. ANSI/TCA A137.1 - Specifications for Ceramic Tile.
- ASTM A1064 - Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- A ASTM 04551 - Poly (Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane.
- B MIA - Marble Institute of America.
- C TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01 33 00.
- B. Submit shop drawings indicating tile layout and patterns, color arrangement, perimeter conditions, and junctions with dissimilar materials.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit 4 samples of each tile, to indicate pattern and color variations.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- F. Submit manufacturer's certificate under provisions of Section 01 33 00 that products meet or exceed ANSI/TCA A137.1.
- G. Submit maintenance data under provisions of Section 01 77 00.
- H. Include recommended cleaning and stain removal methods, and cleaning materials.

1.4 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1 for tile material.
- B. Conform to ANSI/TCA A137.1 DCOF AcuTest for coefficient of friction.
- C. Conform to ANSI/TCA Standards and TCA Handbook for tile installation.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum five years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum five years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain 50 degrees F during installation of mortar materials.

1.7 EXTRA MATERIALS

- A. Provide extra quantity of full size tile and trim shape units to Owner under provisions of Section 01 77 00.
- B. Provide quantity equal to 5 percent of units installed of each shape and color.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE

- A. Caesar, www.caesar.it
- B. Crossville Ceramics, www.crossvilleinc.com.
- C. Dat-Tile Corp., www.daltile.com.
- D, Emser Tile, www.emser.fiandre.com.
- C Graniti Fiandre, www.granitifiandre.com.
- D Imola Ceramica, www.imo1aceramica.com.
- E Interceramic, www.interceramic.com.
- F Iris Ceramics, www.irisfmg.com.
- G Portobello America, Inc., www.portobelloamerica.com.
- J. Pantheon Tile, www.pantheontile.com.
- K. Shaw Commercial, www.shawinc.com.
- L. Substitutions: Under provisions of Section 01 25 13.

2.2 TILE MATERIAL

- A. Porcelain Floor Tile: ANSI/TCA A137.1, conforming to the following:

Manufacturer and Pattern	Equivalent to Dat-Tile Porcelalto
Moisture Absorption	0 to 0.5 percent
Size	12 x 12 x ¼ inch
Edge	Square
Surface Finish	Matte
Color	As selected
Coefficient of Friction According to ANSI A137.1 DCOF Acutest	Not less than 0.42 average value wet and dry

- B. Base: Match floor tile for moisture absorption, surface finish, and color; tile size; 12 inch long x 4 inch high; bull-nosed top edge, coved internal and external corner.

2.3 MANUFACTURERS - MORTAR AND GROUT

- A. C-Cure, www.c-cure.com.
- B. Custom Building Products, www.custombuildingproducts.com.
- C.H.B. Fuller Company, www.hbfuller.com.
- D. Hydromet, www.bostikfindley-usa.com.
- E. Laticrete International, Inc., www.laticrete.com.
- F.W.R. Bonsai Company, www.bonsai.com.
- G. MAPEI, www.mapei.com.
- H. Substitutions: Under provisions of Section 01 25 13.

2.4 MORTAR MATERIALS

- A. Portland Cement Mortar Materials: ANSI/TCA A118.1.
- B. Latex-Portland Cement Mortar: ANSI/TCA A118.4 and the following:
 - 1. Acrylic resin latex additive.
 - 2. Dry mortar mix supplied by latex manufacturer.

2.5 GROUT MATERIALS

- A. Portland Cement Grout Materials : ANSI/TCA A118.7.
- B. Latex-Portland Cement Grout: ANSI/TCA A118.7 of color selected and the following:
 - 1. Acrylic resin latex additive.
 - 2. Microban antimicrobial additive, www.microban.com.
 - 3. Dry mortar mix supplied by latex manufacturer.

2.6 ACCESSORIES

- A, Thin Load Bearing Direct Bond Membrane: Chlorinated polyethylene elastomer sheet material laminated with fabric on both sides meeting requirements of ANSI A118.12.
 - 1. Dat-Tile Corp., Dat Seal TS, www.daftile.com.
 - 2. Compoti(e Corp., Composeal Gold, www.compotite.com.

3. NAC Products, Inc., ECB Membrane, www.nac-anti-fracture.com.
 4. Noble Company, Noble Seal TS, www.nobelcompany.com.
 5. Pasco Manufacturing, Inc., Baseline, www.pascospecialty.com.
 6. Substitutions: Under provisions of Section 01 25 13.
- B. Waterproof Membrane: ASTM D4551, Grade 40, polyvinyl chloride sheet.
1. Compotite Corporation, www.compotite.com.
 2. Dat-Tile Corp., www.daltile.com.
 3. Pasco Manufacturing Inc., www.pascospecialty.com.
 4. Noble Company, www.nobelcompany.com.
 5. Substitutions: Under provisions of Section 01 25 13.
- C. Reinforcing Mesh: ASTM A1064, 2 x 2 inch size, of WO.5/WO.5 wire size; welded fabric, galvanized.
- D. Thresholds: Marble complying with Group A of the Marble Institute of America (MIA), color selected by Architect; profile as indicated or selected from manufacturer's standard shapes.
- E. Sealant: Type specified in Section 07 92 00.

27 MORTAR MIX AND GROUT MIX

- A. Mix and proportion pre-mix setting bed bond coat and grout materials in accordance with manufacturer's instructions, and referenced standards.

28 SEALER

- A. Tile and Grout Sealer: Aqua Mix Penetrating Sealer manufactured by Aqua Mix, Inc., www.aguamix.com.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing surfaces.

3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.

- B. Vacuum clean existing surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

tiles before installation to produce an even range of color and finish.

3.3 INSTALLATION - FULL MORTAR BED METHOD

- A. Install mortar bed, tile, and grout in accordance with ANSI/TCA 108.5 and applicable tile installation standards of the TCA Handbook.
- B. Install waterproof membrane material. Extend vertically up wall a minimum of 6 inches. Extend into floor drain. Use recommended solvent cement to weld joints when pan dimensions exceed maximum width of material.
- C. Apply mortar bed over surfaces to a thickness of 2-1/2 and to slopes as shown.
- D. Install reinforcing mesh in middle of mortar bed.
- E. Lay tile to pattern indicated on Drawings, or if not indicated, request from Architect. Do not interrupt tile pattern through openings.
- F. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base, and wall joints.
- G. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight without voids, cracks, excess mortar, or excess grout.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Provide control joints, vertical and horizontal, at not-to-exceed 20'-0" oc. Keep control joints free of mortar or grout. Install joints in accordance with TCA Handbook. Apply sealant to joints.
- J. Allow tile to set for a minimum of 48 hours prior to grouting.
- K. Grout tile joints.
- L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 CLEANING

- A. Clean work under provisions of Section 01 77 00.
- B. Clean tile surfaces.

3.5 SEALING

- A. Install sealer on all surfaces in accordance with manufacturer's recommendations.

3.6 PROTECTION

- A. Protect finished installation under provisions of Section 01 61 00.
- b. Do not permit traffic over finished floor surface for a minimum of 48 hours. After 48 hours and until 72 hours, cover area with 3/8 inch plywood panels if traffic is required.

END OF SECTION

DIVISION 09 - FINISHES
09 51 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

The requirements of conditions of Contract and of Division 1 apply to the work of this Section.

1.01 DESCRIPTION

A. Scope of Work

1. The work of this Section shall include all labor, materials, equipment, and the performing of all operations required to complete all acoustical work as indicated on the drawings, Finish Schedule, and as specified herein.

2. Work Included

a. Metal suspension systems.

b. Acoustical units.

3. Work Not Included

a. Electrical fixtures and electrical work.

b. Gypsum board ceiling and soffits.

c. Mechanical work, (registers, etc.).

B. Permits, Fees, Code Rules, & Safety Orders

All fees and permits required for the completion, inspection, and testing of this work shall be arranged for and paid for by this Contractor. All work and materials shall be in full accordance with the latest rules of the National Board of Fire Underwriters and local, state, and federal ordinances and the Electrical Safety Orders of the Division of Industrial Safety. Regulations of the State Fire Marshall, and any prevailing rules and regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations shall be met. Whenever these Specifications call for or describe a better quality than required by the afore mentioned codes, the provision of these Specifications shall govern the installation. Where the above rules, ordinances, orders, or regulations call for work herein, the Contractor shall furnish all labor, materials, and equipment required to comply therewith.

C. Shop and Installation Drawings

1. The layout of all ceilings, registers, grilles, and lighting fixtures, in each room of space shall be submitted to the Architect for written review. Shop

drawings shall include all installation details. Submittals shall conform to the requirements of the General Conditions.

2. Work shall not be started in the shop or on the job site until the shop and erection drawings, fixture and equipment layout drawings, and samples have been reviewed by the Architect.

3. Samples of the tee bars, connectors, and acoustical materials, shall be submitted for the written review of the Architect.

1.02 MANUFACTURERS

The suspension systems and acoustical units shall be furnished and installed by a franchised and licensed distributor/installer of: Armstrong, Celotex Corp., or U.S. Gypsum products as reviewed by the Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be delivered to the site in manufacturer's unopened containers. Keep all materials dry, clean, and protected from deterioration.

- A. Suspension System: The following general features shall be included in the suspension system: Armstrong - Prelude t-grid installed in 2' x 4' grid as shown on drawings. All exposed metal shall be a low sheen white color. Wall angle shall be formed from 24 gauge cold rolled steel and have 1" x 1" legs finished to match runners. Accessory items such as splice and intersection clips, hold-down clips, wall clips, expansion joints, etc.,
- B. Shall be provided as determined by job conditions.

General Contractor shall provide an Additive Alternate #1 cost to provide Armstrong - Clean Room T-grid in the Beverage Building. All exposed metal shall be a low sheen white color.

C. Hanger wires shall be no less than No. 12 gauge galvanized steel and shall comply with all Building Code Requirements.

2.02 DUCT INTERFERENCES

Where air conditioning ducts above suspended acoustical ceilings interfere with suspension hangers, provide independent framing below the ductwork to support the ceiling as an obligation under this Section. Framing shall be supported from walls or structure above, in an approved manner. In no case can support be achieved by attachment to the ductwork.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Hanger wires shall be attached to the structure by mechanical attachment in accordance w/ Code req's. The wires shall be placed at 48 inches on center. Install wall angle on the ceiling level line, with fasteners 24" on center. Attach main runners to hanger wires at 48" on center and join with clips. Level main runners to within 1/8" in 12' with water level or transit. All suspended ceilings shall conform to California State Title 24 Earthquake Stabilization requirements and to CBC Code requirements. Provide splayed seismic bracing wires as required by Code.

Note: Hanger wires near the grid shall be squeezed closed & excess wire beyond the windings shall be cut off to insure easy lifting and removal of tiles for maintenance w/out damage to tiles.

B. Install cross runners at 24" centers except where otherwise indicated on drawings. Provide painted trims and moldings at walls and other vertical surfaces and penetrations, with joints closely butted, mitered angles, and flush. Lapped joints are not permitted. All attachments shall be concealed. Pop rivets and other exposed fasteners will not be accepted.

C. Touch up with matching white enamel any objectionable scratches on the flanges of runners and wall angle.

D. Install the acoustical units in the suspension systems in accordance with the manufacturer's recommendations. Avoid installation of ceiling panels until all trades have completed the work above the ceiling grid.

3.02 GUARANTEES

All labor and material shall be guaranteed against defects for three years from date of completion, including sagging and disconnection of grid systems, and disintegration of acoustical units.

END OF SECTION

DIVISION 09 - FINISHES
09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

The work of this Section shall include all labor, materials, and equipment required to furnish and install all resilient floor covering, and related work, including floor leveling where and as necessary.

1.02 WORK NOT INCLUDED

Metal thresholds furnished and installed by others.

1.03 SUBMITTALS

A. Product Data:

1. Submit manufacturer's product data, installation instructions, and maintenance recommendations for each material proposed for use.

2. Flooring manufacturer's recommended standard dryness testing results.

B. Samples:

1. Submit verification samples of each product specified in color selected for use.

C. Certificates:

1. Attesting fire rated materials tested by independent testing agency and compliance with specifications.

D. Material Safety Data Sheets (MSDS):

1. Submit MSDS for each manufacturer's recommended adhesive proposed for use.

1.04 QUALITY ASSURANCE

Manufacturer:

1. Provide resilient flooring products, including wall base and accessories from a single manufacturer for each product to ensure surface and color matching.

2. Installer's Qualifications:

a) Installer experienced (minimum of two years) to perform work of this section, who has specialized in the installation of work similar to that required for this project and who is acceptable to the product manufacturer.

3. Materials:

a) For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer. Provide secondary materials that are acceptable to the manufacturer of the primary materials. Comply with applicable regulations regarding VOC (volatile organic compound) content of the adhesives.

1.02 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer's original unopened labeled containers. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.

B. Deliver materials sufficiently in advance of installation to condition materials to room temperature prior to installation.

1.03 PROJECT CONDITIONS

A. Maintain a temperature of 70° F ± 5° in spaces to receive resilient flooring products. Specified temperature shall be maintained at least 48 hours before, during, and 48 hours after the installation. Verify concrete floors are dry to a moisture content of 7%, and exhibit negative alkalinity, carbonization and there is no dusting.

1.04 SEQUENCING

A. Do not start installation until satisfactory moisture testing results are obtained and work of other trades is substantially completed, including painting. Keep the areas of installation and materials at minimum 70 degrees F during and for 10 days after installation is completed. Maintain adequate ventilation for the removal of moisture and fumes.

PART 2 - PRODUCTS

2.01 MATERIALS

Materials shall be best quality new stock, delivered to the site in sealed packages with brand and name of manufacturer marked thereon.

A. As applicable: Sheet vinyl flooring shall be Armstrong Corlon, or Mannington Commercial Forms, and shall be of a pattern and color as selected by the Architect and SFSSM Project Manager. Submit a complete line of color samples for selection. Sheet vinyl flooring shall be complete with minimum 6" high continuously returned up coved based with metal top edge.

B. As applicable: Vinyl composition tile shall be 12" x 12" x 1/8" as manufactured by Armstrong and shall be of a pattern and color as specified by the Architect and Project Manager.

C. Rubber top set base shall be 4" and 6" high, complete with preformed molded corner pieces, by Burke Rubber Company. See finish schedule for locations of rubber top set base. Colors shall be selected by Architect.

D. Vinyl reducers shall be .080" thick. Color as selected by City.

PART 3 - EXECUTION

3.01 DEMOLITION

A. In all areas scheduled to receive new resilient floorings, remove all existing carpeting and only loose tiles and mastic, as well as all bases. Clean these surfaces and fill as required and leave ready to receive new carpeting and base.

B. In all areas scheduled to receive new vinyl composition tile, clean, fill, and level all surfaces as required to insure a proper installation of new materials.

3.02 INSTALLATION

A. The Contractor shall, before proceeding with this work, make a detailed inspection of all spaces and surfaces involved and shall arrange for the satisfactory correction of unsuitable working conditions or defects in workmanship or materials of other trades that might impair this work. Commencement of floor covering work shall constitute this Contractor's acceptance of all surfaces upon which flooring materials are to be applied and he shall be completely responsible for same as applicable to a first class installation of his work.

B. The Contractor shall thoroughly clean and sweep all under-surfaces, remove therefrom all dirt, paint, oil, and foreign materials, and shall leave same dry, flush, smooth and suitable in all respects for the installation of the resilient materials.

C. In all floor areas where it is necessary to make surfaces level, use Burke Latex Underlayment floor leveling system. Mix and apply in strict accordance with the manufacturer's printed instructions. Where application depth exceeds 3/8", underlayment shall be applied in two coats. This material shall be allowed to completely set before starting the installation of any floor covering materials.

D. Moisture Testing: Test new concrete slabs for adequate dryness. Delay application of flooring until subfloors are sufficiently dry, or perform remedial measures as recommended by flooring materials manufacturer.

E. Priming: Prime concrete floor slabs on grade; prime other slabs if so recommended by flooring manufacturer.

F. All materials shall be installed in strict accordance with manufacturer's printed instructions for installation.

G. All resilient floor coverings shall be set at right angles to adjoining walls. The under-surfaces shall be spread with cement as recommended by the manufacturer of the materials used at a temperature of approximately 70 degrees F. and when sufficiently bonded to the floor, the floor covering shall be immediately bonded therein. Materials shall be set true to line, and square with all intersecting corners brought together, and symmetrical about center lines of the areas covered. Set flooring in place, then press with heavy roller to attain full adhesion. Where

cutting is required, edges shall be sandpapered smooth. Edges in openings where unlike surfaces join shall have an approved vinyl reducer edge band.

H. Resilient floor tile from all packing boxes shall be scrambled so that variations in tile coloring shall be uniformly distributed over the entire surface of the floor.

I. Install reducer strips at exposed edges of flooring. Cut flooring mechanically to produce square edges.

J. Base Installation:

Install base on solid backing. Bond tight to wall and floor surfaces. Securely cement to backing in long lengths, minimum 18" long filler pieces, top and toe continuously contacting wall and floor, all joints tight. Provide factory-made internal and external corners, and end stops where cove base ends at jambs and offsets. Scribe and fit to door frames and other interruptions.

3.03 USE OF OPEN FLAMES

Refer to the General Conditions regarding use of open flames and inflammable liquids.

3.04 CLEANING

A. All surplus cement shall be removed from adjacent work and exposed tile joints immediately following application. Cement shall be removed from floor covering as recommended by the manufacturer.

B. All discussed implements of service, rubbish, and debris, resulting from the work shall be removed from the building and premises and the entire installation shall be left in a neat, clean, and acceptable condition as approved by the Architect.

C. Apply at least two coats of floor finish on the vinyl tile flooring (VCT) in accordance with manufacturer's written specs. and buff.

3.05 GUARANTEE

Upon completion and acceptance of the work, this Contractor shall furnish a written guarantee to the Owner, covering repair and replacement of all workmanship and materials that may prove defective within a period of one year from date of completion.

END OF SECTION

DIVISION 09 – FINISHES
09 65 19 – RESILIENT TILE FLOORING

PART 1 – GENERAL

- RELATED DOCUMENTS
 - Division 01 Specification Sections
- SUMMARY
 - This section relates to resilient tile.
- PREINSTALLATION MEETINGS
 - Conducted at (insert time, location and key contact).
- SUBMITTALS
 - Product Specification
 - Specification for Adhesive
 - Floor Layouts
 - Samples
 - Schedule
 - Qualifications for Installer
- CLOSEOUT SUBMITTALS
 - Installation Instructions
 - Maintenance Instructions
 - Warranty
 - Manufacturer warrants its resilient products under a 15 Year Commercial Limited Warranty when used in the proper fit for use indoor commercial applications. Resilient flooring must be installed and maintained in accordance with the manufacturer's installation and maintenance guidelines.
 - Manufacturer warrants its adhesive bond to the product and the floor under a 15 Year Commercial Underbed Bond Warranty when installed with Shaw 4200 or S150 adhesives.
 - Contact manufacturer for products that come with underbed warranty coverage.
- QUALITY ASSURANCE
 - Environmental:
 - Environmental Product Declaration (EPD) - Product Specific
 - FloorScore® Certified
 - Embodied Carbon (A1-A3): Less than/equal to 11.59 Kg Co₂/M²
 - Recycled Content:
 - Pre-Consumer: 0%
 - Post-Consumer: 0%
 - Fully Recyclable 0%

- Installer Qualifications: Installer who has been trained in the installation of resilient tile flooring.
- Manufacturer Qualifications
 - Re[TURN] Reclamation Program:
 - Will collect and recycle Shaw manufactured resilient free of charge for quantities of:
 - 5,000 SF (464 SM) or more within the continental United States and Canada.
 - Mockups: Install 100 sf of product at designated location for architect review and approval.
- MATERIAL STORAGE AND HANDLING
 - Store cartons of tile or plank products flat and squarely on top of one another. Preferably, locate material in the “center” of the installation area (i.e. away from vents, direct sunlight, etc.)
 - Flooring material and adhesive must be acclimated to the installation area for at least 48 hours before installation.
 - When palletizing on a jobsite vinyl plank or tiles need to be stacked 2 rows high side by side with no airspace between. Then quarter turned for 2 rows side by side, not to exceed 12 boxes high. A 5/8” or thicker plywood must also be placed on the pallet first.
 - Do not stack pallet’s 2 high unless utilizing a 1” thick plywood in between pallets.
- SITE CONDITIONS
 - HVAC System must be operational for 7 days prior to, during and after installation.
 - Temperature must be between 65° F and 85° F.
 - Material and adhesive must be acclimated to the installation area for a minimum of 48 hours prior to installation. Unless otherwise approved by manufacturer.

PART 2 – PRODUCTS

- TESTING REQUIREMENTS

• Slip Resistance ASTM D2047:	ADA Compliant
• Static Load Limit ASTM F970:	1500 psi
• Residual Indentation F1914:	Passes
• Flexibility ASTM F137:	Passes
• Resistance to Heat ASTM F1514:	Passes
• Resistance to Light ASTM F1515:	Passes
• Resistance to Chemicals ASTM F925:	Passes
• Radiant Flux ASTM E648:	Class I
• Smoke Density ASTM E662:	Passes, <450
- RESILIENT TILE
 - Manufacturer: Shaw Contract

- Product: Commingle, 4350V
- Construction: Heavy Commercial Luxury Vinyl Tile With Fiberglass
- Class ASTM F1700: Class III, Type B
- Finish: ExoGuard+®
- Nominal Dimensions: 9 in w x 48 in | 23 cm w x 122 cm
- Wear-layer Thickness: 20 mil (0.02 in) | 0.51 mm
- Overall Thickness: 0.197 in | 5 mm
- Edge Profile: Squared Edge
- Installation Type: Loose Lay
- Installation: Direct Glue or Perimeter Glue
- INSTALLATION MATERIALS
 - High Moisture Management Solutions (10 Year Warranty)
 - Concrete with %RH \geq 99%, MVER \leq 12, pH \leq 12
 - Apply Shaw Surface Prep EXT followed by Shaw Moisture Shield.
 - Apply USG Advanced skim coat as necessary for patch/skim coat.
 - Install flooring with Shaw 4151* adhesive.
 - Concrete with %RH \geq 99%, MVER \leq 17, pH $>$ 12
 - Apply Surface Prep
 - Apply Shaw Moisture Shield.
 - Apply BC9000
 - Apply USG Advanced Skim Coat as necessary for patch/skim coat.
 - Install flooring with Shaw 4151* adhesive
 - Concrete with %RH \geq 99%, MVER $>$ 17, pH $>$ 12
 - Apply Shaw Surface Prep EXT followed by Shaw MoistureTek.
 - Apply USG Advanced skim coat as necessary for patch/skim coat.
 - Install flooring with Shaw 4151* adhesive.
 - Adhesives:

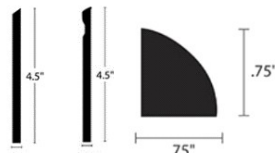
• 4200 Resilient (LokWorx+):	99% RH	5-12 pH	12 lbs.
• 2200 Resilient (LokWorx):	95% RH	5-12 pH	10 lbs.
• Shaw S-150 Spray:	95% RH	7-11 pH	NTR
• 4151 Multi-Use Adhesive:	99% RH	12 pH	12 lbs.
• 4252 Multi-Use PSA Adhesive:	99% RH	5-12 pH	12 lbs.

 - Refer to manufacturers adhesive guide for proper usage
 - Primer (if needed):

- Shaw 9050
 - For dusting / powdering / porous concrete / lightweight concrete prime with a latex primer such as 9050.
 - For patches / levelers prime with a latex primer such as 9050.
- Leveling and Patching Compounds:
 - Use cementitious patching and leveling compounds that meet or exceed Shaw's maximum moisture level and pH requirements. Use of gypsum-based patching and/or leveling compounds which contain Portland or high alumina cement and meet or exceed the compressive strength of 3,000 psi are acceptable.
 - For cracks or saw cuts deeper than 1", follow the preparation and application instructions for QuikFill.
- Transitions and Wall Base (FinishWorx)
 - Transitions
 - Micro-Transition
 - TrimMaster
 - Universal Rubber Transition
 - The Wedge Subfloor Leveler
 - Wall Base Accessories:



- Cove Wall Base
 - Rubber
 - Vinyl
 - Eco Rubber
- Straight Wall Base
 - Rubber



- Sculpted Wall Base
 - Angle Profile
 - Detail Profile
 - Quarter Round Profile

PART 3 – EXECUTION

- EXAMINATION
 - Examine substrates, with Installer present, for compliance with requirements for maximum moisture content, pH, smoothness and level.

- PREPARATION

- All substrates to receive moisture sensitive floor covering require proper moisture testing.
 - CaCl/MVER (ASTM 1869): Results must not exceed 8 lbs.
 - RH (ASTM F-2170): Results must not exceed 90%.
 - pH / Alkalinity (ASTM F-3441): Results must be between 7-10.
 - If the subfloor exceeds these values, moisture mitigation should be performed. Reference Section 11a. or contact the manufacturer rep.
- Perform Bond testing to determine compatibility of adhesive to the substrate.
- Substrates must be structurally sound, clean, flat and dry.
- Substrates must be free of dust, dirt, oil, grease, paint, curing agents, concrete sealers, adhesives, loosely bonded toppings, loose particles and any other substance or condition that may prevent or reduce adhesion.
- Substrates must be flat and smooth within 1/8" in 6 feet or 3/16" in 10 feet.
- Flooring considerations:
 - Existing Resilient Floors
 - Must be single layered, non-cushion backed, fully adhered, and smooth.
 - Show no signs of moisture or alkaline.
 - Waxes, polishes, grease, and grime must be removed.
 - Cuts, cracks, gouges, dents and other irregularities in the existing floor covering must be repaired or replaced.
 - Quarry Tile, Terrazzo, Ceramic Tile, Poured Floors
 - Must be totally cured and well bonded to the concrete and free of any residual solvents and petroleum derivatives.
 - Waxes, polishes, grease, grime, and oil must be removed.
 - Show no signs of moisture or alkalinity.
 - Cuts, cracks, gouges, dents, and other irregularities in the existing floor covering must be repaired or replaced.
 - Fill any low spots, holes, chips and seams that may telegraph through the new flooring.
 - Grind any highly polished or irregular/smooth surfaces.
 - Quarry tile or Ceramic tile grout joints and textured surfaces must be filled with an embossing leveler or substrate manufacturer approved material.

- LAYOUT AND INSTALLATION

- Layout

- Install using conventional tile and plank installation techniques.
- Carefully determine where to begin tile or plank installation.
- It is customary to center rooms and hallways, so borders are not less than half a tile or plank.
- Installation
 - Flooring should have a minimum of 6 – 8" seam stagger.
 - Make sure cut edges are always against the wall.
 - To properly cut the flooring, score the top side of the material with a utility knife. Bend the product and finish the cut through the backside. This will ensure the cleanest cut.
 - Roll the plank or tile with a 3 section 100 lb. roller. Re-roll the entire glued flooring area with the 100 lb. roller within the working time of the adhesive. Continue to roll the floor throughout the working day to ensure a proper bond.
 - Use floor protection after installation. DO NOT use a plastic adhesive-based protection system.
- MAINTENANCE
 - Post Construction Cleaning
 - Dry mop floor using a microfiber mop pad or appropriate floor vacuum to remove dust particulate from the floor.
 - Spray neutral pH cleaner (true neutral pH is 7.0 - it is important to be as close to 7.0 as possible to prevent soil attracting residue), such as Shaw TOTALCARE® Hard Surface Cleaner or Diversey Stride, onto the floor in manageable area (spray mist will dry quickly). Use a microfiber wet mop pad to mop the floor with cleaner. If the pad becomes dirty, be sure to replace the pad with a new microfiber wet mop pad. Work floor in sections.
 - Always rinse the floor by mopping it with water only to remove any remaining residue from the floor.
 - Avoid using mop and shine products on resilient flooring.
 - In the event where dry wall dust/construction dust is mopped with water only, a residue film will appear on the floor after drying. Use the process below to remove the film from the floor.

- Process to remove construction residue or cloudy film from resilient flooring
 - Dry mop floor to remove any construction dust or exterior soil tracked onto the flooring. Use microfiber dry mop pad. If microfiber dry mop pad gets dirty, replace the pad with a clean pad.
 - Spray neutral pH cleaner, such as Shaw TOTALCARE® Hard Surface Cleaner or Diversey's Stride, onto the floor in manageable area (spray mist will dry quickly). Work floor in sections. For smooth surface, use a low rpm (175 rpm) buffer with a 3M red pad on flooring with neutral pH cleaner applied to the floor to remove the residue film. (Never Dry Buff). For embossed or textured flooring, use a cylindrical brush scrubber with red brushes and a neutral pH cleaner applied to the floor to remove the residue film.
 - Using a wet microfiber mop pad, rinse with water only to remove any remaining residue from the flooring. When a wet mop pad becomes dirty, be sure to replace the pad with a new microfiber wet mop pad.
 - Repeat steps #2 and #3, if necessary.
 - When the resilient flooring is cleaned properly, the floor will have the same visual as right out of the box!
 - Contact manufacturer for recommended cleaners.
- Preventative Floor Care
 - Avoid heavy traffic for 24 hours.
 - Proper furniture protection is required to protect resilient flooring.
 - Place chair pads underneath rolling chairs to prevent damage to the LVT flooring.
 - Moving heavy objects requires protective barriers to distribute the weight such as plywood (¼" or thicker) or heavy cardboard to prevent damage to the wear layer
 - Remove adhesive residue with a clean white cloth dampened with odorless mineral spirits or isopropyl alcohol.
 - Use window protection to avoid direct sunlight on resilient flooring.
 - Surface temperature should not exceed 100°F (38°C) from sunlight, bed bug treatment, steam mop, etc. and temperatures should not fall below 55°F (13°C).

- Walk-off mats should be used at all entranceways, transition areas where oil and grease may be present and high moisture areas.
 - Proper mats should have non-staining backing, use PVC backed matting. To avoid possible discoloration, use mats without latex or rubber backings.
- Routine maintenance not included. Contact the manufacturer for full maintenance instructions.

Traffic Level	Vacuum or Dust Mop	Spot Removal	Wet Mop or Auto-Scrub
Light	2+ times per week	As needed	Wet mop weekly. Scrub quarterly
Moderate	1 time per day	As needed	Wet mop daily. Scrub monthly
Heavy	1+ times per day	As needed	Wet mop daily. Scrub weekly

END OF SECTION

DIVISION 09 – FINISHES
09 68 13 – TILE CARPETING

PART 1 – GENERAL

1. RELATED DOCUMENTS
 - a. Division 01 Specification Sections
2. SUMMARY
 - a. This section relates to carpet tile.
3. PREINSTALLATION MEETINGS
 - a. Conducted at (insert time, location and key contact).
4. SUBMITTALS
 - a. Product Specification
 - b. Specification for Adhesive
 - c. Shop Drawings
 - d. Samples
 - e. Schedule
 - f. Qualifications for Installer
5. CLOSEOUT SUBMITTALS
 - a. Installation Instructions
 - b. Maintenance Instructions
 - c. Warranty
 - i. Manufacturer warrants it's EcoWorx® carpet tile products under a Lifetime Commercial Limited Warranty when used in the proper fit for use indoor commercial applications. Carpet must be installed and maintained in accordance with the manufacturer's installation and maintenance guidelines.
6. QUALITY ASSURANCE
 - a. Environmental:
 - i. Health Product Declaration (HPD) - 1000 ppm disclosure
 - ii. Environmental Product Declaration (EPD) - 3rd Party Certified in Accordance with ISO14044, ISO14025 & EN15804
 - iii. CRI Green Label Plus Certified
 - iv. Cradle to Cradle Certified Silver
 - v. NSF 140 Certified
 - vi. Declare Label I Red List Approved
 - vii. PVC-Free
 - viii. Carbon Neutral
 - ix. Embodied Carbon (A1-A3): 3.91 kg CO₂/m²
 - x. Recycled Content:
 1. Pre-Consumer: 61 %
 2. Post-Consumer: 0 %
 - b. Installer Qualifications: Installer who has been trained in the installation of carpet tile.
 - c. Manufacturer Qualifications
 - i. ISO 14001

- ii. ISO 9001
- iii. Carbon Neutral Manufacturing Facility
- iv. Re[TURN] Reclamation Program:
 - 1. Will collect and recycle EcoWorx carpet tile free of charge for quantities of:
 - a. 100 SY (83 SM) or more within continental United States, Australia, Mexico, Europe and U.K. locations.
 - b. 500 SY (418 SM) or more within Canada.
 - c. 5,000 SY (4180 SM) or more within Alaska, Hawaii, U.S. Territories and other international locations.
 - 2. Will collect and recycle ReWorx free of charge for quantities of:
 - a. 500 SY (418 SM) or more withing continental United States, Australia, Mexico and Canada.
 - b. 5,000 SY (4,180 SM) or more within Alaska, Hawaii, and U.S. Territories.
- d. Mockups: Install 100 sf of product at designated location for architect review and approval.

7. MATERIAL STORAGE AND HANDLING

- a. The product should remain in the original packaging / pallet.
- b. Pallets should not be stacked.
- c. Storage should take place in a conditioned environment. Temperatures should remain between 65° F and 95° F. Humidity should not exceed 65%.
- d. The product should not be exposed to any moisture.

8. SITE CONDITIONS

- a. HVAC System must be operational, maintaining the following conditions 24 hours prior to, during and after installation.
- b. The installation site, carpet and adhesive must be between 50°F and 95°F. Adhesives will not function properly when exposed to temperatures outside this range. Do not begin installation if subfloor temperature is below 50° F.
- c. Humidity: The installation site's ambient relative humidity must not fall below 40%.
- d. Moisture Testing: Conduct subfloor moisture testing in accordance to the ASTM F-2170 (in-situ Relative Humidity) and/or ASTM F-1869 (Anhydrous Calcium Chloride).
- e. pH / Alkalinity: Conduct ASTM F-3441 pH/Alkalinity testing.

PART 2 – PRODUCTS

9. TESTING REQUIREMENTS

- | | |
|--|---------|
| a. Pill Test CPSC FF 1 70: | Pass |
| b. Radiant Panel ASTM E648: | Class I |
| c. NBS smoke ASTM E662 NF: | <450 |
| d. Electrostatic Propensity AATCC 134: | <3.5 kv |
| e. TARR ASTM D5252: | 3.0 |

10. TILE CARPETING

- a. Manufacturer: Shaw Contract
- b. Product: Exchange Tile, 5T304
- c. Construction: Multi-Level Pattern Cut/Loop
- d. Fiber: Ecosolution Q100® Nylon
- e. Dye Method: 100% Solution Dyed
- f. Backing: Ecworx® Tile
- g. Protective Treatment: SSP® Shaw Soil Protection
- h. Size: 18 in x 36 in | 46 cm x 91 cm
- i. Gauge: 1/10 in | 39.4 per 10 cm
- j. Stitches: 9.5 per in | 38.0 per 10 cm
- k. Finished Pile Thickness: 0.144 in | 3.66 mm
- l. Average Density: 7000 oz/yd³ | 0.259 g/cm³
- m. Total Thickness: 0.315 in | 8 mm
- n. Tufted Weight: 28 oz/yd² | 949.4 g/m²

11. INSTALLATION MATERIALS

- a. High Moisture Management Solutions (10 Year Warranty)
 - i. Concrete with %RH \geq 99%, MVER \leq 12, pH \leq 12
 - 1. Apply Shaw Surface Prep EXT followed by Shaw Moisture Shield.
 - 2. Apply USG Advanced skim coat as necessary for patch/skim coat.
 - 3. Install flooring with Shaw 4151* adhesive.
 - ii. Concrete with %RH \geq 99%, MVER \leq 17, pH $>$ 12
 - 1. Apply Surface Prep
 - 2. Apply Shaw Moisture Shield.
 - 3. Apply BC9000
 - 4. Apply USG Advanced Skim Coat as necessary for patch/skim coat.
 - 5. Install flooring with Shaw 4151* adhesive
 - iii. Concrete with %RH \geq 99%, MVER $>$ 17, pH $>$ 12
 - 1. Apply Shaw Surface Prep EXT followed by Shaw MoistureTek.
 - 2. Apply USG Advanced skim coat as necessary for patch/skim coat.
 - 3. Install flooring with Shaw 4151* adhesive.
- b. Adhesive Options:
 - i. For EcoWorx (fiberglass reinforced):

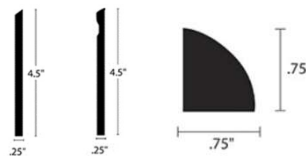
1. 5000 Carpet Tile (LokWorx+):	97% RH	pH 5-11	
15 lbs.			
2. 3000 Carpet Tile (LokWorx):	95% RH	pH 5-11	10 lbs.
3. 3800 Indoor/Outdoor:	99% RH	pH 7-12	12 lbs.
4. 4151 Multi-Use Adhesive:	99% RH	pH 12	12 lbs.
5. 4252 Multi-Use PSA:	99% RH	pH 5-12	12 lbs.
6. LokWorx Tabs:	85% RH	pH 12	10 lbs.
7. LokDots:	No visible moisture		
8. Mill-applied ES:	No visible moisture		
- c. Primer (if needed):
 - i. Shaw 9050

1. For dusting / powdering / porous concrete / lightweight concrete prime with a latex primer such as 9050.
 2. For patches / levelers prime with a latex primer such as 9050.
- d. Leveling and Patching Compounds (if needed):
- i. Use a cementitious patching/leveling compound that meets or exceeds the required moisture level and pH requirements. Use of gypsum-based patching and/or leveling compounds which contain Portland or high alumina cement and meet or exceed the compressive strength of 3,000 psi are acceptable.
 - ii. For cracks or saw cuts deeper than 1", follow the preparation and application instructions for QuikFill.
- e. Transitions and Wall Base (FinishWorx)
- i. Transition Strips
 1. Micro-Transition
 2. TrimMaster
 3. Universal Rubber Transition
 4. The Wedge Subfloor Leveler

ii. Wall Base Accessories



1. Cove Wall Base
 - a. Rubber
 - b. Vinyl
 - c. Eco Rubber
2. Straight Wall Base
 - a. Rubber



3. Sculpted Wall Base
 - a. Angle Profile
 - b. Detail Profile
 - c. Quarter Round Profile

PART 3 – EXECUTION

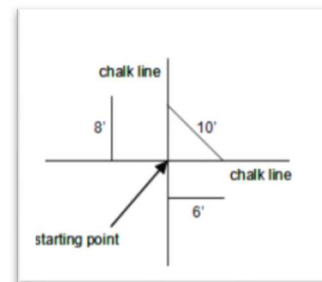
12. EXAMINATION

- a. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content, pH, smoothness and level.

13. PREPARATION

- a. Shaw recommends moisture testing prior to starting the installation.
 - If the subfloor exceeds adhesive moisture tolerances, moisture mitigation should be performed. Reference Section 8a. or contact the manufacturer rep.
- b. Substrate must be structurally sound, clean, level and dry.
- c. Substrate must be free of dust, dirt, oil, grease, paint, curing agents, concrete sealers, adhesives, loosely bonded toppings, loose particles and any other substance or condition that may prevent or reduce adhesion.
- d. Pre-existing Adhesive
 - i. Remove existing adhesives to prevent adhesive incompatibility /reactions and bonding issues. When installing Ecologix backed tiles, removal of existing adhesive is not necessary as long as the existing adhesive is dry and tacky. The top ridges of existing adhesive should be flattened so the existing adhesive does not interfere with adhesion of new adhesive and Ecologix backing. Existing ridges should be no higher than 1/32".
 - ii. Cutback Adhesive: Wet scrape the adhesive, reduce to a well bonded residue and encapsulate with a product such as MRP.
 - iii. Do not use adhesive removers, they will adversely affect the new adhesive and product installed.
- e. Flooring considerations:
 - i. Installing over VCT and VAT: Tiles must be secure to the subfloor. Strip any wax from the surface.
 - ii. Installation over wood subfloors: Prime with a liquid latex such as Shaw 9050.
 - iii. Installing over raised access flooring: Must be smooth, level, secure and clean. Install carpet tile at an offset from panel seams. Gaps must not exceed 1/16" (1.6 mm).

14. LAYOUT AND INSTALLATION



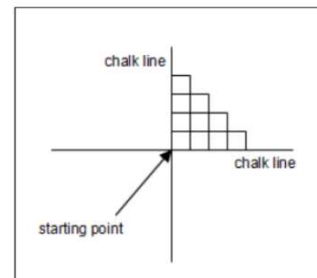
- a. Layout
 - i. Start the tile installation as near to the center of the room as possible and position it to use the largest perimeter cut tile size.

- ii. Snap a chalk line parallel to one major wall bisecting the starting point. It may be necessary to offset the center chalk line to assure perimeter tiles will be at least half size.
- iii. Snap a second chalk line from the starting point at 90° to the first line. Use a 3-4-5, 6-8-10, or larger triangle depending on the room size. Meters or feet may be used to lay out the triangle in these proportions.

b. Apply Adhesive

Use a full spread of adhesive applied with a 3/8" foam paint roller or 1/16" x 1/32" x 5/64" U-notch trowel. When using a 1/16" x 1/32" x 5/64" U-notch trowel to install StrataWorx products, this application method will Increase the overall bond strength and reduce the ease of removing and replacing tiles.

- i. Allow the adhesive to dry completed before installing the carpet tile. Installing into wet adhesive will result in a permanent bond.



c. Installation

- i. Install each full carton and complete an entire pallet before starting another pallet to minimize product variation. All Shaw carpet tiles have directional arrows on the back of the carpet tile to help facilitate the installation method for that product. The numbers within the arrows are for manufacturing purposes only and are not related to the installation.
- ii. Begin installation at the intersection of two chalk lines. Continue until you complete one quadrant.
- iii. Proceed to an adjoining quadrant until all four quadrants are completed. Larger areas may require chalk lines bisecting the original four quadrants.
- iv. Install the carpet tile using the pyramid technique. This will provide alignment checks during the installation. If the edges do not align and misalignment is noted, stop the installation and determine where the misalignment started and correct.
- v. Slide carpet tile into positions to prevent yarn from being trapped at the seams. Trapped yarn can adversely affect the appearance of the installation.
- vi. Tiles must fit snugly, but not be compressed. Press the entire surface of the tile to ensure adhesion.
- vii. After installation, roll the entire installation with a 75 lb or greater roller to assure proper adhesion to the substrate.
- viii. Place plywood over the carpet when heavy objects will be moved within 24 hours after installation. DO NOT use a plastic adhesive-based protection system

15. MAINTENANCE

- a. Preventative Floor Care
 - i. Walk-off mats should be used at all entranceways, transition areas where oil and grease may be present and high moisture areas.
- b. Routine Maintenance
 - i. Set a schedule depending on traffic and vacuum regularly.
 - ii. Remove spots with spot removers as soon as they occur.
 - 1. Use General Soil Spot Removers for most common spots and spills.
 - 2. Use solvent spotters for oil/grease (petroleum—based spots). Solvent gels preferred. Follow manufacturer's recommendations when using solvents. Rinsing may be necessary.
 - iii. Use CRI approved encapsulation agents periodically with
 - 1. Dual-cylindrical counter-rotating brush machine for agitation.
 - 2. Or walk behind extractors at lowest speed.
 - 3. NOTE: Bonnet cleaning is NOT recommended
 - iv. Clean with hot water extraction periodically.
 - v. Contact manufacturer for full maintenance instructions

Traffic Level	Vacuum	Spot Removal	Interim Cleaning	Hot Water Extraction
Light	1-2 times per week	as needed	as needed	1 time per year
Moderate	1 time per day	as needed	as needed	2 times per year
Heavy	2 times per day	as needed	monthly	2 times per year
Extra Heavy	3 times per day	as needed	weekly	monthly

END OF SECTION

DIVISION 09 – FINISHES
09 77 33 – FIBER REINFORCED PLASTIC PANELS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass reinforced plastic (FRP) panels.
- B. Panel moldings.

1.2 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Submit product data for panels and accessories.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 4 x 4 inches in size illustrating panel pattern and color. Submit two 12 inch long samples of panel moldings.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit maintenance data under provisions of Section 01 77 00.
- B. Include data for cleaning and stain removal.
- C. Include manufacturer's recommendations for cleaning materials, polishes, and waxes.

1.5 REGULATORY REQUIREMENTS

- A. Conform to flame/smoke developed rating of 25/450 when tested in accordance with ASTM E84.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and protect products to site under provisions of Section 01 61 00.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install fiberglass reinforced plastic panels when temperatures are below 60 degrees F or above 90 degrees F.

- B. Maintain temperature range for 24 hours before, during, and 72 hours after installation of panels.

1.8 WARRANTY

- A. Provide one year warranty under provisions of Section 01 77 00.
- B. Include coverage for surface staining and finish deterioration.

1 PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Glasteel Inc., www.glasteel.com.
- B. Kemlite Co., www.kemlite.com.
- C. Lasco Products, www.lascoboard.com.
- D. Mariite, www.marlite.com.
- E. Nudo Products, Inc., www.nudo.com.
- F. Panolam Industries, www.panolam.com.
- G. Substitutions: Under provisions of Section 01 25 13.

2.1 MATERIALS

- A. Fiberglass reinforced plastic panels of 0.090 inch thickness in 4 x 10 foot sheet sizes.
- B. Panels to have pebble textured surface finish in color selected by Architect.
- C. Panels to have a flame/smoke rating of 25/450 for a Class A finish when tested according to ASTM E84.

2.2 ACCESSORIES

- A, Moldings: Extruded aluminum or plastic panel accessories in maximum practical lengths. Finish to match panels.
- A. Adhesive: Latex based non-flammable construction adhesive.
- B. Sealant: Silicone sealant specified in Section 07 92 00.
- C. Substitutions: Under provisions of Section 01 25 13.

2 PART 3 EXECUTION

3.2 EXAMINATION

- A. Verify that surfaces and openings are ready to receive work.
- B. Verify that field measurements and tolerances are as instructed by manufacturer.
- C. Verify that required utilities are available, in proper location, and ready for use.
- D. Beginning of installation constitutes acceptance of existing substrate surface conditions by installer.

3.3 PREPARATION

- A. Clean substrate surfaces.
- B. Protect elements of work adjacent to work of this Section from damage or disfiguration.

3.4 INSTALLATION

- A. Install panels and accessories in accordance with manufacturer's instructions.
- B. Coordinate location of panel joints to minimize interference with fixtures and accessories. panel adhesive at 6 inches on center over ` of panel.
- D. Set panel ends and edges in moldings.
- E. Seal moldings and panel joints with sealant.

3.5 FIELD QUALITY CONTROL

- A. Panels shall lay flush with substrate, without air pockets or warpage.
- B. Remove and replace panels not conforming to manufacturer's installation guidelines.

3.6 CLEANING

- A. Clean work under provisions of Section 01 77 00.

3.7 PROTECTION

- A. Protect finished installation under provisions of Section 01 61 00.

END OF
SECTION

DIVISION 10 - SPECIALTIES
10 28 00 – TOILET & BATH ACCESSORIES

PART 1 - GENERAL

The requirements of Conditions of Contract and Division 1 apply to the work of this Section.

1.01 DESCRIPTION

The work of this Section shall include all labor, materials, equipment, and transportation to install all items specified below.

PART 2 - PRODUCTS

2.01 MATERIALS

TOILET ROOM ACCESSORIES:

- A. All items unless otherwise specified herein, shall be constructed of 19 gauge type 304 stainless steel, all welded construction, with satin finish on exposed surfaces. Flanges shall be one piece seamless construction. All units shall be keyed alike.
- B. Contractor shall construct walls of sufficient depth or required backing to install all recessed or semi-recessed equipment as shown and specified.
- C. Equipment:
 - 1. Toilet tissue dispenser unit shall be surface mounted multi-roll dispenser as specified on the drawings. Mount where indicated on the drawings. Furnish and install number of units to total number of toilets.
 - 2. Napkin disposal unit as manufactured by Bobrick Corp. shall be B-3544 (quantity 2). Units shall be located as directed by the SFSSM Project Manager, within 40" to operation above the finish floor.
 - 3. Toilet seat cover dispenser shall be surface mounted units as specified on the drawings. Center in wall above toilet 40" above finish.
 - 4. Floor and on side panel in ADA toilets (as indicated on the drawings. Furnish and install one new dispenser in each new toilet compartment.
 - 5. Toilet room grab bars shall be as scheduled on the drawings.
 - 6. Towel and waste receptacle units, and soap dispensers shall be as scheduled on the drawings Units shall be located where shown on drawings.

6. Mirrors shall be as scheduled on the drawings as Units shall be located where shown on drawings.
7. Unisex signage shall be as scheduled on the drawings. Units shall be located where shown on drawings, installed in strict compliance with ADA and applicable Code requirements.

TOILET COMPARTMENTS:

- A. New floor mounted (and wall mounted) partitions shall be Bobrick, Duraline Series - Water and Fire Resistant solid phenolic partitions and screens, as indicated on the drawings. Install in strict accordance with manufacturer's written specifications. All other compartments and urinal baffles shall be as specified above for wall mounted and floor mounted type partitions. Finish shall be factory finish. A complete line of colors shall be submitted to Architect for selection, prior to ordering partitions. Allow for two colors.
- B. Stiles, panels, and doors shall be constructed of solidly fused plastic laminate with matte finish melamine surfaces, color face sheets, and black phenolic resin core that are integrally bonded and covered by a 15 year limited warranty against breakage, corrosion and delamination. Stiles and doors shall be $\frac{3}{4}$ " thick. Panels shall be $\frac{1}{2}$ " thick. All units shall meet NFPA or ICC Class B, UBC Class II, ASTM E84 Fire Resistive Standard, flame spread 30, and smoke development 55. Stiles, panels, and door colors shall be selected from the complete line of available manufacturer's colors. Head rails for overhead braced compartments (as applicable) shall be anodized aluminum with satin finish.
- C. Floor anchorage stiles shall have a leveling device that is concealed by a one piece, Type 304 satin finish, stainless steel four inch shoe. All door hardware and mounting brackets shall be equipped with manufacturer's standard Type 304 satin finish, Stainless Steel. Hinges and brackets shall not be exposed on exterior of compartments (except for doors that swing out). All doors shall be supplied with three hinges. Threaded inserts for securing hinges and doors shall be factory installed. Each door shall be equipped with one hook, one black rubber bumper, and keeper, and all ADA, T-24 compliant latch(s) and handle(s). Hinges shall be capable of being adjusted when the compartment is unoccupied so that the door can remain slightly ajar, or closed, and shall allow a locked compartment to be opened from the outside, in the event of an emergency, by lifting the door to disengage the latch from the keeper.

PART 3 - EXECUTION

- A. Submit complete Shop Drawings to the Architect for written review prior to ordering materials.
- B. Partitions shall be erected in a neat manner without damage to any of the surrounding finishes and shall be rigidly fastened into place at bottom and top of all fronts and partition ends. Backing required to anchor partitions shall be provided as indicated on the drawings. Wall backing shall be provided as recommended in partition

manufacturer's written specifications and details. Door swing shall always provide a clearance between the door and the fixture.

PART 4 – GUARANTEE

Toilet Partitions including all hardware and mounting brackets shall be guaranteed to be free from defects in material and workmanship for a period of one year, with the extended 15 year limited warranty for the panels, doors, and stiles against breakage, corrosion, delamination and defects in factory workmanship when materials are properly installed, used and serviced normally.

All other components shall carry the manufacturers standard warranty.

END OF SECTION

DIVISION 10 – SPECIALTIES
10 44 00 – FIRE PROTECTION SPECIALTIES

1. PART 1 GENERAL

A. SECTION INCLUDES

- Fire extinguishers.
- Non-rated and fire rated cabinets.
- Accessories.

B. REFERENCES

- ASTM E814 - Fire Tests of Through-Penetration Fire Stops.
- NFPA 10 - Portable Fire Extinguishers.
- CFC - California Fire Code, (CCR) California Code of Regulations, Title 24, Part 9.
- Title 19, State Fire Marshal Regulations.

C. QUALITY ASSURANCE

- Conform to NFPA 10 requirements.

D. REGULATORY REQUIREMENTS

- Conform to requirements of the CFC, Section 906, and Title 19 - State Fire Marshal Regulations, Chapter 3.

E. SUBMITTALS

- Submit product data under provisions of Section 01 3300.
- Include physical dimensions, operational features, color and finish, mounting and anchorage details, rough-in measurements, location, and details.
- Submit manufacturer's installation instructions under provisions of Section 01 33 00.

F. OPERATION AND MAINTENANCE DATA

- Submit manufacturer's operation and maintenance data under provisions of Section 01 77 00.
- Include test, refill or recharge schedules, procedures, and re-certification requirements.

G. ENVIRONMENTAL REQUIREMENTS

- Do not install extinguishers when ambient temperatures may cause freezing.

2 PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Amerex Corporation, www.amerex-fire.com.

B. J.L. Industries, www.jlindustries.com.

C. Larsen's Mfg. Co., www.larsensmfg.com.

D. Potter-Roemer, Inc., www.potterroemer.com.

E. Substitutions: Under provisions of Section 01 25 13.

2.2 EXTINGUISHERS

- A. Dry Chemical Type: Equivalent to J.L. Industries Cosmtc Model 10E, UL 4A:80B:C nominal capacity with multi—purpose chemical agent and inert material in enameled-steel container, with pressure-indicating gage.
- B. Wet Chemical Type: Equivalent to J.L. Industries Saturn Model 25, UL 2A.K.

2.3 CABINETS

- A. Fire rated cabinets, equivalent to
- B. J.L. Industries Ambassador Model No. 1017521-FX2 with solid doors lock and red vertical lettering. Cabinet to be fabricated according to ASTM E814 and be listed and labeled by Warnock-Hersey for one and two hour fire rated wall systems.

3.4 FABRICATION

- A. Form body of cabinet with tight inside corners and seams.
- B. Fabricate body of fire rated cabinet of double wall construction filled with a 5/8 inch thick layer of protective fire barrier insulation.
- C. Predrill holes for anchorage.
- D. Form perimeter trim by welding, filling, and grinding smooth.
- E. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch with pull handle.

2.5 ACCESSORIES

- A. Steel Cable Theft Device: Model STI 6200 as manufactured by STI Inc., www.sti-usa.com.

2.6 FINISHES

- A. Extinguisher: Red enamel.
- B. Cabinet Trim and Door: Electrostatic white enamel.

3 PART 3 EXECUTION

3.1 INSPECTION

- A. Verify rough openings for cabinet are correctly sized and located.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings.
- B. Secure rigidly in place in accordance with manufacturer's instructions.
- C. Install fire rated cabinets in strict conformance with manufacturer's instructions and listing requirements of Warnock-Hersey.
- D. Attach steel cable theft device to each extinguisher. Locate inside cabinet.

END OF SECTION

DIVISION 22 - PLUMBING
22 10 00 – PLUMBING PIPING

1.01 SCOPE

Work of this section includes everything necessary and incidental to completing plumbing work, except as herein specifically excluded.

1.02 GENERAL REQUIREMENTS

- A. All core drilling, cutting, and patching for the installation of work under this section shall be performed under this section of the specifications. No holes will be allowed in any structural members without the written approval of the Architect.
- B. Guarantee: Furnish a written guarantee form as stipulated in section "General Conditions," for a period of one (1) year from date of acceptance of work by the owner.
 - 1. Materials:
 - a. All material and equipment shall be new and in perfect condition when installed, of the best grade and of the same manufacturer throughout for each class or group of equipment. Materials not identified by name or manufacturer shall be comparable to that specified and as approved by the Architect. Maintain adequate job protection for all materials, equipment and work of other trades. Store all pipe at least four inches (4") above grade to avoid contact with water and dirt.
 - b. Unless otherwise directed by the Mechanical Engineer in writing, or specified or indicated, all materials, fixtures and equipment shall be installed in accordance with manufacturer's recommendations and instructions.
 - c. Plumbing equipment shall bear the manufacturer's label nameplate showing all performance characteristics. All valves, pipe fittings, etc., shall bear the manufacturer's trademark or identifying markings.
 - d. All materials of similar function or service shall be of one manufacturer.
 - 2. Approval of Materials:
 - a. Within thirty (30) days after award of the contract, submit to the Architect, ten (6) copies of a complete list of material and equipment proposed for the job including rating and capacity data, sizes, grade, electrical data, part or catalog number, manufacturer's name, pictures, catalog cuts, etc.

- b. Submit with the above list, six (6) copies of complete shop drawings for all fabricated equipment and six (6) copies of complete wiring diagrams with descriptions and details.
- c. For additional submittal requirements refer to Part 3 Execution; 3.05, C. Execution paragraph 3. No exceptions will be allowed for this requirement.
- d. Safety Compliance: All materials, equipment and installation shall comply with the requirements of "Occupational Safety and Health act" (OSHA) Standards.

C. Verification of Dimensions:

- 1. All indicated dimensions are approximate and are given for estimating purposes only. Before proceeding with the work, this contractor shall carefully check and verify all dimensions, sizes, required clearances and shall assume full responsibility for the fitting of all equipment and materials herein required to other parts of the work and to the work of other trades.
- 2. The drawings are essentially diagrammatic to the extent that all offsets, bends, special fittings and locations are not exactly located.
- 3. This contractor shall comply with all contract documents in laying out his work and equipment. He shall coordinate the work of this section with the work of other trades and all job conditions.
- 4. The installation of valves, thermometers, gauges, cleanouts, water hammer arrestor access doors or other indicating equipment or specialties requiring reading, adjustment, inspection, repairs, removal or replacement shall be conveniently and accessibly located with reference to the finished building.
- 5. Where wall and ceiling access doors are required for access to plumbing equipment, *doors* shall be furnished and installed under other sections. Coordinate this requirement with appropriate section of specifications.

D. Rough-in: Rough-in and final connections shall be provided for equipment furnished under other sections and by the owner in accordance with rough-in drawings furnished by others. Future equipment, as noted on the drawings, shall be provided with all required rough-in utilities.

E. Before submitting his bid for the work under this division the contractor shall carefully study all drawings and shall make a careful examination of the premises. He shall determine in advance, the methods of installing and connecting the equipment, the means to be provided for getting the equipment into place and shall make himself thoroughly familiar with all the requirements of the contract. After award of the contract, no subsequent allowances will be made to the contractor due to the failure to comply with the above requirements or any other conditions affecting the installation and completion of the work.

F. Any minor changes in work, which have not been installed, shall be made by this contractor without additional compensation except changes which increase or decrease the size of the materials specified or indicated on the drawings. This contractor shall submit an estimate of the cost, or credit for, such changes he does not consider of a minor nature and shall proceed only upon the written authorization of the Engineer.

G. Machinery Guards: All moving parts of machinery, such as shaft couplings, belt drives, etc., shall be adequately covered with removable metal guards to protect personnel from possible injury. Guards shall be furnished by the equipment manufacturer and shall comply with applicable requirements of applicable state agencies and OSHA.

PART 2 PRODUCTS

2.01 PIPING INSTALLATION

- A. Arranged as shown on the drawings and as required for a complete system.
- B. Run straight and true to line and as direct as possible.
- C. Risers shall be plumb. Form right angles on parallel lines with building wall.
- D. Keep pipes close to walls and partitions, off-set only where necessary to follow walls, or as directed.
- E. Locate groups of pipes parallel to each other. Pipe spacing shall permit application of full insulation and access for servicing valves.
- F. All piping shall be isolated from other piping, any part of the building, framing, conduit, etc., with one inch (1") strips of hair, felt, or pipe isolators.
- G. Risers shall not have couplings in runs from one floor outlet to next.
- H. All piping shall be concealed in walls or above ceilings unless otherwise noted.
- I. Street elbows, bushings, and long screw fittings will not be allowed for on-site buildings.
- J. Cleanouts
 - 1. Floor cleanouts, as specified (see plans for size), shall be no-hub and installed into pipe where shown on plans. Floor cleanouts shall be accessible in all cases and shall be brought to surface on "WYE" branches.
 - 2. Wall cleanouts, as specified (see plans for size), shall be taper thread plugs and installed into pipe where shown on plans. Wall cleanouts shall be accessible in all cases.
 - 3. All cleanouts shall be provided with removable floor or wall plate as herein-before specified.

4. Cleanouts to grade shall be provided with either a traffic rated brass cap or concrete yard box.

K. Install stops on all hot and cold water fixture supplies, unless integral stops are specified. Supply trim shall have all metal-to-metal connections.

L. Protect open pipe ends. Keep piping free from scale and dirt; protect open ends whenever work is suspended during construction to prevent foreign bodies entering and lodging there; use temporary plugs or other approved material for protection.

M. Bending or mitering of pipe to constitute fittings shall not be permitted.

2.02 NIA.

2.03 NIA.

2.04 FUEL GAS PIPING SYSTEM (NIA)

A. Mains, risers, branches, connections of sizes and arrangement as indicated on drawings.

B. Shut-off valves shall be provided in main branches, runs to risers and where indicated on drawings.

C. Piping below grade shall be dipped and wrapped with "Hunt's Process" No. HP#6-F. All field joints and fittings shall be double wrapped with Scotch Wrap No. 50. In lieu of wrapping, "X-Tru-Coat" steel pipe shall be considered an approved equal.

D. Flexible pipe connections to furnaces, duct heaters or hot water heaters are not acceptable.

E. All gas piping exposed to weather, shall be coated with 2 coats of Red *Lead* Primer or *Epoxy* Enamel.

2.05 VALVES

A. Provide shut-off valves where indicated and specified; and in the following locations:

1. Risers and main branches at points of take-off from their supply or return mains.

2. Individual equipment units at Inlet and outlet to permit unit removal for repairs without interfering with remainder of system.

B. Locate valves for easy access and operation; where concealed, access doors shall be provided under other sections. Coordinate requirements with General Contractor.

C. Do not locate valves with stems below horizontal.

2.06 UNIONS

A. Provide unions, screwed or flanged, where indicated and in the following locations:

1. In by-passes around equipment.
2. In connection to traps, heaters, tanks, pumps and other equipment requiring disconnection for repairs or replacement. Locate between shutoff and equipment.
3. Where access panels for unions and valves in walls, partitions and ceilings are required. Coordinate this requirement with the *General Contractor*.

B. For two inches (2") and smaller pipe, use screwed unions; for two and one half inches (2 1/2") and larger use flanged.

C. For steel pipe, use malleable iron unions, 150 PSI SWP for standard pipe and 250 PSI SWP for extra strong pipe, with bronze-to-iron ground joints by Grinnell Company, or approved equal; or cast iron flanged unions gasket type by Grinnell Company, Fig 487, or approved equal.

D. For threaded brass pipe use flanged bronze unions with steel bolts and gasket for 150 PSI SWP, Walworth Company No. 3480, or approved equal; or bronze ground joint unions with octagon ends for 200 PSI SWP, Walworth Company No. 3477, or approved equal.

2.07 CONCEALED PIPING:

A. Where indicated or specified, conceal piping in building construction. Install such piping in time so as not to delay work of other trades and to allow ample time for tests and approval; do not cover before test approval is obtained from the Engineer.

B. Run up branches passing through floor or roof into partition; offset above floor close to equipment unit; expose only as much as necessary for final connection.

C. Where furred spaces are indicated, keep pipes as close to structural members as possible so as to require minimum furring. In case of furred beams, obtain approval, from Architect, of resulting headroom clearance before installing pipes.

D. Access panels: Install where shown and over all concealed valves, cleanouts, isolation unions and any concealed equipment which may require access for operation, maintenance and repair. Panel shall be sized for proper service and be not less than twelve inches by twelve inches (12" x 12"), furnished and installed by this contractor.

2.08 PIPES PIERCING WATERPROOFING:

For pipes passing through waterproofed floor or roof, provide sleeves and flashing to maintaining watertight condition. Submit details for approval.

2.09 CHECK FOR INTERFERENCES WITH OTHER TRADES

- A. Before installing piping check architectural, structural, plumbing, electrical and fire protection drawings. Make accurate layout of all piping, including installed elevations. Submit copies of final layout to other trades for coordination with their work so that grouped pipes, conduit, and ducts will not interfere with each other, or with full swing doors and will leave minimum headroom as indicated.
- B. Coordination of the mechanical piping is the responsibility of this section.
- C. Protect open pipe ends. Keep piping free from scale and dirt. Protect open ends whenever work is suspended during construction to prevent foreign bodies entering and lodging there; use temporary plugs, burlap, or other approved material for protection.

2.10 SUPPORTS, HANGERS, FLASHING, AND SEISMIC RESTRAINT

A. Pipe Support

- 1. All piping shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of pipe and contents in any direction. Maximum spacing of support and braces shall be as detailed on drawings.
- 2. Support horizontal overhead piping with clevis hangers. Upper end of hanger rod shall be supported from a code approved attachment. See drawings for pipe support details. Submit shop drawings of all piping supports for approval.
- 3. Piping shall be attached to top chord members only of prefabricated roof or floor trusses. Where plywood web trusses occur, pipe support may be secured to additional web stiffeners as shown on plans.

B. Flashing: Pipes through roof shall be flashed with "Semco" No. 1110-7 steel reinforced boot type, six (6) pound seamless lead flashing with suitable counterflashing sleeve, OF as approved by the Architect. Submit shop drawings for approval.

C. Seismic Restraint: All piping and equipment shall be suitably restrained and anchored in both horizontal and vertical directions to withstand seismic forces as required by the State of California. See drawings for details.

2.11 PIPES OVER ELECTRICAL EQUIPMENT

- A. Where pipe joints or valves in cold and hot water lines occur within two feet (2'0") in horizontal direction from electrical panels, or equipment, provide a drip pan of size which will afford protection. Submit pan size and construction for approval.
- B. Pans shall be 18 GA. GI sheet, edges turned up two and one half inches (2 1/2") all sides, reinforced with galvanized angles or by rolling edge over one quarter of an inch (1/4") diameter galvanized wire.

- C. Provide drain with three-quarters of an inch (3/4") galvanized flange and galvanized pipe drain to nearest floor sink.
- D. Support with galvanized bars or angles, brace to prevent sagging or swaying, as detailed for ductwork.

2.12 PIPE AND FITTING MATERIALS

A. Service Defined: Classification and names of services as used in "Schedule of Pipe and Fitting Materials" herein, shall have the following meaning--

1. Cold Water: Connections from cold water supply outlets provided by Plumbing Contractor to equipment and for makeup.
2. Drains: Drains from expansion or storage tanks to floor drains, drains from air conditioning equipment condensate pans or piping drip pans.

B. Schedule: Unless otherwise specified, pipe and fitting materials shall conform to following schedule-

1. Interpretation of Schedule: Figure "40" and "80" following pipe material in this schedule designate pipe wall thickness, conforming to ASA 836.10, applicable to sizes one inch (1") to ten inches (10") inclusive. Figure "40" shall mean "standard, 180" shall mean "extra strong" or; "extra heavy," in the accepted trade terminology for pipe wall thickness.

a. Fittings shall conform to pipe as to black, galvanized, or C-P finish.

b. Schedule of Pipe and Fitting Materials

Pipe Material Service	Type of Weight	Fittings Joints	Pressure Rating Material	Shut-Off Valve PSI. SWP
Cold Water Abv. Gnd.	Copper L Tube	Cast Bronze/ Soldered	Wrght Copper	Butterfly 125 Check
Cold Water Below Gnd.	Copper K Tube	Cast Bronze/ Soldered	Wrght Copper	Ball 125 Butterfly
Hot Water (Heating) Abv. Gnd.	Copper L Tube	Cast Bronze/ Soldered	Wrght Copper	Ball 125 Butterfly
Fuel	Gas/Steel 40, Steel 40,	Black/Screwed Black/Welded	Mall. Iron Mall. Iron	150 Sqr Head 150 Cock
Cast Iron	No-hub	N/A	N/A	N/A
Vent	Steal 40,	Galv/Screwed	N/A	N/A
Waste & Soil	ABS	N/A	N/A	N/A

(Cont.) Pipe Material Service	Type of Weight	Fittings Joints	Pressure Rating Material	Shut-Off Valve PSI. SWP
Drains	Steel 40, Copper L Tube	Galv/Screwed Soldered	Steel Galv. Bronze	125 Ball 125 Butterfly
Condensate	Steel 40, Copper L Tube	Galv/Screwed Soldered	Steel Galv. Bronze	125 Ball 125 Butterfly
Chilled Water Supply & Return		Copper Construction – Type “L”		

2.13 ASTM DESIGNATIONS FOR PIPE AND FITTING MATERIALS

A. Pipe, as specified in schedule, shall conform to requirements covered by following ASTM designations:

1. PVC/Steel 40 or 80: A-53, Grade B.
2. Copper Tube "B": B-75.
3. Copper Tube "K" and "L": B-88.
4. Cast Iron: A74-80.

B. Fittings, as specified in schedule for various services, shall conform to requirements covered by the following ASTM designations:

1. PVC Schedule 80.
2. Steel Welding Type: A-234.
3. Bronze, Solder Joint: B-88.
4. Wrought Copper, Solder Joint: ANSI B16.22, 816.18.

2.14 MANUFACTURERS OF PIPE AND FITTINGS

A. Pipe manufacturer shall be submitted for approval. The following manufacturers shall be acceptable for materials listed under each group:

1. PVC Schedule 80.
 - a. Harrington
 - b. Spears
 - c. Ryan-Herco

2. Copper Tubing and Fittings
 - a. Muller Brass
 - b. Chase
 - c. Revere
 - d. Cerro
3. Cast Iron Pipe
 - a. Alhambra
 - b. Anaheim Foundry
 - c. U.S. Pipe and Foundry
 - d. Universal Cast Iron Manufacturing

2.15 PIPE JOINTS

- A. Unless otherwise specified, join pipe as follows:
 1. All PVC - Socket Glue, All steel pipe two inches (2") and smaller shall have screwed joints.
 2. All steel pipe two and one half inches (2 1/2") and larger shall have welded joints.
 3. All copper pipe shall have soldered joints made with 95-5 tin/antimony solder.
 4. Galvanized vent pipe shall be screwed "Durham" tarred drainage fittings.
 5. All joints in underground and under-floor distribution piping shall be welded, regardless of size.
- B. Welding Exceptions: In locations such as risers in shafts or mains in crowded corridors, where welding may be difficult; permission may be given by job inspector or Mechanical Engineer to use screwed joints up to four inch (4") size.
- C. Welding Process, Procedure:
 1. Where welding is required by work of this section, such work shall only be performed by welders qualified and certified by a recognized, approved agency. Such certification shall bear a date not more than six (6) months prior to date of starting work under this section and shall be submitted and approved by the job inspector and Mechanical Engineer prior to starting work.

2. Pipe welding shall comply with the latest revision of applicable code, ASA Code for Pressure Piping and State requirements. Before welding is performed, contractor shall submit to the Mechanical Engineer evidence of compliance of welding and operators qualification according to provisions of governing codes. Standard Procedure Specifications and operators qualified by National Certified Pipe Welding Bureau shall be considered as conforming to requirements of these specifications.

3. Use only welding type fittings and welding neck flanges. The following exceptions may be used, only as approved by the Mechanical Engineer:

a. Join "small" branches into mains with intersection weld, instead of using welding type tee. "Small" shall mean that the branch is one size less than half the size of the main which it intersects as: 1 1/4" branch into 3" main; 1 1/2" branch into 4" main; 2" branch into 6" main; 4" branch into 10" main.

b. Use only "Weldolet" or "Threadolet" type of welding fittings for intersection welding of branches to mains.

4. Do not make direct welded connections to valves, expansion joints, strainers, apparatus, other equipment, which are intended to be removable.

5. Brass piping shall have screwed joints for sizes two inches (2"); flanged for two and one half inches (2 1/2") and larger.

D. Brazing Option: Brazing of threadless brass pipe to bronze fittings with preinserted rings, will be acceptable in place of screwed joints.

1. For brazing joints on threadless brass pipe and copper "B" tube, copper tube type "K" and "L," use brazing alloy, 80% copper, 15% silver, 5% *phosphorous*, which will flow freely at 1300 deg. F; Handy and Harmon "Sil-Flos," or approved equal; use flux and brazing method recommended by manufacturer of brazing alloy.

2. Copper tube type "K" and "L" shall have soldered or sweated joints with solder-joint type or copper fittings. Flared joints with flare type bronze fittings may be used where approved for specific service. Solder shall be 95-5 or equal.

3. Do not make brazed or soldered connections to valves, expansion joints, strainers, apparatus, other units, which are intended to be removable.
Screwed Joints:

E. Screwed Joints;

1. For screwed joints use red or white lead and oil, or approved pipe-joint compound; apply only on male threads.

2. Brass pipe shall have screwed joints, for sizes two inches (2") and under; flanged two and one half (2 1/2") and over.
3. Cut pipe, nipples evenly, cut threads clean, remove burrs, ream ends to full inside bore. Cut brass pipe with hack saw rather than with pipe cutter.
4. Do not use Stulson Wrench for making brass pipe joints tight; such pipe, bearing wrench marks, will not be acceptable and shall be replaced at Contractor's own expense.

F. Joints of Dissimilar Metals: Provide with "EPCO" dielectric valves isolation couplings of same size as pipe.

G. Pipe Preparation:

1. Pipe shall be carefully cleaned before installation. The ends of threaded pipe shall be reamed out full-size with a long taper reamer so as to be partially bell-mouthed and perfectly smooth.
2. All threads on black steel pipe shall be cut with new clean dies, full thickness of the die and so that more than two (2) threads are left exposed on the pipe when the joint is made up in the fitting or valve.
3. Copper, brass pipe and chromed, polished or painted, connections from fixtures shall show no tool marks. Install with approved wrenches.
4. Thread lubricant shall be used for all threaded joint make-up and shall be applied to the make thread only. Lubrication shall include threaded cleanout plugs.

2.16 PIPE FLANGES

- A. Flanges of same weight as fittings in same service category; drilled for 150 PSI service.
- B. Screwed flanges shall be cast iron.
- C. Welded flanges shall be steel welding neck type.

2.17 GASKETS

- A. Gaskets for pipe flanges shall be ring type, one sixteenth inch (1/16") thick, of compressed fiber and special compound, suitable for service intended.
- B. Factory cut for 125 lb. flange size, "Durable Mfg. Co.," Durable Series.
- C. Garlock 122. "Garlock Packing Co.," for hot and cold water.
- D. Rubber gaskets for cast iron pipe shall meet the requirements of ASTM A 74-80.

2.18 PIPE SLEEVES, ESCUTCHEONS, COVERS

A. Furnish and set sleeves to accommodate pipes passing through foundations, walls, floors, partitions, roof; provide escutcheons at exposed finished surfaces pierced by pipes.

2.19 VALVE TYPES

A. General: For valve location and installation, refer to "Valves" under "Piping Installation" herein and the drawings.

B. Valve Requirements: Unless otherwise indicated or specified for particular or individual equipment, following requirements shall apply-

1. Valves, General. Designed for packing under pressure with valve open or closed.
2. Valves used for throttling or controlling flow: for shut off use butterfly or ball type as indicated.
3. Ball valves on all cold water and hot water piping unless otherwise noted.
4. Valves shall have rating of not less than 125 PSI SWP or as indicated in service schedule.
5. Valve Material: PVC Schedule 80 Slip-Slip.
6. Valve ends: Screwed for all sizes two inches (2") and smaller, except copper tube.
7. Valve ends for copper tubes, Type K and L: Solder joint type.
8. Flange valves shall have flange drilling to suit joining pipe flanges.
9. Gate valves shall have solid tapered wedge, except where otherwise specified .
10. Globe type valves shall have renewable composition discs recommended by manufacturer for intended service, or renewable bevel seat and metal disc where so specified.
11. Check valves shall be horizontal swing type with bronze seat and composition or bronze disc as approved; body of same material, pressure rating, screwed or flanged, finish as adjoining globe or gate valve. Check valves in pump discharge lines shall be of the spring loaded non-slam type as manufactured by "Mission" Duo Check Series 150-S-M-F.

2.20 VALVE CATALOG NUMBER DESIGNATIONS

A. Valve design, material of components, workmanship, other features: Equal to "Stockham Valve Company" catalog numbers (unless otherwise noted) for various types of valves listed. (For PVC Schedule 80: Use Specs From Harrington, Spears, Ryan-Herco.)

B. Gate Valves

1. Screwed, bronze, union bonnet, rising stem, 150 PSI SWP; NO. B-120.
2. Screwed, ibbm, non-rising stem, 125 PSI SWP; NO. G 608.
3. Flanged, ibbm, non-rising stem, 125 PSI SWP; NO. G 461.
4. Flanged, ibbm, OS & Y, 125 PSI SWP; NO. G-623.

C. Ball Valves

1. Screwed two inches (2") and smaller, cast bronze body, 40 PSI WOG, "Apollo 3" Series 82.
2. Valves shall include reinforced Teflon packing ring, thrust seal, body seals and seats.
3. Balls shall be chromium plated bronze; with full size ports.
4. Quarter turn on-off, adjustable packing gland and internally inserted stem .
5. 2 1/2" and larger: "Powell" 150 PSI; flanged ball valve fig. 4226T with 316 stainless steel SS) body and 316 55 ball and stem with Teflon seat.

D. Globe and Angle Valves

1. Screwed, bronze, composition, 150 PSI SWP; 8-22 globe, No. 17 angle.
2. Screwed, bronze, bevel seat and metal disc I 200P51 SWP; 8-37 globe, No. 701 angle.

E. Check Valve, Horizontal Swing Type (not for pump discharge)

1. Screwed, bronze body, bronze disc, 125 PSI SWP; B-319.
2. Flanged, cast iron, bronze disc, 125 PSI SWP; G-931.

F. Cocks

One inch (1") and larger, 175 lb. brass, square head, "Powell" Fig. 2201lubricated type.

2.21 MANUFACTURE OF VALVES

- A. Valves: "Stockham," "Crane," "Nibco" or "Potter-Roemer." "Harrington" "Spears" "Ryan- Herco".
- B. All valves shall be the product of manufacturer.
- C. All valves shall bear name or trademark of manufacturer, working pressure, and direction of flow cast or stamped on valve body.

2.22 PIPE ISOLATION

- A. Hangers shall be separated from pipe by means of steel encased hair felt padded isolation.
- B. Isolator shall be as manufactured by "Lemco-Trisolators" or "Potter Roemer RP Isolators." Submit shop drawings for approval.

2.23 PIPING IDENTIFICATION

- A. Each individual pipe line concealed or exposed shall be labeled for quick and easy identification as to direction of flow and content of materials carried in the pipes by method of stenciling.
- B. Labels shall be installed at each valve, special fittings and at all branch take-offs and twenty feet (20'-0") apart on long runs.
- C. Samples of all stenciling for flow and content shall be submitted for approval prior to installation.

LETTERS

Domestic Hot Water Supply	DHW
Domestic Cold Water Supply	DCW
Soil	S
Waste GC	W
Gravity Condensate	GC
Natural Gas (Fuel Gas)	GAS

- D. Prior to stenciling, all fuel gas piping shall be provided with one coat of primer paint and one coat of yellow paint. Primer and paint types as selected by the Architect.

2.24 PLUMBING FIXTURES (N/A)

- A. All plumbing fixtures indicated on drawings and/or specifications shall be furnished and installed in accordance with manufacturer's specifications by this contractor.
- B. Plumbing fixtures be as follows, with connection sizes as indicated in fixture schedule on the plumbing drawings:

1. Watercloset WC-I: American Standard "Cadet" 18" high 9468.018 (1.6) gallons per flush, floor mounted, siphon jet, white vitreous china, elongated bowl. 1 1/2" top spud with Sloan Royal 113 flush valve, 3 gallons per flush, "Church" plastic seat model 295C, elongated, open front, with external check hinge, scratch and stain resistant .C.E.C. listed.
2. Lavatory L-I: American Standard "Lucerne" 0356.028, white vitreous china, wall hung lavatory with faucet holes on 4" centers. Front overflow, 1 1/2"x 1 1/4" cast brass P-trap with chrome finish. Symmons "Scot" S-60-G-H metering faucet with 4" centerset. Rose spray outlet with 0.5 GPM flow rate. Grid strainer drain assembly. C.E.C. listed.
3. Sink S-I: American Standard "Custom Line" single bowl sink, 7013.014 white enameled cast iron, self-rimming 24"x 21" with faucet holes on 8" centers punched for 4 holes. 1 1/2" cast brass L.A. pattern P-trap with chrome finish. American Standard 4331.013 chrome basket strainer. "Cadet" 4161.120 chrome faucet with 2.2 GPM flow restrictor and metal lever handles.
4. Service Sink: American Standard "Florwell" 7741.000 white enameled cast iron floor mounted service sink with 7745.811 rim guard, 3" outlet, 2" cast brass L.A. pattern P-trap with chrome finish, 7721.038 chrome finish drain with strainer, 8344.111 faucet with top brace, stops, and vacuum breaker.
5. Floor Drain FD-I: J.R. Smith #2005-A-P-PB, 5" square top, 2" outlet, trap primer connection, Duco cast iron body with polished bronze grate.
6. Trap Primer TP-I: Precision Plumbing Products, Inc. model "Prime-rite" 1/2" inlet and 1/2" outlet with distribution unit, may be located as indicated on drawings or as required by code. UPC listed.
7. Water Hammer Arrestor WHA-I: Precision Plumbing Products, Inc. model "SC-Series" (size as required), installed on all quick closing valves and all valves which close with the flow of fluid, or on headers serving more than one fixture. Provide a 12"x 12" access panel.
8. RD-1: J.R. Smith #1083-C Roof Drain. Duco cast iron body with no-hub fitting, combined flashing clamp, gravel stop and adjustable "Flow Rate Control" assembly and dome.
9. OD-I: J.R. Smith #1080-0 Overflow Drain. Duco cast iron body with no-hub fitting, combined flashing clamp, gravel stop and adjustable "Flow Rate Control" assembly and dome. 3 1/2" water dam.

C. Interior exposed pipe, valves, and fixture trim shall be chrome plated.

D. The complete installation of each fixture shall include trap and accessories with accessible stop or control valve in each hot and cold water branch supply line. Fixture floor connections shall be made with approved brand of cast Iron floor flange, soldered or caulked securely to waste pipe. Make joint between fixture and floor flange tight with approved fixture setting compound or gaskets.

- E. Polish chrome finish at completion of project.
- F. Install fixtures and fittings as per local codes and manufacturer's instructions.
- G. Do not use flexible water piping.
- H. Caulking: Fixtures shall be bedded and caulked along joint at walls, counter tops and other intersecting surfaces with "Polysenseal" distributed by "Gladding-McBean" or approved equal.
- I. Backing for all fixtures indicated on wall shall be one quarter inch by six inches (1/4" x 6") steel plate; recessed flush with stud face and extending to next stud beyond fixture on each side. Secure plate top and bottom at each stud and weld three eighths inch (3/8") steel stud bolts to each stud. See fixture schedule for type of support required. For wood stud installation, secure backing plate to each stud with three eighths inch by two inch (3/8" x 2") long lag bolts. Minimum two (2) per stud.

2.25 WATER HAMMER ARRESTORS

- A. Piston operated, type K copper barrel, with brass threaded adaptor
 - 1. The piston shall provide a permanent mechanical barrier between fluid and pre-load air change.
 - 2. The piston shall be equipped with two (2) O-rings, "Parker Specifications" N741-75, temperature rated 40 VF to 450 UF. Seal lubricant shall be "Dow Coming" Silicone Compound #111 FDA listed as safe for use in potable water systems.
- B. Shall be designed to operate under domestic and commercial line pressures. Shall be equal to the pipe diameter at the point of installation.
- C. The installation shall be made in the vertical or horizontal positions from the source of lock. Shall be installed in the following locations:
 - 3. All quick closing valves.
 - 4. All valves that close with the flow of fluid.
- D. Normal arrestor operating pressure shall be 35 to 250 Psig; with a maximum surge or spike pressure not to exceed 1500 Psig.
- E. Arrestor shall be fully guaranteed in writing by manufacturer for the entire life of the system.
- F. Shall be as manufactured by "Precision Plumbing Products, Inc.," SC Series. Submit shop drawings for approval by the Mechanical Engineer.

2.26 CLEANOUTS

- A. Floor: "J.R. Smith" #4023 or #4043 or "Zurn" #1400-2 or #1440-3; with polished nickel bronze non-skid adjustable round or square top. Use carpet clamping type top with carpet marker in carpeted areas.
- B. Dry Wall: "J.R. Smith" #4670 or approved equal by "Zurn" or "Josam;" prime coated steel, face or wall type.
- C. All other walls: "J.R. Smith" #14470 or approved equal by "Zurn" 1470 series with chrome plated cover and screws. Provide "J.R. Smith" #4715 or approved equal where wall thickness is inadequate to conceal cleanout.
- D. Submit shop drawings and/or catalog cuts for each type for Mechanical Engineer's approval, prior to installation.

2.27 THERMOMETERS

- B. Mercury-filled lens type type with separable socket. Adjustable, six inch (6") scale shall be 40 F to 240 VF range for hot water system with 2VF increments.
- C. Case, polished, nickel plated or enameled, straight style or angle style case, as required for ease in reading.
- D. Installed *where* shown, and adjacent to each liquid immersion thermostat. Locate accessible and for ease in reading, position thermometers located more than 6 feet (6') above floor.
- E. Thermometers shall be manufactured by "Palmer" 6016, 6017, 1021; or approved equal in "Taylor," or "Scientific."
- F. Submit shop drawings and/or catalog cuts for each type for Mechanical Engineer's approval, prior to installation.

2.28 PIPE INSULATION

- A. General
 - 1. Furnish and install thermal insulation on clean dry surfaces; after testing, inspection, and approval in strict accordance with these specifications, contract documents and manufacturer's recommendations.
 - 2. All insulation and accessory material shall meet the requirements of flame spread not to exceed 25 and smoke developed not to exceed 50, as tested by "Procedure ANSI/ASTM-E 84, NFPA 225 or UL 723.
 - 3. Insulation shall be as manufacture by "Manville" or as approved by the Mechanical Engineer, prior to installation.
 - 4. Installation: By skilled appliers directly in the employ of firms with a minimum of five (5) years successful installation experience, specializing in this

type of work.

5. Pipe Hangers shall be installed outside the insulation. This contractor shall insert a section of cellular glass insulation at the support of a length not less than twice pipe diameter.

B. Medium Temperature Pipe Insulation

1. All piping with hot surfaces shall be insulated. These shall include, but not be limited to the following:

- a. Heating hot water supply piping.
- b. Heating hot water return piping.

2. Insulation shall be one inch (1") thick for piping 1 1/2" and smaller, and one and one half (1 1/2") thick for piping 2" and larger; with a K factor of 0.23 at 75 -F, high density, white draft bonded to aluminum foil reinforced with fiberglass yarn, "Manville Micro-Lok with AP jacket or approved equal in C.S.G., or P.P.G.

3. Insulation shall be applied over clean, dry pipe after piping has been tested. Insulation shall be butted together and longitudinal joint closed with white vapor barrier adhesive. Butt strips shall be applied over the circumferential joint and secured with three inch (3") wide self-sealing butt joint strips.

4. Insulate all fittings, flanges, valves and appurtenances with premolded one-piece PVC folded fitting covers with factory matched precut insulation insert, "Manville Zeston" or approved equal.

C. Weatherproofing

1. General: Where insulated piping is exposed outdoors, it shall be covered. This includes all cold water piping exposed to outdoors.

2. Cover outdoor exposed insulated piping with 0.016 inch thick corrugated aluminum jacket.

3. Aluminum jacket shall be secured with aluminum draw bands eighteen inches (18") on center, with longitudinal seam overlapped and positioned to shed water. At circumferential joint, place sealant around one end and overlap adjacent piece two inches (2") and secure with one half inch (1/2") aluminum hand.

4. Elbows, all valves, flanges, fittings, etc., shall be covered with "GASCO" or equal covers with circumferential joints described above.

2.29 EQUIPMENT IDENTIFICATION

A. Valves

1. Numbered brass disc attached to each valve for identification.

2. Valve tag shall be stamped to identify type of service and sequence number (i.e.: HW-I). Submit sample valve tag for approval prior to installation.
3. Valve directory to be provided with operations and maintenance submittals.
4. All Piping shall have permanent Pipe Markers & Flow Indicating Arrows Attached. Submit Sample for Engineers Approval.

PART 3 - EXECUTION

3.01 SUBMITTALS AND TESTS

A. Requirements and Submittals

1. Conformation to requirements of Uniform Plumbing Code 1991 Edition local and/or State codes and/or Ordinances, including the Uniform City and County Building Codes, State County and City Health Department Ordinances, State of California Industrial Accident Commission Safety Orders.
2. Apply and pay for all permits, fees, inspections, examinations and tests required by any legally constituted authorities.
3. Submission of six (6) brochures containing certified manufacturer's drawings and cuts of all equipment and specialties within thirty (30) days after Contract is signed. Partial or incomplete submittals will be rejected and will be returned to Contractor for re-submittal.
 - a. Submittals shall be in a neat ring binder form and shall contain a complete list, in index form, of the manufacturer's names, cuts of equipment, performance data, catalog numbers and trade names; as required; to properly identify the materials and equipment to be furnished under these specifications.
 - b. Data submitted for each item shall be properly identified by reference to item number of paragraphs in the specifications and mechanical drawings' equipment schedule designation.
 - c. Any deviation from item as specified shall be clearly indicated on the submittal and noted as such.
 - d. These specifications and accompanying drawings specify and illustrate equipment and materials deemed most suitable for the service anticipated. This is not to preclude other products equally as good and efficient. The contractor shall prepare his bid on the basis of the particular

equipment and materials specified for the purpose of determining the low bid. The awarding of the contract shall constitute a contractual obligation to furnish the specified equipment and materials.

e. After the execution of the contract, should the contractor desire to substitute equipment other than that specified in the contract documents, such substitution shall be approved by the engineer.

f. In the event the contractor obtains the Engineer's approval of equipment other than that herein described; he shall, at his own expense, make any changes in the structures, buildings, or piping necessary to accommodate the equipment and shall furnish record drawings to the Engineer.

g. It will be assumed that the cost to the contractor of the equipment proposed to be substituted is less than that of the equipment specified in the contract documents; and, if the substitution is approved, the contract price shall be reduced by an amount equal to the savings.

3.02 EQUIPMENT

A. Regulation, Operation and Instruction

1. Lubricate all bearings in accordance with manufacturer's recommendations and instructions.
2. Check operation of all pumps, fixtures, motors, etc.
3. Furnish the services of a qualified technician for a continuous period of not less than seventy two (72) hours, at a time convenient to the owner to place the entire system into operation, supervise its operation, make all tests and adjustments, correct any and all defects and deficiencies and thoroughly instruct the owner's operators in the proper operation and maintenance of the entire system. Furnish complete test reports including all motor current's, pump performances, and hot water heater performances to the Architect for review by the Mechanical Engineer.
4. Furnish any additional operation, labor, and material that may be required during guarantee period.
5. The contractor shall, during the guarantee period, and as directed by the owner, make any additional tests, adjustments, etc., that may be required and correct any deficiencies arising from the operation of the system.

3.03 OPERATING AND MAINTENANCE DATA

A. Data: Submit to the Architect for approval, prior to acceptance of the installation, complete and at one time. Partial or separate data will not be accepted. Data shall consist of the following-

1. Manufacturer's Literature: Six (6) copies of manufacturer's instructions for operation and maintenance of all equipment, valves, and controls; including

replacement parts lists.

2. Written Instruction: Typewritten instruction for operation and maintenance of the system composed of Operation Instructions and Maintenance Instruction. Six (6) copies submitted to the Architect for approval.

a. Operating instructions shall contain a brief description of the system. Adjustments requiring the technical knowledge of the service agency personnel shall not be included in the operating instructions.

b. Maintenance instructions shall list each item (i.e., plumbing fixtures and equipment) requiring inspection, lubrication, or service and describe the performance of such maintenance.

3. Verbal Instructions: Operating personnel shall be instructed in the operation of the systems in accordance with typewritten instructions. No other verbal instructions shall be given.

4. Binders: Four (4) complete sets of the above data in loose-leaf, ring type binders with permanent covers, with identification on inside cover.

3.04 SPECIAL REQUIREMENTS

A. The manufacturer and/or supplier of all equipment shall certify in writing to the owner that this equipment complies with these specifications.

B. All new equipment shall be anchored as required and/or as detailed on drawings.

C. Written Certifications, in a form approved by the Mechanical Engineer, shall be provided by the equipment manufacturer or his authorized representative

1. That the equipment and its installation was inspected on the job by the manufacturer and that the equipment is in first-class condition throughout, was installed in accordance with manufacturer's requirements and recommendations, and that the installation is approved by the manufacturer.

2. That the equipment is operating in a safe and satisfactory manner and is delivering capacities and performance hereinbefore specified and/or indicated on the drawings.

3. The following shall be certified as described above: All plumbing fixtures and domestic hot water heaters.

D. Damage by Leaks: The contractor shall be responsible for all damage to equipment and premises caused by leaks or breaks in piping or equipment for a period of one (1) year after date of final acceptance.

E. Unless otherwise directed, and/or specified, and/or indicated; all materials and equipment shall be installed in accordance with the manufacturer's recommendations and instructions.

F. Plumbing equipment shall bear the manufacturer's label or nameplate showing

performance characteristics. Identifying size or model number shall be given only when not practicable or customary to show otherwise. All valves, pipe, fixtures and fittings shall bear the manufacturer's trademark or identifying markings.

G. All materials of similar class or service shall be of one manufacturer.

H. Plumbing piping layouts as shown on the drawings are subject to modifications, by contractor, without extra cost as required to clear other items of construction. This contractor shall coordinate the work of this section with that of other sections as to avoid interferences by other crafts involved.

I. Contractor shall visit site prior to bidding and fully acquaint himself with all conditions affecting installation of the proposed system. Failure to do so shall not relieve contractor of responsibility of providing complete, operational, and acceptable system.

3.05 COMPLETION

A. When the installation is complete and adjustments specified herein are made, the system shall be operated for a period of one week, during which time it shall be demonstrated to the Mechanical Engineer as being completed and operating in conformance with these specifications.

B. Record as-built drawings showing locations and size of all plumbing piping, fixtures, and equipment as installed shall be kept up-to-date and available for inspection at all times during construction. These shall be signed by the General Contractor and Plumbing Contractor to certify their accuracy and shall be submitted to the owner prior to final acceptance of the work.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, & AIR CONDITIONING
23 00 00 - HVAC

PART1 - GENERAL

1.00 GENERAL

The General and Special Conditions apply to this Section of the Specification.

1.01 SCOPE

- Provide all labor, materials, equipment, tools, and services required for the installation of the DUCT SYSTEM REVISIONS as indicated in the drawings, and as specified herein:
- The duct distribution system shall include but not be limited to, the components and the work as follows:
 - (4) CARRIER 10 NT #48TCED12C2 Gas/Electric Package Units
 - (2) CARRIER 7.5 NT #48TCED08C2 Gas/Electric Package Units
 - Sheet metal ducts and connections
 - Duct supports and hangers
 - Volume dampers, pressure dampers and fire dampers
 - Turning Vanes, and Extractors

1.02 GENERAL REQUIREMENTS

All core drilling, cutting, and patching for the installation of work under this Section shall be performed under this Section of the Specifications. No holes will be allowed in any structural members without the written approval of the Structural Engineer.

1.03 QUALITY ASSURANCE

- Shall be in conformity with all Local, State, and Federal code requirements.
- To include ASHRAE, ACCA, SMACNA, and NEC.
- City of Phelan, Heating and Refrigeration Codes
- Underwriters Laboratories Inc.
- CARB environmental regulations.
- ARL applicable standards.
- And other applicable Codes, Specifications, or Standards, to be in accordance with the best trade practices.
- Materials shall be new and in perfect condition.

- Materials for similar uses shall be of the same type and manufacture unless otherwise approved by the Mechanical Engineer.
- All work areas shall be kept clean and clear of debris daily and kept in a neat condition continually, while working at the facility.
- All equipment shall be of the manufacturer, kind and type as specified. Substitutions or alternates must have the prior approval of the Mechanical Engineer.
- The Contractor(s) shall conform to OSHA regulations and insure the safety of the occupants during construction. All materials, equipment, and their installation shall comply with the requirements of OSHA Standards.
- Mechanical equipment shall bear the manufacturer's label or nameplate showing all performance characteristics. All valves, pipe fittings, etc., shall bear the manufacturer's trademark or identifying markings.
- Provide mechanical and control operational instructions to City of Phelan Maintenance personnel, to be directed by the Mechanical Contractor, Control Contractor, and others as may be necessary.

1.04 SUBMITTALS

- Product data.
- Maintain a separate set of drawings at the job site for such marking of "As-Built" locations. This set shall be updated as the installation work progresses and shall be available to the Architect at job visits.
- Within thirty (30) days after award of the Contract, submit five copies (5), to the Mechanical Engineer, a list of materials and equipment proposed for the job including: rating and capacity data, sizes, grades, electrical data, part or catalog numbers, manufacturer's names and addresses, trade names, illustrations and descriptive literature. Pertinent data for each article shall be underlined in each copy of each catalog or brochure in which it is described.
- As-Built Drawings.

1.05 PERMITS

Contractor shall apply for and pay for all required permits for the installation and construction of the work under this section.

Arrange for and pay for any inspections by the governing body as required and deliver certification to the Mechanical Engineer.

1.06 PROTECTION OF WORK

- Prior to the start-up of the HVAC systems, all the new outlets for the air shall be covered with gauze, cheesecloth, or similar material in such a manner as to preclude the possibility of any foreign matter within the ducts (such as metal shavings, screws,

etc.) from blowing out of the ductwork.

- Contractor(s) shall repair at his cost any damage to the buildings, grounds, and related items incurred by his operations.

1.07 INSPECTIONS

- As required by the CITY of PHELAN, Department of Building and Safety.
- Inspection and approval of the installation, by the Mechanical Engineer, and the CITY of PHELAN prior to concealment of the installation.

1.08 DUCT INSTALLATION

To be at the locations indicated on the drawings. It is the Contractor(s) responsibility to verify with the Mechanical Engineer, any location where suitability is questioned prior to any installation, and to make notification of improper locations or of interference with any other work.

- Installation shall be in accordance with manufacturer's instructions and the approved shop drawings.
- Protection of all sharp angles and metal protrusions by use of ARMAFLEX.
- Air Conditioning equipment and ductwork shall be anchored as indicated on approved shop drawings and in accordance with ASME Standard Safety Code for Mechanical Refrigeration, and SMACNA Guidelines for Seismic Restraints of Mechanical Systems.
- All duct openings are to be kept closed, where possible, during construction to prevent damage and obstructions.
- All exterior ducts shall be rectangular and exteriorly insulated, and covered with a 24 ga., Galvanized Metal Skin.
- Flexible ducts are to be used on supply and return drops only. (Exceptions dependent on conditions, only as authorized by the Mechanical Engineer). Flexible ductwork shall be extended full length from trunk line to grill or diffuser, and shall be "Wiremold Vintage Duct" type 57. All the Turns in Flex Duct shall be accomplished with a metal adjustable Gore Elbow.
- All ductwork shall be properly connected to the supply air, return air, exhaust air, make-up air etc., as follows:
 - Hanger straps shall be attached to the ducts in a manner to preclude screw penetration into the ducts.
 - All ducts shall be hung free where possible to inhibit contact with partitions,

beams, etc. (Elimination of vibration transfer).

- The duct standing seams shall be protected as per SMACNA standards.
- Drops to individual ceiling registers that are more than twelve inches long shall be sway braced with sixteen gauge galvanized metal strap 1-1/2" wide, secured to the building(s) framing.
- Quadrants and controls on insulated duct shall be mounted on eighteen gauge galvanized hat sections with flush finished insulation.
- All transverse joints on the supply, return, exhaust, and make-up air ducts shall be taped with four inch wide, four ounce canvas saturated with 'ARABOL". Additional applications of 'ARABOL" shall be applied to make the Ductwork completely air tight. *(Upon the approval of the Mechanical Engineer a substitute such as "MIRICLE" High Pressure Duct Sealer may be used.)*

Under no circumstances will the acceptance of a joint installed with duct tape and screws only be made.
- The Counter flashing of Ducts and Vents through walls is required, and shall conform to Code (SMACNA standards) and good installation practices.

PART 2 PRODUCTS:

2.00 SHEET METAL

A. Ducts shall be made up of sheets of galvanized steel of the following gauges:

Rectangular Ducts Maximum Side In Inches	Minimum U.S. Gauge Thickness
Up to 12	26 GA.
13 to 30	24 GA.
31 to 54	22 GA.
55 to 84	20 GA.

B. Flat surfaces shall be crimped diagonally regardless of size. Longitudinal joints in all duct sizes may be flat lock joints. Transverse joints and intermediate bracing shall be constructed of galvanized sheet metal and/or galvanized structural angles as follows:

Maximum Side Inches	Traverse Joints Connection	Intermediate Bracing All Sides
Up to 18 Inches	S & Drives or 1 inch Pocket Slip, 7 - 10 inch Maximum Centers	None
19 inches to 42 inches	1 inch Bar or 1 inch Pocket Slip, 7 -10 inch Maximum Centers	1 inch by 1 inch by 1/8 inch Angles, 4 foot Maximum

43 inches to 60 inches	1 1/2 inch Bar Slip or 1 1/2 inch Pocket Lock (Government Lock)	1/2 inch by 1-1/2 inch by 1/8 inch Angles, 4 Feet from Joint
61 inches to 84 inches	Reinforced Bar Slip Angle on 7 Ft. - 10 inch Maximum Centers, using 1-1/2 inch by 1-1/2 inch by 1/8 inch Reinforcing Angles	1-1/2 inch by 1-1/2 inch by 1/8 inch Angles at 2 Ft. Centers

C. Lock joints shall be hammered to make them airtight and shall be riveted at each corner. The inside of the ducts shall present a smooth surface to the flow of air.

D. Changes in the size of ducts shall increase gradually with a slope of not more than one (1) foot in five (5) feet where possible, but not more than one (1) foot in three (3) feet in any event.

E. All ducts are to extend to full size a minimum of 12" beyond the last outlet to provide cushion chambers.

F. Turns shall be made with a throat radius of not less than the duct width or with turning vanes.

G. Horizontal ductwork shall be strongly supported with galvanized hangers or rods at not greater than five-foot spacing. Vertical rectangular Duct risers shall be supported with appropriate support bracing.

H. Ducts, Plenums, Access Doors, Fresh Air Intakes, and Exhausts shall be installed as indicated on the plans or as required. Where access doors are required, but not shown, doors shall be furnished and installed without additional cost to the Owner.

I. Plenum access doors shall be galvanized sheet steel doors and frames properly reinforced to prevent breathing. Door shall be of same gauge as the duct or casting and shall have a 1/2" CELOTEX core with galvanized sheet steel on both sides. Each door shall be hung on piano hinges and with one or more catches which are operable from both sides and similar to VENTFABRICS, Inc. No. 260 Ventlock latch. Doors shall be hung to open against air pressure and shall be fitted with felt to insure air tightness.

J. Flexible connections for air ducts shall be 16-oz. airtight "Ventglas LA" non-combustible fabric with fire retardant neoprene coating on the outside. Flexible connections shall be attached to the ductwork by lock seam and shall not be more than 6" long. Flexible connections shall be provided where required and/or as indicated on the drawings, not less than 2" nor greater than 4" between mounting flanges.

K. Inspection doors shall be installed in ductwork on upstream and downstream sides of cooling coils, duct heaters and on downstream side of each motorized damper. Inspection doors shall be airtight and shall be insulated with one-inch insulation.

L. Sheet Metal Plenums:

- 18 gauge galvanized sheet wall panels, vertical standing seam construction, spaced approximately 3' (three feet) on centers. Seams bolted with galvanized bolt spaced at 2' (two feet). Each panel cross-broken between seams.

- Panels to be supported and stiffened by 1-1/2" x 1-1/2" x 3-1/16" galvanized steel angles, at corners, floor, ceilings, and doorways; wall sheets bolted to angles with galvanized bolts.

M. All ductwork including insulation, hangers, supports, braces, etc., shall conform to the California Administrative Code, Title twenty-four, and SMACNA low velocity construction standards.

2.01 DUCT INSULATION

Insulation of new ductwork is to be in accordance with the existing ductwork, where it does not conflict with the following requirements:

A. Insulate the outside surfaces of all Plenums, supply, and return ducts for entire length after joints and seams have been taped; not required on exhaust ducts and supply and return ducts exposed inside conditioned space.

B. Ductwork and Plenums exposed to the weather shall be provided with Certainteed Industrial Insulation Board with FSK facing, 1-1/2" thickness, three pound per cubic foot density factory applied reinforced foil and paper (foil-scrim-kraft) facing. All joints shall be sealed with a pre-sized glass cloth vapor barrier tape. Insulation shall be applied as per manufacturer's application recommendations. Ductwork and Plenums exposed to the weather shall have applied on insulation, and galvanized sheet metal cover on all sides.

C. Internally lined duct shall be insulated with one and one half inch thick, one and one half pound density fiberglass liner. The air stream side shall be faced with a black coated mat, applied with adhesive and mechanical metal fasteners as recommended by the manufacturer, and fastened to preclude the possibility of material dropping into the air stream. All insulation shall conform to the California Administrative Code, Title twenty- four, and SMACNA low velocity construction standards. Dimensions of ducts shown on drawings are net inside liners.

2.02 TURNING VANES

- A. Vanes with both dimensions less than 48": Barber-Coleman "Air turns" without splicing.
- B. Vanes with either dimension greater than 48": Double thickness airfoil vanes of approved pattern.

2.03 DAMPERS

- A. Balancing dampers shall be installed in each branch duct and in each main duct to provide for complete air balancing. Each manual volume damper shall be fitted with bearings and with an adjusting device having a locking mechanism. On exposed or accessible ductwork, the adjusting devices shall be fastened to the duct. On concealed or inaccessible ductwork, the adjusting devices shall be fastened to the furring and exposed in the finished space.

B. On ducts of seventeen inches or less, the balancing dampers, (where neither dimension exceeds 17") may be of the job fabricated "Butterfly" type consisting of a blade constructed of eighteen gauge galvanized steel securely riveted or welded at its center axis attached to a square operating rod.

On ducts of eighteen inches or larger the dampers shall be of the manufactured type as "Airfactors" Model # MD-16, or approved alternate.

C. Backdraft dampers: GREENHECK or as specified on drawings or approved alternate.

D. Suitable access to damper(s) shall be provided.

2.04 AIR DISTRIBUTION EQUIPMENT

A. Sizes and capacities are indicated on drawings.

B. Finish: Bake off-white factory finish.

C. Extractors: Anemostat DT2M or approved equal.

D. Supply Air Diffusers: Metal-Aire 9000 Series or as illustrated on the Drawings.

E. Return Air Registers: Metal-Aire Type CC-5 or as illustrated on the Drawings.

F. Finish for Metal-Air Supply and Return Grilles and Registers: Baked Off-White Factory Finish.

G. Independently installed M.V.D's. on each Branch and Main Trunk Line. *(As may be required or illustrated.)*

2.05 AIR CONDITIONING EQUIPMENT *(See Equipment Submittals for Details).*

3 (4) CARRIER 10 NT #48TCED12C2 Gas/Electric Package Units

4 (2) CARRIER 7.5 NT #48TCED08C2 Gas/Electric Package Units

PART 3 EXECUTION

3.01 LOCATION

A. Approximate only, except where definitely fixed by dimension notations.

B. To be followed as closely as possible.

C. Subject to re-arrangement for proper installation.

D. Diagrammatic drawings are to be understood as schematic of the required systems and not to be used for accurate locations.

E. Avoid interference with architectural and structural features, and the work of others.

F. Questionable locations are to be brought to the attention of the Mechanical Engineer prior to the installation of any component.

G. Openings to be provided through walls, partitions and other construction, (not originally indicated) as may be necessary for the passage of ducts, shall be verified by the Mechanical Engineer before proceeding.

H. The installation of valves, thermometers, gauges, cleanouts, dampers, duct access doors or other indicating equipment or specialties requiring reading, adjustment, inspection, repairs, removal or replacement shall be conveniently and accessibly located with reference to the finished Building.

I. Site inspections are to be made prior to the commencement of work, and the Contractor will be held to have examined the premises and to have understood the conditions under which he will be obligated to perform his part of the work. No allowance will be made subsequently in this connection on the behalf of the Contractor for any error through negligence on his part.

3.02 CUTTING AND REPAIR OF STRUCTURES

A. Cutting: Only as indicated in the drawings or as approved by the Mechanical Engineer, or upon determination of the Structural Engineer.

B. Repairing: By the appropriate craftsman to restore the structural condition of the project to preconstruction condition approved by the Mechanical Engineer or authorized project authorities.

3.03 SUBSTITUTIONS

A. Reference in the Contract Documents to any material, product, or process by name, make, or catalog number shall be interpreted as establishing a standard of quality and design intent, and not construed as prohibiting substitutions of any other material, product or process, provided, in the expressed opinion of the Engineer, such substitution is acceptable and fulfills the design intent of the work.

B. Acceptance of substitutions will not relieve the Contractor from responsibility for complying with the requirements of the Contract Documents.

C. Bidders may submit separate bids using materials and equipment of other manufacturers, providing the difference in cost is stated for each item proposed to be substituted.

D. Bidders shall provide to the Engineer all information necessary and required to allow evaluation of the proposed substitutions. Do not base bid on the assumption that a material will be approved as alternate by the Engineer unless the item has been specifically approved for this work by the Engineer prior to the receipt of bids.

3.04 CONTROLS

A. A one year full warranty on all components and labor shall be provided by the Controls/Electrical Contractor.

B. Submittals of all control specification sheets, and related component data, including changes in control wiring, (as-built) shall be submitted to the Mechanical Engineer at the conclusion of the installation (three copies).

C. Verification of all required control components shall be the responsibility of the Controls Contractor.

3.05 ELECTRICAL

A. Shall conform to the requirements as indicated on the Mechanical Drawings, and as provided for by the Manufacturers Equipment and Component Specifications.

B. Utilization of the existing provided electrical service(s) shall be in conformance with all governing authorities and practices as set forth by such administrations I.E.: NEC, Federal, State, Local, UL, L.A, etc.

3.06 AIR SYSTEM TESTS and BALANCE

A. Work under this Section shall include the complete and total Air Balance of all equipment and related Air Distribution Systems.

B. All work shall be done under direct supervision of the Projects Mechanical Engineer. All instruments used by the Air Balancing Contractor shall be accurately calibrated and maintained in good work order.

C. Air balance and testing shall not begin until system has been completed and is in full working order. The Contractor shall put all heating, ventilating and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing.

D. Upon the completion of the air conditioning system, the Air Balance Agency shall perform the following tests, compile the test data, and submit six (6) copies of the complete test data to the Contractor for forwarding to the Engineer for evaluation and approval.

E. Testing and Balance: The Air Balance Agency shall perform the following tests, and balance systems in accordance with the following requirements:

1. Test and adjust belt drive blower RPMs to design requirements.
2. Test and record each motor full load ampere reading.
3. Make pilot tube transverse of main supply return and exhaust ducts obtain design CFM at fans.
4. Test and record system static pressures, suction and discharges.

5. Adjust all main exhaust and return air ducts to proper design CFM.
6. Adjust all zones to proper design CFM, supply and return.
7. Test and adjust each grille and register to within +1- 10% of design requirements.
8. After balancing, Contractor shall demonstrate to the Mechanical Engineer that the system is in balance and shall spot-check diffusers and register at random to ascertain proper air delivery.
9. In preparing balance reports, Contractor shall record information required on AABC test sheets No.'s 12766, 12866, 21266, 12466, and others as may be required.
10. In cooperation with the control manufacturer's representative, adjustments of automatically operated dampers to operate as specified indicated and/or noted.
11. As part of the work of this Contract, the Air Conditioning Contractor shall make any changes in the pulleys, belts and dampers required for correct balance as recommended by the Air Balance Agency, at no additional cost to the Owner.
12. The Air Balance Contractor shall make fast all Damper Handles by Pinning with Tec Screws, or other approved methods which will allow permanent setting of the Damper position. Indelible and or Fluorescent markings are to be used for establishing the original Damper Handle positions.

3.07 OPERATION

- A. Operational Readiness: The Contractor shall insure that the complete installation including all equipment and controls, is complete, operating, checked, and adjusted at the time of final inspection. Contractor shall provide one complete extra set of filters which shall be installed prior to final inspection.
- B. The Contractor shall be held responsible for any delays incurred and/or re-inspection required due to any lack of above mentioned readiness.
- C. Each entire system shall be operated continuously for a period of three (3) full days, at a time requested by the Owner, to prove that the installation will fulfill all guarantee requirements.

END OF SECTION

DIVISION 26 - ELECTRICAL
26 05 33.13 CONDUIT FOR ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this section.

1.02 APPROVAL AND MARKING

All raceways shall comply with the requirements of the Underwriter's Laboratories and shall be delivered to the site in standard lengths with each length bearing the manufacturer's trademark or stamp and the Underwriters' label of approval.

1.03 CONDUIT DEFINITION

Where conduit is mentioned in this Specification, this shall be interpreted as rigid, standard weight steel conduit. Intermediate metal conduit (IMC), electrical metallic tubing, aluminum, polyvinylchloride, or flexible metallic conduit shall be used only where specified herein or noted on the drawings.

1.04 RACEWAYS OTHER THAN CONDUIT

Raceways other than conduit (in the general sense) such as wireways, cable tray, etc., shall only be used when, where, and as allowed by the drawings and this Specification and in compliance with the NEC.

2.00 PRODUCT

2.01 CONDUIT AND FITTINGS

- A. Rigid steel conduit shall be zinc coated on the exterior and may be zinc or enamel on the interior. Couplings and locknuts, etc., shall be hot dipped galvanized or sherardized. All couplings, etc., shall be of the threaded type only.
- B. Bushings for standard weight rigid steel conduit shall be non-metallic for 1" and smaller. For conduits 1-1/4" and larger, insulated metallic bushings shall be used. Bushings shall be O. Z. Electrical Mfg. Co., Type "B" regular type or Type "BL" grounding type.
- C. Intermediate metal conduit (IMC) shall be rigid, zinc coated steel meeting UL 1242. Couplings, locknuts, and bushings for IMC shall be threaded, comparable to those specified for standard weight rigid steel conduit.
- D. Electrical metallic tubing shall be galvanized or sherardized. Couplings and connectors shall be galvanized or cadmium plated and shall be of the compression type equal to Appleton 95T series for couplings and 86T series for insulated box connectors.

- E. Flexible metallic conduit shall be standard or intermediate weight hot dipped galvanized steel and shall have all fittings hot dipped galvanized or sherardized. Fittings shall be the squeeze type. Fittings which use a screw to bind against tubing will not be accepted. Screw-in "Jake" connectors will be accepted only if the conduit is cut "square". Aluminum flexible conduit is not acceptable under this specification.
- F. Neoprene jacketed flexible metallic conduit shall be UL listed, Type UA, liquid tight (sealtite). See this Section under "Execution" for mandatory application of liquid tight flexible conduit. Fittings shall be equal to Appleton "STN" series.
- G. Polyvinyl-chloride (PVC) conduit ,except for telephone entrance conduit, shall be rigid heavyweight type, Schedule 40, Underwriters' approved, complete with PVC fittings.
- H. Telephone entrance conduit shall be polyvinyl chloride GT-80, complete with fittings.

3.00 EXECUTION

3.01 UNDERGROUND CONDUIT INSTALLATION

- A. All conduits installed underground in accessible trenches with removable covers shall be rigid steel.
- B. All buried conduits installed underground, regardless of type of material or size, shall be encased with a 3" (minimum) concrete envelope. The encasement of electrical and signal system feeders and all conduits 2" trade size and larger shall extend under the building to the panelboard or terminal cabinet, etc.
- C. Underground conduits shall be rigid, heavyweight (Schedule 40 or heavier) PVC, 3/4" minimum.
 - 1. Exception: Rigid standard weight or intermediate weight galvanized steel conduit may be used, at the Contractor's option, in lieu of PVC in any underground run. If steel conduit is used in a run that contains PVC, for example, for the ells at the ends of the run, the steel conduit must be of the same size as the PVC, even if the PVC is larger than that shown on the drawings, for the Contractor's convenience.
- D. All riser ells and conduit extensions from underground PVC runs shall be rigid steel conduit. The concrete encasement shall be extended to enclose all such ells and extensions up to grade level.
- E. Conduits installed in underground trenches shall be securely fastened in place so that absolutely no shifting will occur during placing of concrete encasement. Three alternate methods of securing conduits are suggested.
 - 1. Interlocking type plastic spacers set on concrete bases.
 - 2. Installation of conduits in the cells of concrete blocks placed at every joint.
 - 3. Patented steel stakes with bracket arms spaced on intervals equal to the conduit section length.

4. Other methods must be specifically approved by the Architect.
- F. The minimum separation between conduits in a common encasement shall be 3".
 - G. All underground conduits containing wiring with over 110 volts to ground shall include a properly sized ground wire. See Section 16450.
 - H. Conduit stubs installed for future extensions shall be rigid steel for at least 5 feet of the conduit run. The conduit ends shall be terminated with couplings and pipe plugs. The closed end shall be double wrapped with Scotchwrap #50 for the last 12 inches. The concrete envelope shall leave 3 inches of the wrapped conduit exposed for future connection.
 - I. All underground conduit stub outs, group of stub outs, in one location or pull box installed below grade in conduit run, shall be furnished with concrete monuments, 6"x6"x15" deep buried flush with grade, over the capped ends or pull box, or in lieu of concrete monuments as described, a brass identification plate may be permanently attached to building or concrete curb stating the exact distances and directions of the conduit or pull box location. The exact location of the monument or tag shall be shown on the "as-built" drawings.
 1. The face of monuments shall be furnished with 3" square brass plates securely mounted and engraved with the number and size of conduits or pull box.
 - J. Where storm drains, sewer lines and other gravity lines are to be crossed by conduits, grade stakes shall be set for the gravity lines, elevations of conduits shall be set for the gravity lines and elevations of conduits shall be put at proper depth so that there will be no conflict with storm drains, sewer lines and other gravity lines. It shall be the responsibility of the Contractor to coordinate elevations of all conduits to miss all gravity lines. Where conduits are installed and not properly coordinated, it shall be the responsibility of the Contractor to remove and reconstruct the conduit runs as required, and all costs in connection with such removal and relocation shall be borne by the Contractor.
 - K. Exposed conduit stubbing up through floor slab into bottom of exposed panels, cabinets or equipment shall be lined up, properly spaced and shall be straight and plumb. Conduits shall be in-stalled at sufficient depth below slab to eliminate any part of the bend above top of slab. All conduit stub ups shall be wrapped with tape from a point 2" below the top of slab, to at least 3" above slab. Tape shall be removed after slab has been cured.
 - L. The joints of all underground conduits shall be liquid and gas tight.
 - M. A segmented steel test mandrel of proper size shall be pulled through each non-metallic conduit 2" and larger. This test shall be made within 2 hours after concrete envelope has been poured. The job Inspector shall witness this test and shall so state in his report. A steel cable diameter minimum shall be fastened to both ends of the mandrel and mandrel shall be repulled through the conduit in the opposite direction.

3.02 ABOVE GROUND CONDUIT INSTALLATION

A. Rigid Steel and Intermediate Metal Conduit (IMC):

1. Rigid steel conduit or IMC shall be used where subject to mechanical injury, where installed in concrete, and where used exposed on exterior work.

B. Electrical Metallic Tubing (Steel Tube):

1. Electrical metallic tubing may be used for all interior above ground applications except where noted to be rigid steel or flexible conduit in these Specifications or as noted otherwise on the drawings. EMT may be used for exterior temporary feeders. All EMT shall have UL label.

C. Flexible Steel Conduit:

1. Flexible steel conduit shall be used only where noted on the drawings, where required for connection to motors, etc., or with the approval of the Architect, where absolutely necessary due to structural conditions.
2. Plastic coated flexible metallic conduit (Sealtite), complete with proper fittings, shall be used in lieu of regular flexible conduit in all areas subject to moisture, dampness, rain; in excessively dusty or dirty areas; where subjected to constant personnel contact; for connections to all kitchen equipment; for connections to all shop equipment and where specifically called for on the drawings.
3. Flexible aluminum conduit shall not be used.

D. PVC Conduit:

1. PVC conduit shall not be used above grade except where it is specifically indicated otherwise herein, or noted on the drawings. All riser ells (as well as all conduit extensions) from PVC systems into masonry walls or exposed areas shall be rigid steel. The underground portion of all steel ells shall be encased in concrete.
2. Connections, bending, cutting and installation shall be as recommended by the manufacturer.

E. All conduit of every type, used for electrical systems of 110 volts to ground or higher, shall have a copper ground wire installed therein. See Section under Grounding for sizing of ground wire. Conduit fill shall include the ground wire in all cases. See Section 16450.

F. Conduit shall be concealed, unless otherwise indicated. All conduit runs exposed to view, except those in attic spaces, shall be installed parallel, or at right angles to structural members, walls, or lines of the building.

- G. Conduit shall be kept at least 6" from the covering on hot water and steam pipes, and 18" from the covering on flues and breechings. The open ends of all conduit shall be kept closed with approved conduit unions where union joints are necessary. Running threads will not be permitted.
- H. Conduit bends, other than factory ells, shall have radius of not less than 10 times the internal diameter of the conduit.
- I. Hanger straps, rods, or pipe supports under concrete shall be attached to inserts set at the time the concrete is poured. Under wood use bolts, lag bolts, or lag screws; under steel joists or trusses use beam clamps.
- J. Factory made pipe straps shall be one-malleable iron or two-hole galvanized clamps.
- K. Conduit shall be supported at intervals not exceeding 10 feet and in all cases with a support not more than 3 feet from the outlet and at any point where it changes in direction. Perforated strap and plumber's tape shall not be used in the support of conduits.
- L. All conduits which are installed at this time and left empty for future use or where conductors are to be installed by the representative of the signal system manufacturer shall have a #12 "TW" insulated, copper pull wire or 1/8" polyethylene rope left in place for future use. All empty conduits, including conduit stubs, shall be tagged at all exposed ends with brass tags marked as shown on the drawings or as directed by the Architect's representative.
- M. Where conduit passes from one type of construction to another, or where there is a possibility of dissimilar movements, a suitable flexible or expansion device shall be installed.

END OF SECTION

DIVISION 26 - ELECTRICAL
26 05 33.16 – BOXES FOR ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section.

2.00 PRODUCT

2.01 OUTLET BOXES

- A. Outlet boxes five feet and below or mounted on building exterior shall be cast boxes equal to Crouse Hinds "FS" or "FD".
- B. Outlet boxes above 5 feet shall be pressed steel knockout type and shall be hot dipped galvanized or sherardized, equal to Steel City or Bowers Manufacturing Company. All boxes shall be of proper code size for the number of wires or conduits passing through or terminating therein, but in no case shall any box be less than 4" square, unless specifically noted as smaller on the drawings. Covers shall be of the types most suitable for the fixtures or devices used at the outlets and shall finish flush with plaster or other finished surface. Approved factory made knockout seals shall be used in all boxes where knockouts are not intact. Boxes in concrete shall be a type which will allow the placing of conduit without displacing the reinforcing bars.

2.02 PULL BOXES

- A. Pull boxes shall meet all code requirements as to size for conduits terminating therein and to thickness of metal used in fabrication or casting.
- B. Fabricated sheet steel pull boxes shall be installed only in dry protected locations and shall be furnished with required 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 surroundings.
- 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.

3.00 EXECUTION

3.01 OUTLET BOXES

- A. Outlet boxes shall be used as pull boxes wherever possible, and junction or pull boxes shall be installed only as required by the drawings or specifications, or as directed.

- B. All outlet boxes shall be accurately placed and securely fastened to the structure independent of the conduit. Particular care shall be taken in locating outlet boxes in acoustic tile. The plaster ring shall be set flush with the finished surface of the ceiling wall. Hangers shall be used to support outlet boxes in all ceilings. Hangers for lighting fixture outlets shall have adjustable studs.
- C. The plaster ring Crouse-Hinds "condulets" shall be used for all switch, receptacle and junction outlets where conduit is exposed.
- D. All outlets shall be installed square and true, at the proper heights and shall be coordinated with the other trades to insure a proper installation.

END OF SECTION

DIVISION 26 - ELECTRICAL
26 05 53 - CONDUCTORS

1.00 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work specified in this Section.

1.02 LUGS

Furnish and install proper lugs in all panelboards, switchboards, gutters, etc., required to properly terminate every cable. Where paralleled conductors or conductors of large size are to terminate on a breaker (either copper or aluminum) a short length of copper cable (of capacity of the breaker) shall be connected to the breaker, and the proper bolt or compression type lug installed to connect this cable to the feeder cable. The cutting of cable strands to fit the breaker will not be permitted. Lugs shall be Burndy, ILSCO or approved equal.

2.00 PRODUCT

2.01 COPPER, 600 VOLTS AND LESS

- A. All conductors shall be delivered to the site in their original unbroken packages, plainly marked or tagged as follows:
 - 1. Underwriters' labels.
 - 2. Size, kind and insulation of wire.
 - 3. Name of the manufacturing company and the trade name of the wire.
 - 4. Month and year when manufactured which date shall not exceed 2 years prior to the date of delivery to the site.
- B. Unless specifically otherwise allowed herein, all conductors shall be minimum of 98% conductivity, soft drawn copper.
- C. 600 volt type THHN/THWN 90 degrees /75 degrees C., type "THW" 75 degrees C or Type "XHHW", dual rated 90 degrees C (dry) /75 degrees C (wet) and down to – 35 degrees C, 600 volt insulation shall be used for all other wiring except where specifically noted otherwise.
- D. Minimum wire size shall be #12 AWG unless specifically noted as #14.
- E. All size #8 AWG and larger conductors shall be stranded.
- F. Connectors and terminal lugs shall be used for terminating stranded conductors #8 and larger shall be T&B, ILSCO, or equal, solderless connectors.

- G. All branch circuit and fixture wiring joints, splices and taps for conductors #10 and smaller shall be made with UL approved connectors listed for 600 volts. Connector bodies shall consist of a cone shape expandable coil spring insert, insulated with teflon or plastic shell.
- The connectors shall be the "Wing Nut" as manufactured by Ideal Industries, "Scotchlock" as manufactured by Minnesota Mining and Manufacturing Company.
- H. Make all connections and splices necessary to properly install and complete the work, and all splices shall be taped. All tape shall be 3M "Scotch" #33 plastic electrical tape. All connections and splices shall be electrically and mechanically perfect, and in strict accordance with all code requirements.

3.00 EXECUTION

3.02 COPPER, 600 VOLTS AND LESS

- A. Connectors and terminal lugs shall be used for terminating stranded conductors #8 and larger.
- B. All branch circuit and fixture wiring joints, splices and taps for conductors #10 and smaller shall be made with UL approved connectors listed for 600 volts. Connector bodies shall consist of a cone shape expandable coil spring insert, insulated with teflon or plastic shell.
- C. Make all connections and splices necessary to properly install and complete the work, and all splices shall be taped. All tape shall be 3M "Scotch" #33 plastic electrical tape. All connections and splices shall be electrically and mechanically perfect, and in strict accordance with all code requirements.
- D. Bolt type solderless connectors shall be tightened and then re-tightened after 24 to 48 hours before taping. Owner's Inspector shall be informed of this procedure during the waiting period and shall witness the act of retightening.
- E. All debris and moisture shall be removed from the conduits, boxes and cabinets.
- F. No oil, grease, or similar substances shall be used to facilitate the pulling in of conductors. Use minerallac, linseed soap or specifically approved wire pulling compound.
- G. Wire in panel cabinets, pull boxes and wiring gutters shall be neatly grouped, taped together with 3M "Scotch" #33 plastic electrical tape, T&B Model Ty-Rap cable strap or laced with #12 standard lacing twine and fanned out to the terminals.
- H. No splices shall be allowed in any cast iron or concrete pull box, unless it is specifically called for on the drawings or it is with the specific written approval of the Architect. In all cases a watertight heat shrink process jacket over the splice as manufactured by Raychem or Sangamo shall be used. Data for the jacket to be used shall be submitted to the Architect for review.

I. IDENTIFICATION

- (1) All branch circuit wires shall be color coded and so noted on the directory in panels. Color coding shall be as follows:

120/208 Volt or 240 Volt

A-phase hot leg: black
B-phase hot leg: red
C-phase hot leg: blue

Neutral: white
Switch legs: purple
(or other appropriate color)

277/480 Volt

A-phase hot leg: brown
B-phase hot leg: orange
C-phase hot leg: yellow

Neutral: white w / black stripe
Switch legs: pink (or other
appropriate color)

1. All control wiring shall be color coded, tagged at both ends, and clearly identified as to function and terminal connection in each control panel, cabinet, transfer-switch or box.
2. Feeder conductors shall be taped at both ends and at all pull boxes with same color coding as used for branch circuit wiring.

END OF SECTION

DIVISION 26 - ELECTRICAL
26 05 70 - WIRING DEVICES

1.00 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work specified in this Section.

1.02 IDENTIFICATION

The plates of wiring devices shall be identified with machine engraved inscriptions when so noted on the drawings or specified under "EXECUTION" herein. Engraved letters shall be at least 3/16" high and filled with suitable black or red paint.

2.00 PRODUCT

2.01 RECEPTACLES

A. Duplex Receptacles:

1. Duplex receptacles shall be ivory, grounding type, 125 volt, 20 ampere and shall have two current carrying contacts and one grounding contact which is internally connected to the frame. Outlet shall accommodate standard parallel blade cap and shall be side wired only. Receptacles shall have self straps which are U.L. approved for installation without a bonding jumper. Receptacles shall be Arrow-Hart #5262-I, Bryant, Leviton or P&S #5262-I, General Electric #GE5262-2, or Hubbell #CR20.

B. Weatherproof Receptacles:

1. Weatherproof receptacle shall be G.F.I. type mounted in "FS" conduit with Rain-tite while in use cover. G.F.I. receptacle shall be grounding type duplex receptacle with ground fault interrupter shall conform to NEMA Configuration 5-20R, 20 amp receptacle and a circuit capacity of 20 amperes. When leakage exceeds 5 m.a., the interrupter shall open the circuit at the receptacle within 1/30 of a second. Interrupter shall only protect the receptacle indicated unless indicated on the drawings as feed-thru type. Where feed-thru type receptacle is used at the last outlet on a run or is for single receptacle protection, the two "load" terminals shall be left unconnected or the two "load" leads capped as required. Receptacle shall be complete with test and reset buttons. Rain-tite while in use covers, for locations which may be wet while in use shall be complete with gasket between the enclosure and the mounting surface and between the cover and the base to assure a proper seal. The enclosure shall employ stainless steel mounting hardware and be constructed of impact resistant polycarbonate. The outlet enclosure shall be U.L. listed and manufactured by TayMac Corporation or approved equal.

2.02 SWITCHES

A. Circuit Switches:

1. Circuit switches shall be ivory, totally enclosed, bakelite, or composition base, toggle type with 277 volt, A.C. rating for full capacity of contacts for incandescent or fluorescent lamp loads. Switch ratings shall be 20 ampere only. Switches shall be back and side wired.
2. Listed below are switches, only, which are approved.

a. Single Pole Switches Make

Toggle Type

Hubbell	#1221-I
P&S	#20ac1-I
Sierra	#5721

b. Double Pole Switches Make

Toggle Type

Hubbell	#1222-I
P&S	#20AC2-I
Sierra	#5722

2.03 NAMEPLATE

Provide black-on-white nameplates for each switchboard, panel, terminal cabinet, control center, pull box, disconnect switch and magnetic motor starter to correspond with designations on the drawings. Nameplates shall be secured with screws, bolts or rivets. Other means of attachment shall not be accepted. "DYMO" type labels will not be accepted.

END OF SECTION

DIVISION 26 - ELECTRICAL
26 24 16 - PANELBOARDS

1.00 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section.

1.02 GENERAL FEATURES

Panelboards shall be flush, or surface mounting as indicated with sub-breakers as shown on panel schedules, hinged lockable doors, index card holders, engraved nameplates and proper bussing. Where indicated on the drawings, panelboards shall be furnished with sub feed breakers and/or lugs, split bussing, contactors, time switches, relays, etc., as required. Unless indicated otherwise, each panel shall be complete with a main breaker or a molded case switch of sufficient interrupting capacity. Panelboards shall meet UL 67, UL 50, N.E.C., and NEMA PB-1 requirements.

2.00 PRODUCT

2.01 STEEL GAUGE AND FINISH

All panelboards shall be finished with one coat of zinc chromate and coat of primer sealer after a thorough cleaning where exposed to public view (e.g., corridors, covered passages, offices, etc.) and baked gray enamel in switchboard, janitor's, heater and storage rooms. Primer coated panelboards shall be painted to match surroundings after installation. Panelboards shall be fabricated of sheet steel of the following minimum gauges: Door and trim #12; Enclosure - code gauge steel.

2.02 KEYING

All panelboards shall be furnished with flush locks using the manufacturer's standard lock and key. Door handles which extend beyond face of panel with integral locks will not be accepted for flush mounted panels but will be allowed on surface mounted panels.

2.03 CIRCUIT BREAKER WIRE TEMPERATURE RATING

All circuit breakers shall be U.L. labeled as suitable for use with 60 degree/75 degree C or 75 degree C rated conductors.

2.04 CIRCUIT BREAKER FEATURES AND AUXILIARIES

- A. Where two or three pole breakers occur in the panels, they shall be common trip units. Single pole breakers with tie-bar between handles will not be accepted.
- B. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall be furnished with lockout clips, mounted in the "on position in addition to the padlock able facilities. The breakers shall be able to trip automatically with lockout clips in place.

2.05 CIRCUIT BREAKER ARRANGEMENT

Circuit breakers shall be arranged in the panels so that the breakers of the proper trip settings and numbers correspond to the numbering in the panel schedules on the drawings. Circuit numbers of breakers shall be black-on-white tabs or other previously approved method. Circuit number tabs which can readily be changed from front of panel will not be accepted. Circuit number tabs shall not be attached to or be a part of the breaker.

2.06 PANELBOARD AND CIRCUIT BREAKER IDENTIFICATION

- A. In addition to the engraved bakelite nameplate hereinbefore specified, panelboard manufacturer shall stencil the panel number or letter on inside of panel door to correspond with panel designation on drawings.
- B. Provide a red and white bakelite nameplate with 1/2" high letters in each 277/480 volt panel fastened to face of dead front plate, to read "WARNING 480 VOLTS.

2.07 BUSSING

- A. Bussing shall be rectangular cross section silver plated copper.
- B. Each panelboard shall be equipped with a ground bus secured to the interior of the enclosure of sufficient size for the *panel* being used and shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

2.08 ANCILLARY EQUIPMENT

Where contactors, relays and/or time switches are installed in the panelboards, they shall be installed in separate barriered sections located at the top or bottom of the panelboards under a separate lockable door in front trim which shall be keyed the same as the circuit breaker section.

2.09 GUTTERSPACE

Minimum gutter space where feeder enters panel shall be 6" high. In all panels where double lugs are required or where feeder cable size exceeds bus size, minimum gutter space shall be 12" high at the end where feeder enters.

2.10 CARD HOLDERS

Index card holders shall be metallic with clear plastic shield.

2.11 DIMENSIONS

Unless specifically noted otherwise, all panelboards shall be 20" wide and nominally 5-3/4" deep.

2.12 SHORT CIRCUIT CAPACITY

All panelboards shall have bus bracing and circuit breaker fault interrupting capability to withstand and interrupt the available RMS symmetrical fault currents indicated on the drawings. In no case, however, shall this capability be less than for 10,000 amperes at 208/240 volts and 14,000 amperes at 480 volts.

2.13 MANUFACTURER

- A. Lighting and appliance panelboards for 120/208 volt, three phase, 4 wire S/N or 120/240 volt, single phase, 3 wire S/N, shall be as hereinafter specified. Circuit breakers in the panelboards shall have a minimum interrupting capacity of 10,000 amperes.

General Electric.....Type AQ
Industrial Electric Mfg.....Type PIB
Square D.....Type NQOD
Westinghouse.....Type POW-R-LINE 1

- B. Distribution panelboards for 208/240 volt, three phase, 3 wire shall be as hereinafter specified. Circuit breakers in the panelboards shall have a minimum interrupting capacity of 10,000 amperes.

General Electric..... Type CCB
Industrial Electric Mfg..... Type CDP
Square D.....Type I-Line
Westinghouse.....Type POW-R-LINE 3 or 4B

- C. Lighting panelboards for 277/480 volt, three phase, 4 wire S/N shall be as hereinafter specified. Circuit breakers in the panelboards shall have a minimum interrupting capacity of 14,000 amperes.

General Electric.....	Type NEHB
Industrial Electric Mfg.....	Type AE
Square D.....	Type PIBS
Westinghouse.....	Type POW-R-LINE 3

- D. Distribution panelboards *for* 480/277 volt, three phase, 4 wire shall be as hereinafter specified. Circuit breakers in the panelboards shall have a minimum interrupting capacity of 14,000 amperes.

General Electric.....	Type CCB
Industrial Electric Mfg.....	Type CDP
Square D.....	Type I-Line
Westinghouse.....	Type POW-R-LINE 4 B

3.00 EXECUTION

3.01 DIRECTORY

Each panel shall have a neatly typewritten directory with the name and number of the room, area or the equipment served by each circuit breaker which shall correspond with the final circuit arrangement, including all addenda and change orders. Where rooms are provided with room numbers and/or nameplates, these same numbers and names shall be used in lieu of those shown on the drawings. Spaces in directories for spare circuit breakers shall be neatly marked "Spare" in pencil. The directory shall also indicate the panel designation, voltage and phase at the top. Each directory shall be mounted in the index card holder behind a clear plastic window.

END OF SECTION

DIVISION 26 - ELECTRICAL
26 24 19 – MOTOR CONTROL CENTERS

1.00 GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section. Refer to Section 16470 regarding motor control switchboards (centers).

2.00 PRODUCT AND EXECUTION

2.01 DISCONNECT SWITCHES

Disconnect switches shall be 250 volt or 600 volts A.C., as required, NEMA Type HD, quick make, quick break, horsepower rated, non-fusible or fusible switches in NEMA Type I enclosure with number of poles and amperage as indicated on the drawings. Where enclosure is indicated W.P. (weatherproof), or enclosure is in location exposed to moisture, switches shall be in raintight NEMA Type 3R enclosure. Disconnect switches shall be complete with padlock able door and door interlock that prevents the door from being opened unless the operating handle is in the "off" position. Fuses shall be NEMA Class K-5, dual element, time delay, current-limiting type.

2.02 INDIVIDUAL MAGNETIC MOTOR STARTERS

- A. Magnetic motor starters shall be A.C. line voltage, across-the-line units in NEMA Type I enclosure unless other types of enclosures are indicated. All starters located outside of a building whether or not indicated to be W.P. (weatherproof) and all starters noted W.P. shall be furnished in NEMA Type 3R weatherproof enclosures. Starters shall be horsepower rated for the motor controlled and shall be equipped with properly sized overload elements. Every pole shall be with overload element.
- B. Verify the exact motor current and voltage characteristics with the Contractor supplying the motor before installation of a starter. Each starter shall be equipped with 480/120 volt control power transformer, "hand-off-auto" switch or stop-start push button as required and each unit shall have an engraved laminated plastic nameplate securely fastened to the front cover indicating the device controlled.
- C. All magnetic starters shall have a minimum of one auxiliary contact. Additional auxiliary contacts shall be provided as required to comply with the requirements of the wiring diagrams on the electrical and mechanical drawings and the description of function, if any, in the Mechanical Division of the Specifications.

- D. The following types of magnetic motor starters are approved:

<u>Manufacturer</u>	<u>Type</u>
Allen Bradley	Bul.709
Cutler Hammer	Bul. 9586, A10 Series
General Electric	Class CR 306
Siemens	Class A20
Square D	Class 8536
Sylvania	Bul. 6013-TM
Westinghouse	Type A200 (Size 4 max.) or Class 11-200 (Size 5 thru 8)

2.03 COMBINATION MAGNETIC STARTERS

- A. Combination magnetic starters shall be a circuit breaker and an across-the-line magnetic starter installed in a single NEMA Type I enclosure. NEMA 3R enclosure shall be used under the same circumstances as specified for magnetic starters.
- B. Horsepower rating, overload setting and auxiliary devices for the magnetic starter portion shall all be as specified in the preceding paragraph for individual magnetic starters, including overload elements for every pole.
- C. Combination magnetic starters shall also be used where both disconnect devices and magnetic starters are used at the same location regardless of whether the symbols indicate a combination device, unless specific notation, unusual operation, or space condition cause variation.
- D. Circuit breakers shall be molded case, "E" frame or larger, 240 volts rated, 22,000 AIC, symmetrical, minimum.
- E. Magnetic starters shall be as specified in 2.01.

2.04 MAGNETIC STARTERS AND BREAKERS FOR EXISTING MOTOR CONTROL CENTERS

Starters and breakers for existing motor control centers shall be of same type and manufacture as existing. Interrupt ratings shall match existing, but in no case shall the interrupt rating of the breakers be less than 22,000 AIC.

2.05 INDIVIDUAL CONTROL RELAYS

- A. Individual control relays shall have convertible contacts rated a minimum of 10 amperes, 600 volts, regardless of usage voltage.

Coil voltage, number and type of contacts shall be verified and supplied to suit the specific usage as shown in the wiring diagrams and/or schedules on the electrical and mechanical drawings. Furnish in the NEMA Type I enclosure unless indicated otherwise

B. The following relays are approved:

<u>Manufacturer</u>	<u>Type</u>
Alien Bradley	Bul. 700, Type BR
Cutler-Hammer	Type M, D26 Series
General Electric	Class CR 2811
Siemens	Class J10
Square D	Class 8501, Type H
Sylvania Bul.	7305-TM
Westinghouse	Bul. 16-320, Type AR

END OF SECTION

SECTION 32 01 90
LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes maintaining exterior site landscape areas for a period of 90-days following substantial completion, for the following:
1. Maintenance of plantings and groundcover.
 2. Maintenance of landscaped grounds.
 3. Disposal of green and trash waste.
 4. Labor and equipment for work in this Section.
 5. Replacement and replanting of failed plantings.
 6. Preparation of year-round maintenance manual.

1.2 RELATED SECTIONS:

- A. Section 32 84 00 Planting Irrigation
- B. Section 32 93 00 Plants

1.3 SUBMITTALS

- A. Product Data: Submit list of products used for maintenance in this Section, including manufacturer's data and analysis. Products include:
1. Fertilizers: Data for each type planned for use for landscape plants and lawns.
 2. Sand, organic amendments and soil mixes.
 3. Pesticides, Fungicides and Herbicides: When needed for pest and disease control, submit data sheet for each type before application.
- B. Maintenance Staff: Names of Supervisor and Foreman assigned to the job and proof of education or credential, and description of experience.
- C. Pest Control Personnel: Submit names and a copy of the licenses of California Licensed Pest Control Advisor and Qualified Applicator assigned to work in this Section.
- D. Maintenance Program: Submit for approval 2 copies of the proposed Maintenance Program for the work during the 90-Day Maintenance Period.

- E. Maintenance Manual: Submit 2 copies of a maintenance manual for the on-going, year-round landscape maintenance activities after the 120-Day Maintenance Period, to guide future maintenance.

1.4 QUALITY ASSURANCE

A. References

1. For Maintenance Program and Maintenance Manual: Based on recommended practices in the book, Arboriculture, 4th edition, by Harris, Clark & Matheny, 2004.
2. University of California Cooperative Extension publications on ornamental landscape and sod maintenance practices, including fertilization, pruning, pest control, integrated pest management and other applicable maintenance requirements.

B. Maintenance Staff:

1. Foreman: Experienced and trained in the standard maintenance practices for the types of plants under this Section, able to implement the approved Maintenance Program. The foreman shall be on the job site to lead and direct the work of the landscape crew whenever maintenance work is scheduled.
2. Supervisor: Credentialed in ornamental horticulture from an accredited program, with a minimum of 4 years in landscape maintenance of projects of similar size and type and experienced with supervision of landscape crews in implementing a maintenance program.

C. Pest Control Personnel:

1. Qualified Applicator: Licensed by the State of California, experienced in the safe handling and application of pesticides, fungicides and herbicides as prescribed by a California licensed Pest Control Advisor, strictly in accordance to applicable local, State and Federal codes, regulations, and laws.
2. Pest Control Advisor: Licensed by the State of California, experienced in Integrated Pest Management practices, analyzing ornamental landscape weed and pest problems, and prescribing appropriate pest control practices, including the legal application of appropriate types of pesticides, fungicides, and herbicides.

D. Landscape Maintenance Company:

1. Engaging a separate landscape maintenance company for the work in this Section will be subject to Owner approval.
2. Landscape Maintenance Company: 5 years minimum experience with similar size and type of project and meeting the qualifications and requirements of this Section and other Related Sections of this Contract.

1.5 MAINTENANCE PERIOD

- A. Commencement: Date of Acceptance of landscape installation work.
- B. Duration: 90 days from final completion or longer if deemed necessary due to final acceptance inspection (see Maintenance Review) for plant establishment specified herein.

- C. Maintenance Review: Provide 5 working days advance notice to the Owner's Representative when scheduling a field review of maintenance work.

- 1. Intermediate Reviews: At the end of 45 days and at the end of 90-days
- 2. Final Acceptance Inspection: At the end of 120 days

1.6 MAINTENANCE OBJECTIVES

- A. Design Intent: To encourage healthy natural growth among plants to achieve the intended appearance of the design through best possible plant maintenance practices.
- B. Water Conservation: To achieve high efficiency in irrigation water use and minimal waste of water.
- C. Maximizing Environmental Sustainability:
 - 1. To minimize use of chemical pest control by utilizing integrated pest management practices (IPM) to the maximum.
 - 2. To recycle green waste appropriately.
 - 3. To promote environmental amelioration through landscaping.

1.7 WARRANTY

- A. Unacceptable Plants: Replace dead plants and plants not showing evidence of active growth at 60-day review and at the end of Maintenance Period.
- B. Replacement Plants: Provide the same kind and size as originally planted. Maintain replacement plants for a new maintenance period, length same as original.
- C. Special Warranty Period:
 - 1. Shrubs and groundcovers: 90 days.
 - 2. Trees: One year unless specifically noted otherwise.
 - 3. Warranty period shall commence upon written acceptance of the landscaping by the Owner.

PART 2 - PRODUCTS

2.1 REPLACEMENT PLANTS

- A. Plant Materials: Nursery-grown stock requirements as specified in Section 32 90 00 Plants.
- B. Landscape Plants:
 - 1. Match species, size, form and quality, subject to approval.
 - 2. Source: Same nursery that supplied the original plants, unless otherwise approved.
- C. Planting Accessories: As specified in Section 32 92 00 Plants.

D. Fertilizers

1. Plantings and Groundcover Plants: Commercial complete fertilize with a N-P-K nutrient ratio of 3-1-1 as approved.

E. Equipment

1. Quality of Equipment and Tools: Use well-maintained and clean tools suited for the plant types and type of maintenance activity in conformance with standard practice.
2. Replace plants that have unacceptable damage caused by incorrect and inappropriate use of equipment and tools at Contractor's expense.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify condition of landscape areas and the irrigation system's operation during handover of project at commencement of Maintenance Period.
1. Document general conditions of plantings, including trees, shrubs, vines, and ground cover areas.
 2. Record plant materials that are damaged, in poor condition or dying that are subject to replacement as part of the original installation work.
 3. Document general condition of existing irrigation system and any work that do not meet specified requirements and are subject to corrective work.
- B. Review approved Maintenance Program for the Maintenance Period and clarify questions with the Owner's Representative.
- C. Staffing and Scheduling:
1. Obtain approval on maintenance staffing and work schedule.
 2. Approved staffing and work schedule shall not relieve Contractor from providing additional staff and time necessary to meet the requirements of this Section.

3.2 PROTECTION

- A. Protect planting areas from damage of all kinds from beginning of work until Final Acceptance.
- B. Public Protection: Provide temporary barriers, fences, and signs as necessary to protect the Public from potential hazards from any work under this Section. Coordinate location of fencing with Owner's Representative.
- C. Worker Protection: Ensure all work under this Section complies with local, State and Federal laws, codes, and regulations.

3.3 GENERAL MAINTENANCE WORK

- A. Irrigation Systems: Maintain the irrigation systems for the planting areas in full operational condition.

1. Adjust controller program once a week or as frequently as needed, to provide sufficient water to plantings according to evapotranspiration (ET) rates and weather conditions.
 2. Inspect all portions of the irrigation system once a week for repair needs to prevent damage to plantings and to prevent water loss.
 3. Visually check for distressed plants as sign of potential irrigation problems and inspect for leaks and any other damages and malfunctions in the system, including all control components.
 4. Adjust dripline, sprinklers and bubblers to ensure uniform and adequate application of water to entire planted areas.
 5. Restore, repair or replace components promptly as required by trained, experienced personnel.
 6. In the event of failure of the automatic irrigation systems for longer than 3 days, manually water plantings until automatic system is restored to full operation.
- B. Fertilization: In accordance with approved Maintenance Program.
- C. Weeding:
1. Keep all plantings and hardscape areas free of weeds.
 2. Apply integrated pest management practices as much as practicable. Where practicable, weed by hand or mechanical equipment to reduce use of herbicides.
 3. Where infestation is extensive, apply appropriate preemergent and selective herbicides by a Pest Control Applicator, as recommended by Pest Control Advisor in strict accordance with manufacturer's instructions and local codes and regulations.
- D. Pest and Disease Control: Apply integrated pest management practices as much as is practicable.
1. Inspections: Vigilantly check for diseases and pests during routine maintenance activities, in addition to regularly scheduled inspections by Pest Control Advisor to prevent spread of infestation.
 2. Control diseases and vertebrate and invertebrate pests promptly to prevent spreading of problems.
 3. Chemical treatment: When recommended by the Pest Control Advisor, apply in strict accordance with manufacturer's instructions and local codes and regulations.
- E. Grounds Maintenance:
1. Remove from Project and dispose legally, all debris created from maintenance operations at the end of each workday. Recycle green waste in an appropriate manner.
 2. Remove and dispose of legally, all trash and litter that collect in planted and hardscape areas in the course of maintenance work.

3. Clear gutters, drain inlets, catch basins and drainage of debris and other obstructions to allow drainage of excess irrigation water and precipitation and to prevent ponding and flooding.

3.4 TREES

A. Watering Basins:

1. Maintain watering basins around trees so that enough water can be applied to establish moisture through major root zones.
2. Maintain originally indicated depth of mulch to reduce evaporation and frequency of watering.

B. Training and Pruning:

1. Train young trees under five (5) years using thinning cuts to develop a properly callipered and tapered trunk and permanent scaffold branches. Stripping of lower branches (raising up) of young trees will not be permitted. Retain lower branches in a tipped-back or pinched condition.
2. Prune trees to maintain a natural appearance, balancing crown with roots. Do not make heading cuts or stub back to trunk or primary branches.
3. Prune trees to eliminate diseased and damaged growth, and narrow V shaped branch forks that lack strength.
4. Pruning Individual Species: Schedule pruning for the time of year recommended by published horticultural standard. Avoid pruning when there is an increased risk of insect attack or disease infestation for the species.

C. Staking and Guying of Trees:

1. Inspect stakes at least once a month to prevent damage to trees. Adjust, reposition and restake as needed in accordance with Section 329300.
2. Remove stakes as soon as tree can stand unsupported during normal wind conditions, in most cases within two growing seasons following original installation.

D. Fertilization: Fertilize trees with a high nitrogen fertilizer once in the dormant season in late winter or early spring at rates below. For trees growing in ground cover and shrub areas and in sod, the fertilization shall be in addition to that applied to these other plants:

1. Trees less than 6 inches in trunk diameter: 0.15 lb to 0.37 lb N per inch of trunk diameter.
2. Trees greater than 6 inches mm in trunk diameter: 0.37 lb to 0.75 lb N per inch of trunk diameter.
3. Distribute fertilizer uniformly around the root zone within the drip line and water thoroughly into the root zone.

3.5 SHRUBS, GROUND COVERS, AND PERENNIALS

A. Pruning:

1. Ground cover areas with trees: Maintain a vegetation-free area 3-feet in diameter around trunk except when this would create a cleared area greater than the ground cover area.
2. Shrubs in large ground cover areas: Maintain a vegetation-free area 12-inches in diameter around base of shrub.
3. An approved herbicide may be used to clear plants around trunks. Remove all cleared plant material from Project.
4. Edge as required to maintain area boundaries in a neat and trim fashion and to keep growth off hardscape, buildings, other structures, shrubs, and trees, using hand or power tools where mowing, hedging, or line trimming is appropriate.
5. Pruning of Shrubs: Prune to preserve the natural shape and form of each species unless the original design intent requires hedging and shearing into geometric forms.
6. Pruning Methods and Timing: In accordance with published standards approved for the Project, using accepted standard methods and practices appropriate for the types of shrubs, perennials, vines, espaliers, and ground covers.

B. Fertilization: Fertilize ground cover and shrub areas at a rate of 1 lb of nitrogen (N) per 1000 square feet at three-month intervals.

1. Herbicide handling and application: As specified in this Section.

C. Pest Control: As specified in this Section.

3.6 REPAIR, REPLACEMENT AND REPLANTING

- A. Damages to property, including but not limited to all structures, utilities, and other finished work due to Contractor's neglect or performance of the Work shall be reported to Owner's Representative. Restore, repair, replace, or rebuild damaged property at Contractor's expense.
- B. Plants damaged, injured, or killed due to neglect or in the course of performing the work in this Section shall be replaced with healthy, well developed plant material to match those originally installed. Replant within 10 days of notice of damage and in accordance with original Drawings and Specifications.

3.7 FINAL ACCEPTANCE

A. Acceptance:

1. Upon satisfactory completion of all work required for the Maintenance Period, but exclusive of replacement materials under Warranty Period.
2. Coordinate a review for final acceptance with Owner at least 5-working days prior to anticipated final review date at the end of Maintenance Period.

B. Corrective Work:

1. Complete work requiring corrective action or replacement within 10 days of review notice and perform in accordance with original requirements.
2. After corrective work is completed, request a final review for final acceptance as specified above.
3. Continue maintenance of landscaped areas until corrective measures have been completed and accepted.

C. Conditions for Final Acceptance of Work at End of Maintenance Period:

1. Each plant shall be alive and thriving, showing signs of growth and no signs of stress, disease, and other weaknesses.
2. Plants not meeting these conditions shall be replaced and a one-year Warranty Period will commence for such plants on Date of Final Acceptance.
3. Approved Maintenance Manual as defined by Paragraph 3.9 of this Section.

D. Final Acceptance Date: Date on which the Engineer issues a Notice of Final Acceptance when the Owner will assume responsibility for maintenance of the work.

3.8 MAINTENANCE MANUAL

A. Prepare maintenance manual as specified herein.

B. Purpose: A manual to guide the year-round, ongoing maintenance required for the landscaping areas, with the same maintenance objectives as indicated herein.

C. Content Subjects:

1. General Maintenance
2. Irrigation System Maintenance
3. Irrigation Scheduling and Water Management for Conservation
4. Pruning and Training Plants
5. Fertilization
6. Vertebrate and Invertebrate Pest Control
7. Weed Control
8. Disease Control
9. Special Maintenance Requirements for Specific Plant Species
10. Waste and Litter Removal
11. Year-Round Maintenance Schedule

- D. References: Base content of manual on References in this Section and landscape maintenance requirements in this Section.
- E. Format: All manual information shall be provided in a PDF with the following items:
 - 1. Provide instructions and descriptions of maintenance activities and requirements in clear, type-written English on 8.5 inch by 11-inch letter size white paper.
 - 2. Provide illustrations to supplement text material as necessary for clearer communication. Graphics may be on 11-inch by 17-inch size paper as necessary, folded to letter size format.
 - 3. Provide charts, schedules, and catalog cuts as appropriate.

END OF SECTION

SECTION 32 84 00
PLANTING IRRIGATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings
 - 2. Valves
 - 3. Sprinklers, outlets and accessories
 - 4. Control system

1.2 SYSTEM DESCRIPTION

- A. Adjustments to existing automatic programmable electronic solenoid controlled underground irrigation system for exterior plantings.

1.3 RELATED SECTIONS

- A. Section 329300 – Plants

1.4 DEFINITIONS

- A. Lateral Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Mainline Piping: Downstream from point of connection (P.O.C.) to the water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

1.5 SUBMITTALS

- A. As-Built Drawings: Include location, type, size and design data.
 - 1. Piping layout to point of connection, pipe types, and sizes
 - 2. Location of sleeves under pavement
 - 3. Location and coverage of sprinkler heads, nozzles, and outlet devices
 - 4. All valves, hose bibbs and other accessories
 - 5. Controller and wiring; show wire size and number of conductors for each control cable
 - 6. Plant and landscaping features, site structures
 - 7. Schedule of fittings to be used.
- B. Product Data: Include pressure ratings, rated capacities, and settings of selected models for the following:
 - 1. Controller, control system and wiring diagram
 - 2. Specialty valves

- 3. Valve Boxes
 - 4. Rotors and sprinklers
 - 5. Irrigations specialties and accessories
- C. Field quality-control test reports.
- D. Operation and maintenance data.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Work and materials shall be in accordance with requirements of the utility supplying water for backflow prevention and all applicable laws and regulations of governing authorities.
- C. Installer's Qualifications: Engage an experienced installer who has installed irrigation systems for a minimum of 5 years and who has successfully completed irrigation systems similar in material, design, and extent to that indicated for this Project.

1.7 ORDINANCES AND REGULATIONS

- A. All local, municipal, and state laws, rules and regulations governing any portion of this work shall be made a part of these specifications and their provisions carried out.
- B. When specifications or drawings describe materials, workmanship of construction of better quality or higher efficiency, it shall take precedence over such laws, rules, and regulations.

1.8 PROJECT CONDITIONS

- A. Site Inspections: Verify Project site conditions and note irregularities affecting Work of this Section. Report irregularities to the Engineer prior to beginning work.
- 1. Beginning work of this section implies acceptance of existing conditions. Preliminary site and soils report available at the City Office are for informational purposes only. Data in reports are not intended as representations or warranties of accuracy or continuity of conditions between soil borings.
 - 2. The Owner assumes no responsibility for interpretations or conclusions drawn from this information.
 - 3. Conduct all necessary site inspections and investigations for the proper installation of the specified work.
- B. Utility Locations: Arrange for and coordinate with the Engineer the location of all underground utilities. Repair underground utilities damaged during construction.

1.9 SEQUENCING AND SCHEDULING

- A. Maintain uninterrupted water and power service to the Project site during normal working hours. Arrange for any temporary water shutoffs with the Engineer.
- B. Coordinate irrigation systems work with landscape and other site work.

1.10 SHIPPING, HANDLING AND STORAGE

- A. Shipping: Components shall be packaged to protect against damage from shipping, handling, and transit. Cover all pipe openings to prevent the entry of foreign material. Isolate solvents from other system materials to avoid damage from spillage or leakage.
- B. Handling:
 - 1. Pipe and Fittings: Do not bump, scrape or drop. Do not use of chains, hooks, cables, and other devices that can damage pipe and fittings.
 - 2. Exercise caution in handling solvents.
- C. Storage:
 - 1. General: Provide proper storage of system materials. Environmental control shall be provided to maintain proper storage conditions as prescribed by the manufacturers of the irrigation system components.
 - 2. Pipe: Store pipes supported off the ground for the full length of pipe and in a manner that will prevent pipe distortion and accidental motion.
 - 3. Non-metallic Pipe and Fittings: Protect from exposure to direct sunlight during shipping and storage and minimize exposure to sunlight during installation.

1.11 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Rotors and Spray Heads: Five each of each body and nozzle type.
 - 2. Operations and Maintenance Manual: Controller.
 - 3. Keys to any locking enclosures.

1.12 WARRANTY

- A. Complete all work in accordance with the Drawings and Specifications and warrant materials and workmanship to be free from defects for the period of one year from the Date of Acceptance.
- B. Repair or replace all defects in material or workmanship, and any damage resulting from the repairing of such defects that may develop during the warranty period at no additional cost to the Owner.
 - 1. Make such repairs or replacements within three days of written notification by the Owner.

2. Owner reserves the right undertake repairs and replacement, at the Contractors expense, for repairs and replacement that are not complete within three days of notification.

1.13 DAMAGE TO PROPERTY

- A. Repair property damaged by defective irrigation material, poor workmanship or negligence of Contractor and his employees at Contractor's expense and restore to its original condition and to the satisfaction of Engineer.

1.14 MAINTENANCE SERVICE

- A. Maintain the irrigation system for the Maintenance Period of 90 Days.
- B. Maintenance Work:
 1. Maintain by applying standard industry practices, keeping the system fully operational including, but not limited to, the following:
 - a. Program irrigation controller to match current reference ET and link to weather station for automatic weather-based adjustments.
 - b. Adjust remote control valve pressure regulator and flow control as required.
 - c. Adjust nozzles to maintain coverage and adequate soil moisture.
 2. Water Conservation: Program and adjust equipment to apply water in an efficient and water conserving manner and to minimize waste from over watering and runoff.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

- A. Sleeving:
 1. Provide rigid, unplasticized polyvinyl chloride (PVC) 1120, Type 1, Grade 1, NSF approved pipe, extruded from material meeting the requirements of ASTM D 1785, white in color.
 2. Provide Schedule 40 solvent weld pipe for sleeving.
 3. Provide Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM D 2466 and ASTM D 1784.
 4. Provide primer approved by pipe manufacturer and solvent cement conforming to ASTM D 2564.
- B. Mainline Pipe and Fittings:
 1. Provide rigid, unplasticized polyvinyl chloride (PVC) 1120, Type 1, Grade 1, NSF approved pipe, extruded from material meeting the requirements of ASTM D 1785, white in color.
 2. See plans for piping size. Solvent weld pipe for mainline piping.
 3. Type 1, PVC solvent weld fittings conforming to ASTM D 2466 and ASTM D 1784.

4. Provide primer approved by pipe manufacturer and solvent cement conforming to ASTM D 2564.
- C. Lateral Pipe and Fittings:
1. Provide rigid, unplasticized polyvinyl chloride (PVC) 1120, Type 1, Grade 1, NSF approved pipe, extruded from material meeting the requirements of ASTM D 2241, white in color.
 2. See plans for piping size. Solvent weld pipe for lateral piping.
 3. Type 1, PVC solvent weld fittings conforming to ASTM D 2466 and ASTM D 1784.
 4. Provide primer approved by pipe manufacturer and solvent cement conforming to ASTM D 2564.
- D. Swing Joints and Risers:
1. Nipples:
 - a. Provide rigid, unplasticized polyvinyl chloride (PVC) 1120, Type 1, Grade 1, NSF approved pipe, extruded from material meeting the requirements of ASTM D 1785, uniformly gray in color
 - b. Provide Schedule 80 threaded nipples conforming to ASTM D 2464 and ASTM D 1784.
 2. Fittings:
 - a. Provide Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM D 2466 and ASTM D 1784.
 - b. Provide Schedule 40, Type 1, PVC threaded, socket, or both type fittings conforming to ASTM D 2466 and ASTM D 1784.
 - c. Provide primer approved by pipe manufacturer and solvent cement conforming to ASTM D 2564.

2.2 REMOTE CONTROL VALVES (RCV)

- A. Industrial-strength glass-filled nylon globe valves for commercial use, with pressure regulating module; manufacturer, model, size as shown on Drawings.
- B. Boxes for RCV:
 1. Type: Rectangular plastic hinged cover with bolt down lock kit, Carson 1914-2 or approved equal.
 2. Color: Green.

2.3 ROTOR/SPRINKLER HEADS AND NOZZLES

- A. Rotor/Sprinkler Heads and Nozzles: Plastic, pressure compensating; manufacturer, model, size as shown on Drawings.

2.4 CONTROL SYSTEM

- A. Controller:
 1. Electronic, solid state, nonvolatile memory, with percentage adjustment, 2-wire decoder controller; manufacturer, model, number of stations as shown on Drawings.

2. Provide controller with satellite operational capability.
- B. Control Wires:
 1. Provide Hunter IDWIRE or approved equal control wire.
 2. Provide Hunter DBRY-6 waterproof connectors in the red and blue two-wire path for connections, or approved equal.
 3. Provide one two-wire decoder per remote control valve.
- C. Surge Protection:
 1. Provide grounding for one decoder at the end of each wire path and one grounding within 8-10 feet of the controller.
 2. Grounding shall be: grounding rod with less than 10 Ohms resistance. Rod shall be 5/8" diameter and a minimum length of 10 ft. It is to be stamped as UL listed.
- D. Boxes for Control Wire Splices:
 1. Type: 10-inch round plastic, with bolt down lock kit, Carson 910-3 or approved equal.
 2. Color: Green.
- E. Controller Housing: Weatherproof, watertight, with lockable access door.

2.5 MISCELLANEOUS INSTALLATION MATERIALS

- A. Pipe Joint Compound: Teflon tape.
- B. Provide other ancillary materials and equipment necessary to install the assemblies and the systems to fully operational condition.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify field conditions and location of existing utilities are acceptable.
- B. Piping layout indicated is diagrammatic only. Route piping to avoid plants and structures.

3.2 LAYOUT OF WORK

- A. Stake out the irrigation system. Items to be staked include remote control valves and rotors.
- B. Location of Piping, Valving and Water Emission Devices: Design location is approximate and based on assumed location of existing irrigation rotor heads. Make adjustments to existing and new irrigation components to avoid architectural features, and obstructions such as trees, signs, and light standards.

- C. Irrigation System Layout Review: Irrigation system layout review will occur after the staking has been completed. Notify the Engineer 7 days in advance of review. Modifications will be identified by the Engineer at this review. Obtain Engineer's approval before starting excavation.

3.3 EXCAVATION, TRENCHING, AND BACKFILLING

- A. Trench in accordance with Technical Specifications and Greenbook.
- B. Excavate to permit the pipes to be laid at intended elevations and to permit workspace for installing connections and fittings.
- C. Minimum cover (distance from top of pipe or control wire to finish grade) as follows:
 - 1. 18 inches over mainline pipe.
 - 2. 18 inches over control wire and over electrical conduit.
 - 3. 12 inches over lateral pipe to rotors.
- D. Backfill only after lines have been inspected and tested.
- E. Excavated material is generally satisfactory for backfill.
 - 1. Use only backfill free from rubbish, vegetative matter, and stones larger than 2 inches in maximum dimension.
 - 2. Use backfill free of sharp objects which may damage the pipe
 - 3. Remove material not suitable for backfill.
- F. Backfill for pipe not in sleeve by one of the following methods:
 - 1. Backfill and puddle lower half of trench. Allow to dry 24 hours. Backfill remainder of trench in 6-in. layers. Compact each to density of surrounding soil.
 - 2. Backfill rest of trench by depositing the backfill material equally on both sides of pipe in 6-in. layers and compacting each to density of surrounding soil.
- G. Enclose pipe and wiring beneath hardscape structures, walks, curbs, etc., in sleeves. Minimum compaction of backfill for sleeves shall be 95 percent Standard Proctor Density in accordance with ASTM D 698. Use of water for compaction around sleeves by "puddling" method is not acceptable.
- H. Dress backfilled areas to original grade. Incorporate excess backfill into existing Project site grades.
- I. Where utilities conflict with irrigation trenching and pipe work, contact the Engineer for trench depth adjustments.

3.4 ASSEMBLING PIPE AND FITTINGS

- A. General:
 - 1. Keep pipe free from dirt and pipe scale. Cut pipe ends square and deburr. Clean pipe ends.

2. Keep ends of assembled pipe capped. Remove caps only when necessary to continue assembly.
 3. Trenches may be curved to change direction or avoid obstructions within limits of curvature of pipe. Maximum offset per 20-foot pipe length: 7.5 feet for 2-in. diameter pipe and 2 feet for 2.5 and 3-in. diameter pipe. All curvature shall result from the bending of the pipe lengths. No deflection will be allowed at pipe joints.
- B. Sleeving:
1. Install sleeving at a depth to allow encased pipe or wiring to remain at specified burial depth.
 2. Extend sleeve ends 12 inches beyond edge of paved surface. Cover pipe ends and mark with stakes.
 3. Bore for sleeves under obstructions that cannot be removed. Use equipment and methods designed for horizontal boring.
- C. Mainline Pipe and Fittings:
1. Use only strap-type friction wrenches for threaded plastic pipe.
 2. PVC Solvent Weld Pipe:
 - a. Use primer and solvent cement. Join pipe as recommended by manufacturer and in accordance with accepted industry practices.
 - b. Cure for 30 minutes before handling and 24 hours before allowing water in pipe.
 - c. Snake pipe from side to side within trench.
 - d. Fittings: The use of cross type fittings is not acceptable.
- D. Lateral Pipe and Fittings:
1. Use only strap-type friction wrenches for threaded plastic pipe.
 2. PVC Solvent Weld Pipe:
 - a. Use primer and solvent cement. Join pipe as recommended by the manufacturer and in accordance with accepted industry practices.
 - b. Cure for 30 minutes before handling and 24 hours before allowing water in the pipe.
 - c. Snake pipe from side to side within trench.
- E. Specialized Pipe and Fittings:
1. PVC Threaded Connections:
 - a. Use only factory-formed threads. Field-cut threads are not acceptable.
 - b. Use only Teflon-type tape or Teflon-based paste.
 - c. When connection is plastic-to-metal, plastic component shall have male threads and metal component shall have female threads.

3.5 INSTALLATION OF ROTOR/SPRINKLER IRRIGATION COMPONENTS

- A. Rotor/Sprinkler Assembly:
1. Flush lateral pipe before installing rotor assembly.
 2. Install in accordance with the installation details at locations shown on the Drawings.

3. Locate rotors and sprinklers 2 inches from adjacent walls, fences, or edges of paved areas.
4. Install rotors/sprinklers perpendicular to the finish grade.
5. Supply appropriate nozzle and adjust arc of coverage of each rotor/sprinkler for best performance.
6. Adjust radius of throw of each rotor/sprinkler for best performance.

3.6 INSTALLATION OF CONTROL SYSTEM COMPONENTS

- A. Controller:
 1. Location of controller as shown on the Drawings is approximate. Location shall be as approved by the Engineer during sprinkler layout review.
 2. Install and test controller in accordance with manufacturer's instructions.
 3. Connect controller to existing power inside restroom plumbing chase.
- B. Valve Control Wire:
 1. Extend one run of twisted 2-wire to the pull box shown on the plans for future use.
 2. Provide a 24-inch excess length of wire in an 8-inch diameter loop at each 90 degree change of direction, at both ends of sleeves, and at 100 feet intervals along continuous runs of wiring. Do not tie wiring loop. Coil 30-inch length of wire within each remote-control valve box as shown on Drawings.
 4. If control wire must be spliced, make splice with wire connectors and waterproof sealant and install in accordance with manufacturer's instructions. Locate splice in a valve box which contains an irrigation valve assembly, or in a separate 10-inch round valve box. Use same procedure for connection to valves as for inline splices.
 5. Unless otherwise shown, install wire parallel with and below mainline pipe.
 6. Protect wire not installed with PVC mainline pipe with a continuous run of warning tape placed in the backfill at 6-inches above the wiring.
- C. Surge Protection:
 1. Location of grounding rods as shown on the Drawings is approximate. Confirm the absence of underground utilities before driving grounding rods into the earth.
 2. Drive grounding rods into the ground in a vertical position at a location 8-10 feet from the electronic equipment and at right angles to the two-wire path.
 3. All grounding circuit components shall be installed in a straight line.

3.7 INSTALLATION OF OTHER COMPONENTS

- A. Provide other ancillary materials and equipment necessary to install the assemblies and systems to fully operational condition. Install in accordance with manufacturer's instructions.

3.8 TESTING

- A. Notify the Engineer 7 days in advance of testing.

- B. Pipelines jointed with solvent-welded PVC joints shall be allowed to cure at least 24 hours before testing.
- C. Furnish clean, clear water, pumps, labor, fittings, and equipment necessary to conduct tests.
- D. Hydrostatic Pressure Test:
 - 1. Subject mainline pipe to a hydrostatic pressure equal to 1.5 times the anticipated operating pressure (min. 120 psi) for 2 hours. Test with mainline components installed.
 - 2. Subject lateral pipe to a hydrostatic pressure equal to anticipated operating pressure. Test with risers for sprinklers capped.
 - 3. Backfill to prevent pipe from moving under pressure. Expose couplings and fittings.
 - 4. Leakage will be detected by visual inspection. Replace defective pipes, fittings, joints, valves, or appurtenances. Repeat test until pipe passes test.
 - 5. Use of cement or caulking to seal leaks is prohibited.
- E. Operational Test:
 - 1. Activate each remote-control valve in sequence from controller. The Engineer will visually observe operation, water application patterns, and leakage.
 - 2. Replace defective, wiring, or appurtenance to correct operational deficiencies.
 - 3. Replace, adjust, or move water emission devices to correct operational or coverage deficiencies.
 - 4. Replace defective pipes, fittings, joints, valves, sprinklers, or appurtenances to correct leakage problems. Cement or caulking to seal leaks is prohibited.
 - 5. Repeat tests until each lateral passes all tests.

3.9 DEMONSTRATION

- A. Demonstrate to the Owner's maintenance personnel the operation of equipment, water emission devices, specialties, and accessories. Review operating and maintenance information.
- B. Notify the Engineer 7 days in advance of demonstration.

3.10 PROJECT RECORD (AS-BUILT) DRAWINGS

- A. Maintain on the Project site and separate from documents used for construction, one complete set of Contract Documents as Project Documents. Keep documents current. Do not backfill trenches and excavations until as-built information is recorded.
- B. Record pipe and wiring network alterations. Record work that is installed differently than shown on the Drawings. Record accurate reference dimensions, measured from at least two permanent reference points, of each irrigation system valve, backflow prevention device, satellite controller, sleeve end, wiring connections, and other irrigation components enclosed within a valve box.

3.11 CLEAN UP

- A. Upon completion of work, remove from Project site all machinery, tools, excess materials, and rubbish.

3.12 MAINTENANCE

- A. Interim Maintenance: Program and maintain the system in full operational condition for irrigating plantings until Date of Substantial Completion
- B. 90 Day Maintenance Period: In accordance in accordance with the Technical Specifications and Greenbook standards.

END OF SECTION 328400

SECTION 32 93 00

PLANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rough and finish grading
 - 2. Soil testing
 - 3. Preparation of planting soil with amendments
 - 4. New trees, plants, and ground cover
 - 5. Root barriers
 - 6. Filter fabric
 - 7. Weed abatement

1.2 RELATED SECTIONS

- A. Section 32 84 00 - Landscape Irrigation

1.3 REFERENCES

- A. ANSI Z60.1 – American Standard for Nursery Stocks, 2004 edition
- B. Arboriculture, 4th edition, by Harris, Clark, & Matheny, copyright 2004
- C. Integrated Pest Management (IPM) publications, current editions, from University of California Cooperative Extension

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated that are not plants.
- B. Samples for Verification:
 - 1. 5 lb each of inert mulch in labeled plastic bags. See plan for type.
 - 2. Fertilizers, one small package in manufacturer's packaging of each type.
 - 3. Soil amendments.
- C. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis for standard products and seed.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. Qualification Data: Current California Landscape Contractor's License.
- E. Soil Test Report:
 - 1. Soil shall be tested from a minimum of three (3) locations per acre of planted area. Representative samples shall be taken from random and varied locations of the project site that will receive landscaping installation. Samples

should represent major conditions of exposed cut soils, fill soils, and native undisturbed soil. Sample from the top foot for ground cover and shrubs. Sample from the expected depth for large container stock. Label each sample for location/origin, type of soil condition visibly observed, and sampling depth. Laboratory report shall identify each sample with same information. All samples taken shall be split into two samples, one half will go to a qualified laboratory by the Contractor (at his or her expense) and the other half will be retained by the Owner. All samples shall be at least one pint in volume. All samples shall go to an approved soil-testing laboratory.

2. A copy of the soil test results shall be submitted to the Owner and Architect before work begins.
3. Testing methods should comply with the United States Department of Agriculture Handbook Publication No. 60, Methods of Soil Analysis published by the Soil Science Society of America and peer-viewed methods published in scientific journals. Evaluations and recommendations should be based on University of California publication's and peer-viewed articles published in scientific journals.
4. The Owner shall appoint a representative to oversee soil sampling that may be required. The time, depth, location, and number of samples to be taken as per instructions from the Owner.
5. Soil report shall include:
 - a. pH measurement.
 - b. Determination whether limestone is present or not.
 - c. Percent water in saturation extract.
 - d. Electrical conductivity of the saturated extract (salinity E_{Ce}) / soluble salts.
 - e. Measurement of sodicity (Sodium Adsorption Ratio).
 - f. Concentration of boron in saturation extract.
 - g. Nutrients and elements:
 - 1) Measurement (low, medium, high) of: Boron, calcium, copper, iron, magnesium, manganese, molybdenum, phosphorus, potassium, sodium, sulfur, and zinc.
 - 2) Analyze saturation extract for: calcium, magnesium, sodium, boron, chloride, phosphorus, nitrate and sulfate.
 - 3) Trace metals: Aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, nickel, selenium, silver, strontium, tin and vanadium.
 - 4) The presence of calcium carbonate and/or magnesium carbonate.
 - h. Soil Texture (gravel, sand, silt and clay). Determine organic matter content by the measurement of organic carbon. The quality of the organic matter shall be determined by measuring organic carbon and total nitrogen.
 - 1) Methods of Soil Analysis, Part 1, Physical and Mineralogical Methods, Soil Science Society of America, Inc., 1986, chapter 36, pgs 901-926 and Methods of Soil Analysis, Part 3 Chemical Methods, Soil Science Society of America, Inc, 1996, chapter 34, pgs 965-977 & pgs 1001-2 and chapter 37, pg 1088
 - i. Interpretation and recommendations for correction of nutritional deficiencies/ excesses and potential toxicities. These recommendations shall include:
 - 1) Volume of soil amendment per 1,000 sq.ft. and cu.yd. of backfill mix.
 - 2) Pounds of gypsum per 1,000 sq.ft. and cu.yd. of backfill mix.

- 3) Pounds of soil sulfur per 1,000 sq .ft. and cu.yd. of backfill mix.
- 4) Pounds of iron sulfate per 1,000 sq.ft. and cu.yd. of backfill mix.
- 5) Pounds of pre-plant fertilizer per 1,000 sq.ft. and cu.yd. of backfill mix.
- 6) Pounds of soil polymers per 1,000 sq.ft.
- 7) Recommendation for soil leaching.
- 8) Recommendation for tree drain installation.
- 9) Pounds of maintenance fertilizer per 1,000 sq. Ft. and analysis.
- 10) Recommendation for soil wetting agent and application rate.
- 11) Percent of site soil-to-soil amendment in backfill mix.
- 12) Whether or not soil polymers need to be added to soil.

If any of the above listed items are not recommended, the recommendation shall call for zero volume or zero poundage per 1,000 square feet. All soil test costs will be the responsibility of the Contractor.

- F. Planting Schedule: Indicating anticipated planting dates for installing plants, coordinated with overall project schedule.
- G. Maintenance Period: 90 days maintenance of plantings from Date of Substantial Completion.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Schedule: Time, procedures and practices for maintenance of lawns spanning a full calendar year, covering irrigation frequency, fertilizer types and rates of application, lawn mowing frequency, disease and pest control, and other maintenance practices required by the plant types.

1.6 QUALIFICATIONS

- A. Nursery: Company specializing in growing and cultivating plants specified in this section.

1.7 QUALITY ASSURANCE

- A. Landscape Contractor's Qualifications: A qualified landscape installer whose work has resulted in successful establishment of exterior plants.
 1. Field Supervision: Maintain an experienced full-time supervisor on Project site when planting work is in progress.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the California State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
 1. Soil Analysis: Analysis shall include fertility, agricultural suitability, particle size analysis and fertilizer recommendations.
 2. Soil Laboratory: A05 soil test as performed by Soil and Plant Laboratory, Inc., P.O. Box 11744, Santa Ana, CA 92711, (714) 558-8333 or equal laboratory tests approved by the Architect.

- C. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver plants after preparations for planting have been completed. Install in approved locations in a timely manner whenever possible. If planting is delayed more than six hours after delivery, set plants in approved shade area, protect from weather and mechanical damage, and keep roots moist.
 - 1. Transport plants and seeds under protective cover.
 - 2. Water root systems of plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.9 COORDINATION

- A. Coordinate with other works in Contract, including but not limited to:
 - 1. Irrigation System: Planting work shall proceed after testing and approval of the irrigation system.
 - 2. Paving and other construction work: Coordinate planting area requirements with paving work, including irrigation sleeving, piping, and wiring.

1.10 MAINTENANCE

- A. Maintain planting areas and trees for the Maintenance Period of 90 days.
- B. Maintenance Work:
 - 1. Maintain by applying standard horticultural practices as prescribed by Arboriculture, 4th edition (2004), by Harris, Clark, & Matheny; including mowing, watering, weeding, fertilizing, as required to establish healthy, viable planting.
 - 2. Pest and Disease Control: Apply Integrated Pest Management (IPM) Practices as recommended by the University of California Cooperative Extension publications for pest control whenever possible to keep trees and shrubs free of insects and diseases.
 - a. Pesticides and herbicides may be used only when IPM practices have proved ineffective.
 - b. Application of pesticides and herbicides: In strict compliance with all applicable government codes and regulations.

PART 2 PRODUCTS

2.1 SOIL AMENDMENTS AND FERTILIZER

- A. The following amendments and fertilizer information are for Bidding purposes only. Application rates, amendment types, and fertilizers shall follow soil report recommendations.

B. Soil Conditioner - shall be a product that aids the structure of the soil consisting of rapidly decaying, slowly decaying and non-decaying material. The rate of decomposition of this amendment is very important.

1. The humus material shall have an ash content of no less than 8% and no more than 50%.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm @ 25° C. (ECe less than 10) on a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 parts per million.
5. Silicon content (acid-insoluble ash) shall be less than 30%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, sludges, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable (stable humus must be present). Wood-based products are not acceptable which are based on redwood or cedar.
9. Sludge-based materials are not acceptable if the soil already has a high level (toxic level) of zinc, copper or other heavy metals based on soil analysis.
10. Carbon: nitrogen ratio is less than 25: 1.
11. The compost shall be aerobic without malodorous presence of decomposition products.
12. The maximum particle size shall be 0.5 inch, 80% or more shall pass a NO. 4 screen.

Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis: arsenic: 20, cadmium: 15, chromium: 300, cobalt: 50, nickel: 100, copper: 150, lead: 200, mercury: 10, molybdenum: 60, selenium: 50, silver: 10, vanadium: 50, zinc: 300

The commercial grade product used shall be Loamex, or approved equal.

C. Mycorrhizal fungi shall be added in all planting areas, regardless of Soils Report. Mycorrhizal inoculum consists of a combination of:

1. Inoculum shall contain a blend of eight top types of Endospores: Glomus aggregatum, G. clarum, G. deserticola, G. intraradices, G. monosporus, G. mosseae, Gigaspora margarita, and Paraglomus brasilianum, and

seven top types of Ecto fungi spores: *Laccaria laccata*, *Pisolithus tinctorius*, *Rhizopogon amylpogon*, *R. fulvigleba*, *R. rubescens*, *R. villosuli*, and *Scleroderma* spp. The guaranteed Endo spore count shall be a minimum 50 spores/cc, and the Ecto spore count shall be a minimum 50,000 spores/cc

2. Manufacturers:
 - a. BioOrganics Mycorrhizae Inoculants, (888) 332-7676
 - b. Mycorrhizal Applications, Inc, (866) 476-7800
 - c. Tri-C Enterprises, LLC, (800) 927-3311
 - d. Or equal.
- D. Agricultural grade gypsum - shall be a ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) calcium sulfate product minimum 92% grade. Ninety-percent (90%) shall pass a 50-mesh screen. Control of dust during application is mandatory. The commercial grade product used shall be U.S. Gypsum, Sof'n'Soil, Dolmar, or approved equal.
- E. Sulfur (soil sulfur) - shall be elemental sulfur (99.5%) commercially manufactured so that a pure sulfur product is used. Sulfur is a constituent of three amino acids (cystine, methionine and cysteine) and is essential for protein synthesis. Sulfur is also supplied by gypsum. Sulfur is not effective until it is oxidizes. The bacteria are specific for this and are not common in alkaline soils. The oxidization may require months or years. Gypsum is rapid in its actions. The sulfur used shall be 99.5% elemental. Sizing on stacked screen shall be approximately: 8-mesh 4.3%; 20-mesh 7.8 %; 50-mesh 46.9 %; 100-mesh 39.3 %; 200-mesh 1.7%. The commercial grade product used shall be Wil-Gro; Union Chemicals, Baker Industries, or approved equal.
- F. Iron sulfate - derived from sulfate-deep green ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$), a minimum analysis of iron shall be expressed as metallic is 20.0%. The commercial grade product used shall be Wil-Gro, Bandini, Wilson & Geo. Meyer, or approved equal.
- G. Chelated iron shall be Becker Underwood Sprint 138 Fe or other approved equal commercial FeEDDHA for dicots and woody plants, and Becker Underwood Sprint 330 Fe or other commercial FeDTPA for grasses and monocots, or approved equal.
- H. Pre-plant starter fertilizer (1-10-10) analysis shall be a commercial grade flowable fertilizer with a 1 % nitrogen analysis; 10% phosphorous pentoxide and 10% potassium oxide. No potassium chloride is to be used. Organic nitrogen shall be from cottonseed meal and urea. Phosphorous. from superphosphate and cottonseed meal. Potassium (potash) from sulfate of potash and cottonseed meal. Screen analysis 74% to be retained on a 20-mesh screen. 0% to pass a 4-mesh screen, and 2 % to pass a 48-mesh screen. The commercial grade product used shall be Wil-Gro, Gro-Power, Bandini, Kellogg, or approved equal.
- I. Prilled post-plant fertilizer (14-7-3) for maintenance - all areas. A maintenance fertilizer shall be used that is granular and homogeneous. Iron and zinc shall be in chelated form and sizing of granules during manufacture is very important. A regular maintenance program using this product for at least the first year is recommended. The homogeneous fertilizer granules used shall contain a fertilizer analysis of 14% nitrogen of which 4% is ammoniac sulfate. Remainder of nitrogen shall be 8.75% water soluble and 1.25% water insoluble. Available phosphorous pentoxide shall be 7%. Potassium oxide shall be 3%. Minor

elements shall be chelated 25% by volume consisting of iron 2.0%; zinc 0.15% and manganese 0.15%. By-product calcium shall be 2.0%. Organic nitrogen is derived from urea and cottonseed meal. Phosphate from superphosphate and cottonseed meal. Potash from sulfate of potash and cottonseed meal. No potassium chloride is to be used. Sulfur from sulfate of ammonia. Calcium from superphosphate, iron \ from ferrous sulfate and mixed sulfides. Zinc and manganese are expressed as metallic and in their elemental form. Screen Analysis (% retained) approximately: 4-mesh 1.3%; 8 mesh = 24.2%; 20-mesh = 74.0%; and 48-mesh = 0.05%. The commercial grade product used shall be Wil-Gro Fairway, Gro-Power, Bandini, Kellogg, or approved equal.

- J. Planting tablets shall be tightly compressed chip type commercial grade planting tablets, of varying sizes with the following available percentages by weight of plant food:

Nitrogen	20.0 % min.
Phosphoric acid	10.0% min.
Potash	5.0 % min.

The commercial grade product used shall be Agriform, Gro-power, or approved equal.

2.2 WETTING AGENT

- A. An adjuvant (helping agent) is needed to make water penetrate difficult to wet soils. Also, organic soil amendments are more receptive to increased water holding capacity.
- B. Soil water repellence resulting from compaction will be overcome with multiple applications of a soil penetrant in the irrigation water.
- C. Product used shall have the following functioning agents: 2- hydroxyethyl ammoniumalkyl benzene sulfonate = 8.77%; alkyl phenoxy poly - (ethylene oxy) ethanol= 4.49%; di (2 hydroxy ethyl)- ammonium cis-9 otadecenoate-octyl alkyldiamide = 2.50 %; dimethyl silicone = 1. 00 %; carrier= 83.24 %. Adjuvant used shall be a commercial grade product and manufactured by Naiad/Wil-Gro, Dow, Dupont, or approved equal.

2.3 PLANTING BACKFILL FOR TREES AND SHRUBS

- A. (For Bidding purposes only. Application rates shall be per soil analysis recommendation). Planting backfill shall be a thoroughly blended mixture of site soil and soil amendments at the following mixtures:

soil conditioner	30%
site soil from excavated planting pit	70%
gypsum	10 lbs. per cu. yd. of mix
iron sulfate	5 lbs. per cu. yd. of mix
pre-plant (1-10-10)	5 lbs. per cu. yd. of mix

2.4 PLANT TABLETS

- A. Agriform (or approved equal) 20-10-5, three 20-gram tablets for 15 gallon or larger size trees, two 10-gram tablets for 5 gallon size plants, one 10-gram tablet for 1 gallon size.

2.5 GUYING AND STAKING MATERIALS

- A. Tree stakes shall be of. non-pressure-treated Lodgepole Pine. Stakes shall have straight shafts, shaved and cut clean, and bare of branches and stubs. Stakes shall be of uniform thickness throughout length, with a minimum diameter of 2- inches, free of loose knots, splits, or bends. One end tip shall be tapered to allow ease of installation.
- B. Tree ties shall be manufactured of virgin, flexible vinyl meeting ASTM-D-412 standards for tensile and elongation strength. Material shall be black for ultraviolet resistance. Tree ties shall be manufactured with a double-back locking configuration. Tree ties shall be of sizes required to adequately support tree and shall elongate with the tree growth, thus preventing damage to the tree. Tree ties shall be "Cinch Tie," or approved equal.
- C. Guying Hardware:
 - 1. Wire: Pliable 1/8" galvanized steel cable.
 - 2. Hose: 1/2" new black rubber hose.
 - 3. Turnbuckles: galvanized or dip-painted, size as required.
 - 4. Cable clamps: galvanized, size as required.
 - 5. Safety Sleeve: 1/2" white PVC full length of wire.
 - 6. Steel Guy Anchor: Duckbill Anchor by Foresight Products (800) 325-5360; Platypus Tree Anchoring Systems (866) 752-8478, or equal. Size as needed.

2.6 FILTER FABRIC

- A. Spun-bonded polypropylene with UV inhibitors, non-degrading geotextile fabric that blocks 95% of weed growth and is permeable to air, water, gasses and fertilizer. Typar 3301 or equal.
- B. Properties:
 - 1. Unit Weight: 3.0 oz/yds²
 - 2. Tensile Strength: 135 pounds
 - 3. Puncture Strength: 35 pounds
 - 4. Air Opening Size: 60/70 equivalent sieve
 - 5. Elongation at Break: <70%
 - 6. Trap Tear: 50 pounds
 - 7. Flux: 70 gal/ft²/min
 - 8. Permittivity: 1.2 sec⁻²
 - 9. Color: Black

2.7 Root Barrier

- A. Polyethylene (0.08 inch thick) or polypropylene (2.032 - 2.16 mm thick), with self-locking joiners, 1/2" raised 90 degree molded root deflecting ribs, ground lock tabs, double top edge, UV inhibitors. Use 24" barrier unless otherwise stated. Root barrier by Deep Root, 101 Montgomery Street, Suite 2850, San Francisco, CA 94104, 415-781-9700, or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Examine areas to receive planting for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Planting work shall proceed only after testing and approval of the irrigation system.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, and existing exterior plants from damage by planting operations.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 ROOT BARRIER

- A. Install root barrier as per manufacturer's recommendations.
- A. Root barrier shall be installed where trees are planted within five-feet (5') of paving or other hardscape elements (such as walls, curbs, walkways, etc.).
- B. Root barrier shall be aligned vertically and run in a linear fashion, along and directly adjacent to paving or other hardscape elements to be protected.
- C. Install root barrier along the edge of paving or hardscape element for a distance of 10 feet (10') in each direction from the tree trunk, for a total of twenty-feet (20') per affected tree. Where trees are closer than ten-feet (10') apart, a single continuous piece of root barrier shall be used.
- D. Root barrier shall not surround root ball of tree at any time.
- E. Tops of root barriers are to be flush with finish grade of soil, with no portion visible above finish grade.
- F. Do not distort or bend root barrier during construction activities.
- G. Overlap root barrier a minimum of 12-inches at splices.

3.4 GENERAL MAINTENANCE WORK

- A. Irrigation Systems: Maintain the irrigation systems for the planting areas in full operational condition.
 - 1. Adjust controller program once a week or as needed, to provide sufficient water to plantings according to evapotranspiration (ET) rates and weather conditions.
 - 2. Inspect all portions of the irrigation system once a week for repair needs to prevent damage to plantings.

- a. Visually check for distressed plants as sign of potential irrigation problems and inspect for leaks and any other damages and malfunctions in the system, including all control components.
 3. Check spray heads and sprinklers during operation immediately after mowing of lawns. Check for water coverage and damage from mowing equipment. Adjust sprinklers to ensure uniform and adequate application of water to entire lawn areas.
 4. Restore, repair, or replace components promptly as required by trained, experienced personnel.
 5. In the event of failure of the automatic irrigation systems for longer than 3 days, manually water plantings until automatic system is restored to full operation.
- B. Fertilization: In accordance with approved Maintenance Program.
- C. Weeding:
1. Keep planting areas free of weeds.
 2. Where practicable weed by hand.
 3. Where infestation is extensive, apply appropriate pre-emergent and selective herbicides by a Pest Control Applicator, as recommended by Pest Control Advisor in strict accordance with manufacturer's instructions and local codes and regulations.
- D. Pest and Disease Control:
1. Inspections: Vigilantly check for diseases and pests during routine maintenance activities, in addition to regularly scheduled inspections by Pest Control Advisor.
 2. Control diseases and vertebrate and invertebrate pests promptly to prevent spreading of problems (including gophers, moles and ground squirrels).
 3. Chemical treatment: When recommended by the Pest Control Advisor, apply in strict accordance with manufacturer's instructions and local codes and regulations.
- E. Grounds Maintenance
1. Remove from Project and dispose legally all debris created from maintenance operations at the end of each workday.
 2. Remove and dispose legally all trash and litter that collect in planted and hardscape areas in the course of maintenance work.

3.5 CLEANUP AND PROTECTION

- A. During planting, keep adjacent pavement and construction clean and work area in an orderly condition.

- B. Protect plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged planting.

3.6 DISPOSAL

- A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris.
- B. Legally dispose of them off Owner's property.

3.7 GENERAL MAINTENANCE AND THE MAINTENANCE PERIOD

- A. Keeping the plants in a healthy, growing condition by watering, fertilizing, pruning, spraying, weeding and all other necessary operations of maintenance. All paving and walks shall be kept clear, clean and washed down.
- B. Protection: The Contractor shall be responsible for providing adequate protection of all planting areas against traffic or other use by erecting fencing or other acceptable means immediately after the planting is completed. Warning signs and barricades shall be placed in various high traffic areas. Damaged areas shall be repaired immediately by the Contractor.
- C. Weeding and cultivating: All tree, shrub, and groundcover areas shall be kept free of weeds, noxious grasses, rocks over 1-inch in diameter, clods, trash and debris on a weekly basis. Groundcover and shrub areas shall be cultivated at intervals of not more than 14 days minimum.
- D. Replacement: During the Maintenance Period, plants which die or which are in an unhealthy or badly impaired condition shall be replaced by the contractor within 14 days after unsatisfactory condition is evident. No replacement of plantings shall be made in any season definitely unfavorable for planting. At the conclusion of the Maintenance Period, the Landscape Architect will make an inspection of the work to determine the condition of all plants. All unhealthy plants shall be removed from the site and replaced with plants of the same kinds and sizes as originally specified. Such replacement shall be made in the same manner as specified for the original planting and at no extra cost to the Owner.
- E. Fertilization:
 - 1. Trees - post fertilization shall occur at 100-day intervals after planting. Apply fertilizer at the rate of 1-lb. per 1-inch caliper of tree trunk diameter at breast height. Fertilizer shall be 14-7-3 or approved equal.
 - 2. Shrubs - post fertilization shall occur 60 days after planting and apply fertilizer at the rate of 1 teaspoon per each one-gallon plant and 1 tablespoon per five-gallon plant. Fertilizer shall be 14-7-3, or approved equal.
 - 3. Groundcover and lawn areas - post fertilization shall occur 60 days after planting and apply fertilizer at the rate of 7-lbs per 1,000 square feet fertilizer shall be 14-7-3, or approved equal.

- F. Maintenance Period: The Maintenance Period shall begin on the first day after the pre-maintenance observation acceptance and shall continue thereafter for no less than 90 continuous calendar days. If any plants are replaced during the Maintenance Period, then the 90-day Maintenance Period for those plants shall begin at the date of installation for that plant, if so directed by the Landscape Architect or the Owner.
- G. Extended Maintenance Period: When, in the opinion of the Landscape Architect, there is improper maintenance, and/or poor condition of plant materials, and/or unhealthy condition of plant materials, then the Contractor shall be responsible for additional maintenance of the work at no additional cost to the contract until all work is acceptable by the Landscape Architect.

END OF SECTION 329300

WATER QUALITY MANAGEMENT PLAN



Land Use Services Department



Plan Review Comments

Project Description:		Sheep Creek Road - PHELAN		Application #:	DRNSTY-2021-00054
Site Address/Tract No:				APN:	3066-261-10 3066-251-18
Applicant/Contact:		David Larson Redbrick Solution, LLC 19153 Town Center Drive Suite 203 Apple Valley, CA 92308		Application Date:	
				Expiration Date:	
Applicant Phone:		(661) 816-5179		Applicant Email:	
Plans Reviewer:		Scott Lyle (NV5)	Phone:	(858) 385-0500	
		Email:	scott.lyle@nv5.com (Preferred contact)		
<input type="checkbox"/> 1st Review:		<input type="checkbox"/> 2nd Review:		<input type="checkbox"/> 3rd Review:	
<input checked="" type="checkbox"/> 4th Review	1/31/2024				

No further comments.

[END of COMMENTS]

I hereby declare that I have exercised responsible charge of the review of this project as defined in Section 6703 of the Business and Professions Code. The comments expressed herein are confined to a review only and do not relieve the Engineer of Work of their responsibilities for project design.

Tamara O'Neal
Name

1/31/2024
Date:



01/31/2024

RED BRICK SOLUTION

FINAL On-Site Hydrology Study

January 11, 2024
JN 200039

**APN: 3066-261-10 &
3066-251-18**

Sheep Creek Road PHELAN

**San Bernardino
County, California**



County of San Bernardino
BUILDING AND SAFETY

THE PLANS AND DETAILS HAVE BEEN

REVIEWED

FOR CODE COMPLIANCE

THE REVIEW OF THESE PLANS SHALL NOT BE
CONSTRUED TO BE A PERMIT FOR ANY
VIOLATION OF ANY CODE OR ORDINANCE OF
THIS CO.

By J. J. CO.

Date 02/06/2024

THESE PLANS SHALL BE ON THE JOB FOR ALL
REQUESTED INSPECTIONS

timothy_chang@bls.abnccounty.gov
(909) 387-4096 • C (909) 659-0566

PROFESSIONAL ENGINEER'S AFFIRMATIVE STATEMENT

I have examined and am familiar with the information in this document and all appendices, and based on my inquiries of individuals immediately responsible for obtaining the information in this document, I believe that the information is true, accurate, and complete AAA

Prepared by

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Consulting Engineers & Architects

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Appendix A -Exhibits

- A- Location / Land Use Map
- B- FEMA MAP
- C- NOAA 14 Precipitation
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- E- Off-Site Tributary Watershed Map
- F- Pre-Development Hydrology Map
- G- G2 Post-Development Hydrology Map
- H- Pipe Capacity Calculation\
- I- Off-Site Flow By-Pass Channel
- J- Proposed Slope Channel
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Appendix B- Hydrologic Calculations

- Pre-Developed 25-year Rational Method Analysis
- Pre-Developed 100-year Rational Method Analysis
- Post-Developed 100-year Rational Method Analysis
- Post-developed 100-year Unit Hydrograph

Appendix C- Retarding Basin Calculations

A. LOCATION OF PROPERTY

Appendix A, Exhibit A shows the 23.96-acre overall project site is located north and east of the Phelan Pinion Hills Community Service District offices and is bounded by Sheep Creek Road on the West, Comercial Development and School fields on the North, residential homes on the East an Warbler Road on the South.

B. DESCRIPTION OF PROPERTY

The project consists of Class A soils (see Exhibit D1) with Poor Cover consisting of Annual grass CN 67 (see Exhibit D2) and Barren graded land CN 78. Graval and Decomposed Granite are to be considered 20-percent impevious CN 98 and 80-percent Commercial Landscaping CN 32. The overall project will expand the existing 3.11-acre PPHCSD site into a 23.96-acre development comprised of APN 3066-261-10 that encompasses the existing 3.11 acre site, and the northerly 5.02-acre commercial site; APN 3066-251-18 a proposed 14.6-acre park; a quick claim of the southern 0.42- acre portion of Sahara Road; the easterly 0.72-acre extention of Warbler Road; a 0.49-acre reciprical access road on the north; the removal of the 0.40 dedication of Sheep Creek Road, and the existing 0.90-acre developed commercial site west of the existing PPHCSD site. Total project acreage is then $3.11+5.02+14.60+0.42+0.72+0.49-0.40+0.90=24.86$ -acres.

The overall tributary area is then reduced by the slope areas that drain off-site and areas conveying off-site tributary flows through the site that do not confluence with on-site flows prior to exiting the site. This area was identified as the slopes on Sheep Creek Road, the north and east slopes of the basin, and the eastern by-pass channel totaling 1.09-acres for a total project area ($24.86-1.09=$) 23.77-acres.

C. PURPOSE AND SCOPE

The purpose of this study is to determine the commercial developments effect on hydrology and mitigate the developed storm flows to protect downstream developments from an increase in flows.

D. METHODOLOGY

This study is based on using the San Bernardino County Hydrology Manual 1986 Revision, the April 6, 2010 Addendum for Arid Regions, the September 4, 1987 Detention Basin Design Criteria Memo, and CivilDesign Rational Method and Unit Hydrograph Software to model the storm channel flows.

The following criteria were used for the off-site tributary flows:

- | | |
|--------------------------|--|
| 1. Current land use: | Private Unincorporated |
| 2. Pervious ratio | Pre-10% Post-85% |
| 3. Intended Use: | Private Unincorporated |
| 4. NOAA 14 Precipitation | 100-year 1-hour=1.28 in. Post-Developed
100-year 24-hour=5.53 in.
25-year 1-hour = 0.927 in. Pre-Developed |
| 5. Soil Type | Group A |

E. COMPLIANCE WITH REGULATIONS

All calculations are based on generally accepted engineering practices in accordance with the San Bernardino County Hydrology Manual's Hydrologic Criteria and Drainage Design including the April 6, 2010 Addendum that addresses the Antecedent Moisture Condition (AMC) for arid regions of the County and the September 4, 1987 Detention Basin Design Criteria Memorandum.

F. FLOODPLAIN INFORMATION

The project site is located within the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Panel 06071C6450H effective August 28, 2008. This panel indicates that the site is in "Zone AO". Zone AO (hatching) is defined by FEMA as "flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined." (See Appendix A, Exhibit B) for the San Bernardino County.

II. OFF-SITE TRIBUTARY FLOWS

Research shows that a FEMA FIS (06071CV001D) was performed on this general area, but the Horse Canyon area was not listed as one of the 'Flooding Sources Studied by Detailed Methods'. We infer from this that it was studied by 'Approximate Methods' although again it is not listed under this heading. Page 46 of the FEMA FIS report, Table 7 -Summary of Discharges, lists Horse Canyon as having a 1-percent peak discharge of 1,219 cfs.

Red Brick Solution, LLC (RBS) prepared a separate off-site hydrology study titled "Off-Site Tributary Storm Flows APN: 3066-261-10 Sheep Creek Road Phelan" that reanalyzed the data from BSI Consultants, Inc. Detailed Study of Zone 6 – Phelan Area Hydrology Study dated November 20, 1989 that determined a base flow at the mouth of Horse Canyon to be 4070 cfs. Using the 4070 cfs flow at the mouth of Horse Canyon, RBS determined that the flows split several times before reaching the project and that portion of the off-site storm flow that reaches the Dip-Section in Sheep Creek Road is 1434 cfs (See Exhibit E). If the 1,219 cfs listed in the FEMA FIS report were analyzed similarly by RBS it would determine that the entire 1,219 cfs would reach the Dip-Section in Sheep Creek Road where it would combine with an additional 209 cfs tributary along the path of travel. The combined $(1219+209 =)$ 1428 cfs. In RBS's separate report at this point 1434 cfs combines with the additional 209 cfs for a combined flow rate of $(1434+209=)$ 1644 cfs with a street dip section capacity of 1095 flowing northeasterly in a natural channel capable of conveying 1330 cfs. In Addition, the flow paths depicted in Exhibit E as a 2nd crossing of Sheep Creek Road just south of Warbler Road were proven to be diverted north with any local tributary flows to Sheep Creek Road captured and conveyed north within Sheep Creek Road past Warbler Road via a cross-gutter and elevated high point to the east on Warbler Road.

Thus, the remaining off-site tributary flow of $(1644-1095=)$ 549 cfs identified in the RBS separate report at the Dip-Section in Sheep Creek are directed northeasterly as sheet flows toward the northeast and enter the future park site from the south, east of the existing PPHCSD campus. Considering that this 549 cfs sheet flows are historically travelling across the easterly topography of the site that will not be disturbed, no improvements are deemed necessary until the final phase of the parks development plan. At that time these flows need to be captured and diverted easterly along Warbler Road to the eastern boundary where a separate channel system will divert these flows north to the northeast corner of the site and release them into their historic conveyance.

A by-pass channel design is presented in Appendix A, Exhibit I, that shows a 15-foot base width channel with 5:1 side slopes flowing 9.77 feet per second at a slope of 2.24 % approximately 2.17 deep and 37-feet wide. This results in a capacity of 549 cfs, which will contain these flows. The channel as shown will have $(3.17 \text{ channel depth} - 2.17 \text{ W.S.E} = 1)$ 1-ft of freeboard. This will prevent flooding of the 100-year storm as defined by FEMA Special Flood Hazard Zone AO from the offsite flows.

III. ON-SITE HYDROLOGY

A. ON-SITE DRAINAGE DESCRIPTION-PHASE 1

According to the USGS topographic survey of the area, the tributary drainage area consists of the proposed commercial property, including the PPHCSD offices, a community park and vacant land. Drainage flows from all these areas are generally to the northeast. The vegetation on the undeveloped areas of the project site is considered to be of poor to average cover.

B. PRE-DEVELOPED CONDITIONS

The assessor's map of the area shows the project consists of an initial parcel which contains the PPHCSD offices to the southwest, a small community park to the southeast and vacant land to the north. The site is also impacted by a 0.90-acre commercial parcel surrounded on 3 sides by the site, the fourth side borders Sheep Creek Road. To the east of the initial parcel are 2 additional undeveloped parcels which are included in the drainage area. An existing ridgeline bisects the site running from the southwest corner of the site to the northeast corner of the site. Using the San Bernardino County Hydrology Manual and CivilDesign software to perform a Rational method analysis, the single drainage area (DA1) pre-developed site was divided into two drainage management areas (DMA-A & DMA-B) each consisting of three (3) subareas (1A-3A & 4B-6B respectively) that ultimately confluence at the northeast corner of the site. The pre-developed site (see Appendix A, Exhibit F) was analyzed using the point rainfall of 0.927 for a 25-year AMC II storm event that determined that the undeveloped storm flows are approximately 38.08 cfs and a 100-year AMC III storm event of 65.04 cfs.

C. POST-DEVELOPED CONDITIONS

The 100-year storm condition outlined in the San Bernardino Hydrology Manual considers a 3-day storm event where the ground is saturated, and no ground water percolation occurs. This is accomplished by considering the Antecedent Moisture Condition case III (AMC-III) for our study. Using the point rainfall of 1.28 inches for the 100-year-one-hour storm event.

The developed site drainage area is somewhat smaller due to street improvements along Sheep Creed Road, which direct some flows onto Sheep Creek Road and then north past the project.

The developed site considers that the drainage will travel through entire site through various conveyances contained in three (3) Drainage Management Areas (DMA-A,B,&C). All three DMA's lead to the northeast corner of the project where a single retention basin will mitigate the 100-year storm flows (see Appendix A, Exhibit hydrology G).

Drainage Management Area DA1-DMA-A (subareas 1A-19A; nodes 1-22) consists of 6.46-acres which includes a portion of the existing two sites and the proposed new development to the north.

8.97 ac?

Drainage Management Area DA1-DMA-B (subareas 20G-31A; nodes 23-37) consists of 9.02-acres along the southerly access road and the proposed play areas west of the existing site. This contains a soccer field and a multi-purpose turf area that convey the storm flows via perimeter channel having a base width of 10-foot, 10:1 side slopes, flowing less than 0.4-ft deep.

Drainage Management Area DA1-DMA-C (subareas 32K-34K; nodes 38-41) consists of the easterly undeveloped 8.30-acres along the southern and eastern property lines flowing north to the northeast corner of the site.

Converting the Rational method analysis data to the Unit Hydrograph Method, it was determined that this combined 23.77-acre area will generate a 100-year 24-hour storm flow of 68.04 cfs.(see Appendix B, 100-year Unit Hydrograph)

D. CURB AND GUTTER CAPACITY / CATCH BASIN SIZING

The project is designed with 6-inch curbs and 2-percent surface slopes that have a maximum capacity to convey 7.79 cfs at curb height. A maximum storm flow of 6.73 cfs flow occurs at Node 18 which is less than the 7.79 capacity and only rises to 4.5 inches above the flowline. These calculations are based on using an LA County grated catch basin configuration shown on Figure D-14 at the end of this report.

E. STORM DRAINSIZING

Although Pipe sizes are calculated while utilizing the CivilDesign Rational Method Software we have provided two scenarios in Appendix A as Exhibit H. One scenario shows the worst case piped flows between nodes 21 & 22 (Ap7) where a 24-inch diameter pipe conveys 32 cfs at a 4.09% slope half full. The minimum slope needed to carry this flow was determined to be 2.00%. The second scenario

shows the capacity of an 18-inch diameter pipe at a minimum slope of 0.5% to be 7.99 cfs. These flows will exit as a free outlet into a ten (10) foot base width channel with 10:1 side slope flowing less than 0.4-feet deep. To mitigate the velocity changes at the exit of the pipe systems a rip-rap pad will need to be sized by the site engineer.

F. DETENTION BASIN SIZING

The San Bernardino County Hydrology Manual Detention Basin Design Criteria memorandum requires that the developed 100-year storm flow of 68.04 cfs (DA1) be mitigated to 90% of the pre-developed storm flow ($38.08 \times 0.9 =$) 34.27 cfs. The required detention basin volume was then determined by running CivilDesign Route Software that analyzes the 68.04 cfs unit hydrograph against an outflow that varies with the depth of water in the basin that is limited to 34.27 cfs.

A retarding basin is detailed in Appendix A, Exhibit K which shows a 6-foot deep 1.07 ac-ft basin with five (5) 12-inch diameter storm drain discharge pipes under the spillway set at an outlet elevation of 4117.5 that retains 3.5 feet of storm water equal to a volume of 0.402 Ac-Ft. These pipes are set at a 1% (0.5 ft elevation drop in 50 lf) slope. After analyzing the 100-year storm event (see Appendix C) it was determined that the water surface elevation reaches a depth of 6.0-ft (elevation 4120) with a maximum discharge rate of 33.6 cfs which is below the 34.27 cfs maximum allowed.

The spillway elevation is set at elevation 4120 with the embankment at 4122 that gives us 2-foot of freeboard. The 15-ft base width and 5:1 embankment spillway is designed to carry the $Q_{1000} = 1.35 \times Q_{100} = 92$ cfs at a depth of 0.72-feet with 1.28-feet of freeboard.

The drawdown time to drain the 0.402 Ac-Ft of retained volume at a depth of 3.5 feet is determined by the percolation rate that is reported to be 4.24 in/hr. Using a factor of safety of 2 (FS=2) the percolation rate is reduced to a value of 2.12 in/hr. Thus, the drawdown time is equal to (3.5×12) 42-inches divided by 2.12-in/hr that equates to 19.74 hrs which is less than the 48-hrs required.

IV. CONCLUSIONS

Based on the separate report entitled “Off-Site Tributary Storm Flows APN: 3066-261-10 Sheep Creek Road Phelan” that the uses data from the BSI Consultants, Inc. Detailed Study of Zone 6 – Phelan Area Hydrology Study dated November 20, 1989 to determine the projects off-site tributary flow rate of 549 cfs and how it can be safely around the site with no impact to the project. New data from the FEMA Flood Insurance Study (06071CV001D) was reviewed for this general area, that shows the tributary watershed producing only 1,219 cfs which can be fully contained within the existing off-site channel system without any tributary flows on to the currently designed project site.

The proposed project will also mitigate the on-site 68.04 cfs 100 -year 24-hour storm event to below the 90% pre-developed storm event flows of 34.27 cfs tributary to the downstream neighbors. In addition, 0.402 ac-ft of storm water will be retained for infiltration to meet the Mojave River WQMP

requirements. The drawdown time was determined to be 19.74 hrs which is less than the required 48-hrs. All improvements will be required to be maintained by the property owner or assigns. All building Pad Elevations should be elevated one (1) foot above the highest adjacent proposed drainage grade and at a minimum elevation of 4121.0 being one (1) foot above the water surface elevation of the proposed basin. The site design engineer shall also size headwalls and rip-rap areas based on the velocities and pipe sizes calculated in the rational study provided herein.

REFERENCES:

County of San Bernardino Public Works Hydrology Manual. Created in August 1986.

<http://cms.sbcounty.gov/Portals/50/floodcontrol/HydrologyManual.pdf>

San Bernardino County Detention Basin Design Guidelines Criteria dated September 4, 1987

<http://www.sbcounty.gov/Uploads/lus/PW/DETENTIONBASINDESIGN.pdf>

San Bernardino County Hydrology Manual Addendum for Arid Regions dated April 6, 2010.

https://cms.sbcounty.gov/Portals/50/floodcontrol/20100412_addendum.pdf

Federal Emergency Management Agency website: <https://msc.fema.gov/portal> accessed December 2016.

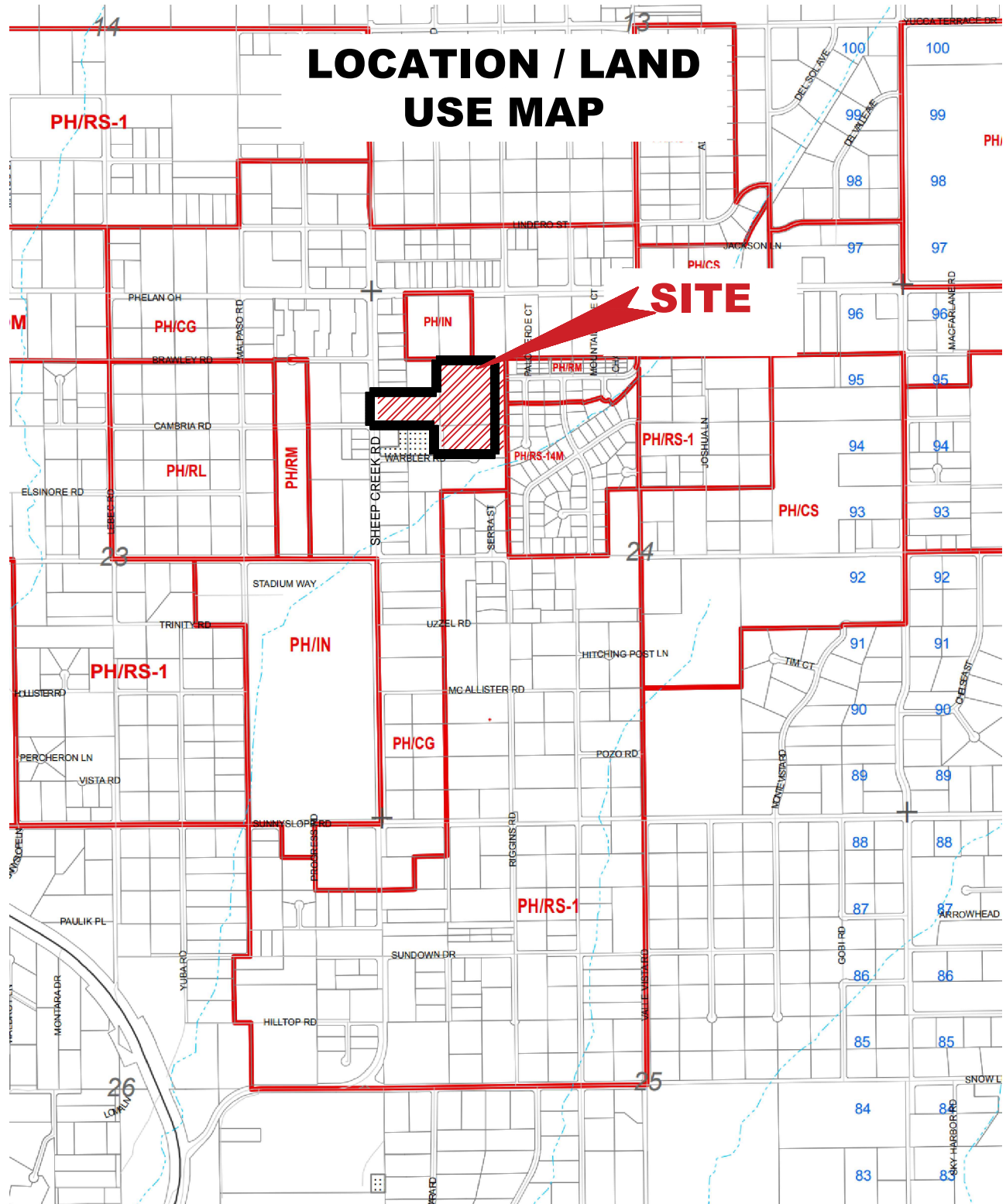
NOAA Atlas 14, Volume 6, Version 2 POINT PRECIPITATION FREQUENCY (PF) ESTIMATES WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION. Accessed December 2016.

NRCS Soils Data from Soil Map; San Bernardino County, California, Mojave River Area; Version 8, Sep 12, 2016 Accessed December 2016.

APPENDIX A - Exhibits:

Location / Land Use Map – A
FEMA Map – B
NOAA 14 Precipitation – C
USGS Soil Type – D
Off-Site Tributary Watershed Map - E
Pre-Development Hydrology Map - F
Post-Development Hydrology Map - G
Pipe Capacity Calculation - H
Off-Site Flow By-Pass Channel - I
Proposed Slope Channel - J
Retarding Basin Design -K

LOCATION / LAND USE MAP



DATE: 03/15/2022

DRAWN BY: DWL

CHECKED BY: DWL

SCALE: NTS

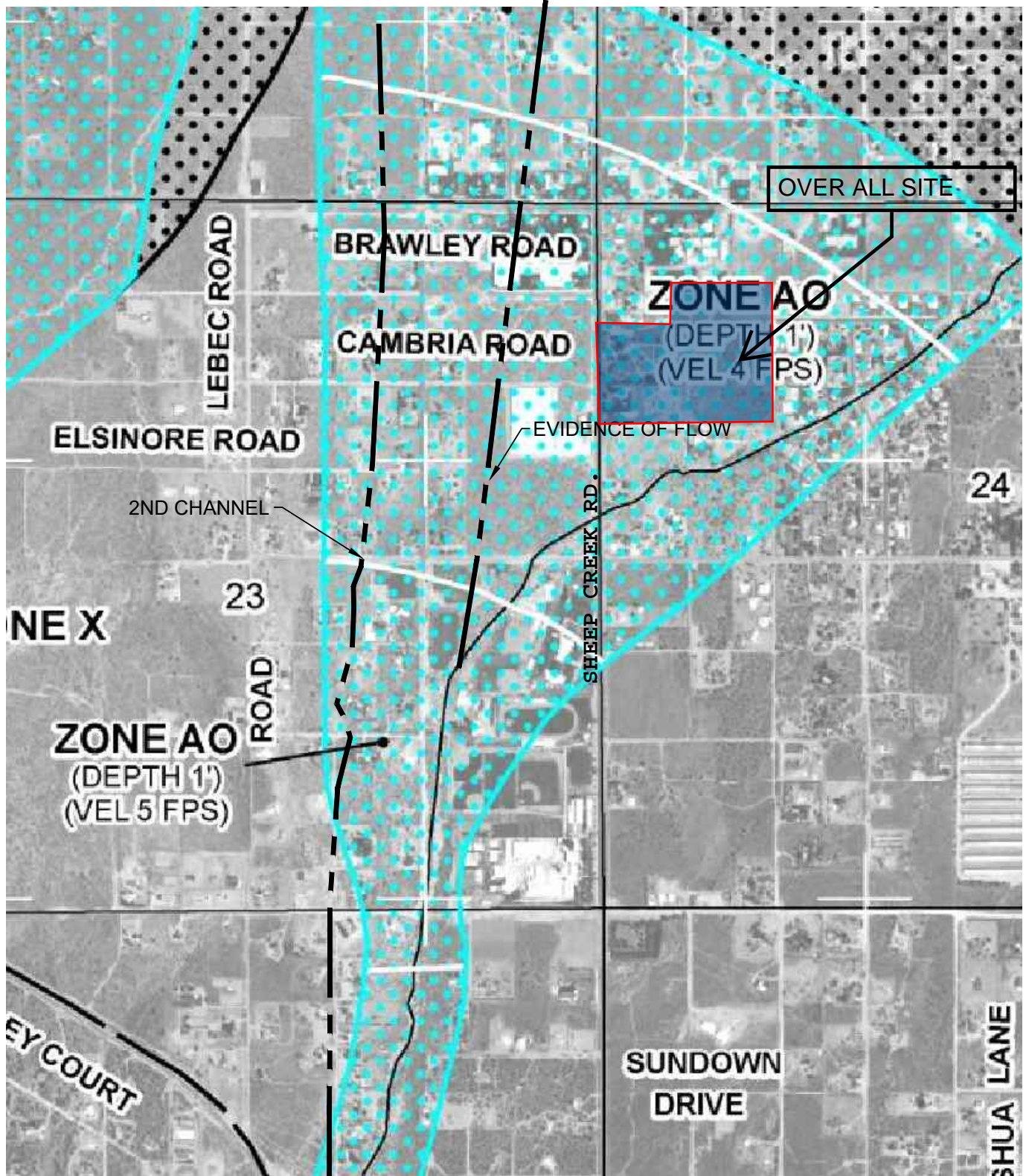
EXHIBIT A

PPHCSD-COMMUNITY CENTER
PHELAN - SAN BERNARDINO, CA
COUNTY, CA

APN: 3066-261-08,10
3066-251-14

**RED
BRICK**
SOLUTION

CONSULTING ENGINEERS
& ARCHITECTS



JOB: 20039
 SCALE: 1" = 1000'
 FILE:
 DATE:

EXHIBIT B

PROJECT
 PHELAN PINION HILLS PARK
 HYDROLOGY STUDY

**RED
 BRICK**
 SOLUTION



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.083 (0.069-0.101)	0.118 (0.098-0.144)	0.167 (0.138-0.205)	0.209 (0.171-0.259)	0.270 (0.214-0.345)	0.320 (0.248-0.417)	0.373 (0.282-0.498)	0.430 (0.316-0.591)	0.510 (0.360-0.732)	0.576 (0.392-0.855)
10-min	0.119 (0.099-0.145)	0.170 (0.140-0.207)	0.240 (0.198-0.294)	0.300 (0.246-0.371)	0.388 (0.307-0.495)	0.459 (0.355-0.598)	0.534 (0.404-0.714)	0.616 (0.452-0.847)	0.732 (0.515-1.05)	0.826 (0.562-1.23)
15-min	0.144 (0.120-0.176)	0.205 (0.170-0.250)	0.290 (0.239-0.355)	0.363 (0.297-0.448)	0.469 (0.371-0.598)	0.555 (0.430-0.723)	0.646 (0.488-0.864)	0.745 (0.547-1.02)	0.885 (0.623-1.27)	0.998 (0.679-1.48)
30-min	0.207 (0.172-0.252)	0.294 (0.243-0.359)	0.416 (0.343-0.509)	0.521 (0.426-0.643)	0.672 (0.532-0.858)	0.796 (0.616-1.04)	0.927 (0.701-1.24)	1.07 (0.785-1.47)	1.27 (0.894-1.82)	1.43 (0.974-2.13)
60-min	0.285 (0.236-0.348)	0.405 (0.335-0.495)	0.574 (0.473-0.702)	0.718 (0.587-0.886)	0.927 (0.733-1.18)	1.10 (0.849-1.43)	1.28 (0.966-1.71)	1.47 (1.08-2.02)	1.75 (1.23-2.51)	1.97 (1.34-2.93)
2-hr	0.420 (0.348-0.512)	0.576 (0.476-0.703)	0.791 (0.653-0.969)	0.975 (0.798-1.20)	1.24 (0.980-1.58)	1.45 (1.13-1.89)	1.68 (1.27-2.24)	1.92 (1.41-2.64)	2.26 (1.59-3.24)	2.53 (1.72-3.75)
3-hr	0.523 (0.433-0.637)	0.707 (0.585-0.863)	0.960 (0.792-1.18)	1.18 (0.962-1.45)	1.48 (1.17-1.89)	1.73 (1.34-2.26)	1.99 (1.51-2.66)	2.27 (1.67-3.12)	2.66 (1.88-3.82)	2.97 (2.02-4.41)
6-hr	0.750 (0.621-0.914)	1.00 (0.832-1.23)	1.35 (1.12-1.66)	1.65 (1.35-2.03)	2.06 (1.63-2.63)	2.39 (1.86-3.12)	2.74 (2.07-3.66)	3.11 (2.29-4.28)	3.63 (2.55-5.20)	4.04 (2.75-5.99)
12-hr	0.997 (0.826-1.22)	1.38 (1.14-1.68)	1.90 (1.56-2.32)	2.32 (1.90-2.87)	2.92 (2.31-3.73)	3.39 (2.63-4.42)	3.88 (2.93-5.19)	4.39 (3.23-6.04)	5.09 (3.59-7.30)	5.65 (3.84-8.39)
24-hr	1.30 (1.15-1.49)	1.87 (1.66-2.16)	2.64 (2.33-3.05)	3.27 (2.86-3.81)	4.14 (3.51-4.99)	4.83 (4.01-5.94)	5.53 (4.48-6.97)	6.27 (4.94-8.12)	7.29 (5.51-9.84)	8.08 (5.90-11.3)
2-day	1.53 (1.35-1.76)	2.23 (1.97-2.57)	3.17 (2.80-3.67)	3.96 (3.47-4.61)	5.05 (4.28-6.08)	5.90 (4.90-7.26)	6.79 (5.50-8.56)	7.72 (6.08-10.0)	9.01 (6.81-12.2)	10.0 (7.32-14.0)
3-day	1.65 (1.46-1.90)	2.42 (2.14-2.79)	3.47 (3.06-4.01)	4.35 (3.81-5.06)	5.56 (4.72-6.70)	6.53 (5.42-8.03)	7.53 (6.10-9.49)	8.59 (6.77-11.1)	10.1 (7.61-13.6)	11.2 (8.21-15.7)
4-day	1.75 (1.55-2.02)	2.58 (2.29-2.98)	3.72 (3.29-4.30)	4.68 (4.10-5.45)	6.02 (5.10-7.25)	7.08 (5.88-8.71)	8.20 (6.64-10.3)	9.38 (7.39-12.1)	11.0 (8.34-14.9)	12.3 (9.02-17.2)
7-day	1.93 (1.71-2.22)	2.86 (2.53-3.30)	4.17 (3.68-4.82)	5.29 (4.63-6.16)	6.88 (5.83-8.29)	8.16 (6.77-10.0)	9.51 (7.70-12.0)	11.0 (8.63-14.2)	13.0 (9.83-17.6)	14.6 (10.7-20.5)
10-day	1.99 (1.76-2.29)	2.97 (2.63-3.42)	4.36 (3.85-5.04)	5.56 (4.87-6.48)	7.30 (6.19-8.79)	8.71 (7.23-10.7)	10.2 (8.27-12.9)	11.8 (9.32-15.3)	14.1 (10.7-19.1)	16.0 (11.7-22.4)
20-day	2.30 (2.04-2.65)	3.49 (3.09-4.02)	5.21 (4.60-6.03)	6.73 (5.90-7.85)	8.99 (7.61-10.8)	10.9 (9.01-13.3)	12.9 (10.4-16.2)	15.1 (11.9-19.5)	18.2 (13.8-24.6)	20.8 (15.2-29.1)
30-day	2.67 (2.37-3.07)	4.04 (3.58-4.66)	6.07 (5.36-7.02)	7.89 (6.90-9.19)	10.6 (8.98-12.8)	12.9 (10.7-15.8)	15.3 (12.4-19.3)	18.0 (14.2-23.3)	21.9 (16.6-29.6)	25.2 (18.4-35.2)
45-day	3.15 (2.79-3.63)	4.73 (4.19-5.46)	7.09 (6.26-8.20)	9.22 (8.07-10.7)	12.4 (10.5-15.0)	15.2 (12.6-18.7)	18.2 (14.7-22.9)	21.4 (16.9-27.7)	26.2 (19.8-35.4)	30.1 (22.0-42.1)
60-day	3.51 (3.11-4.04)	5.20 (4.60-5.99)	7.75 (6.84-8.96)	10.1 (8.82-11.7)	13.6 (11.5-16.4)	16.6 (13.8-20.4)	19.9 (16.1-25.1)	23.5 (18.5-30.4)	28.8 (21.7-38.8)	33.1 (24.2-46.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

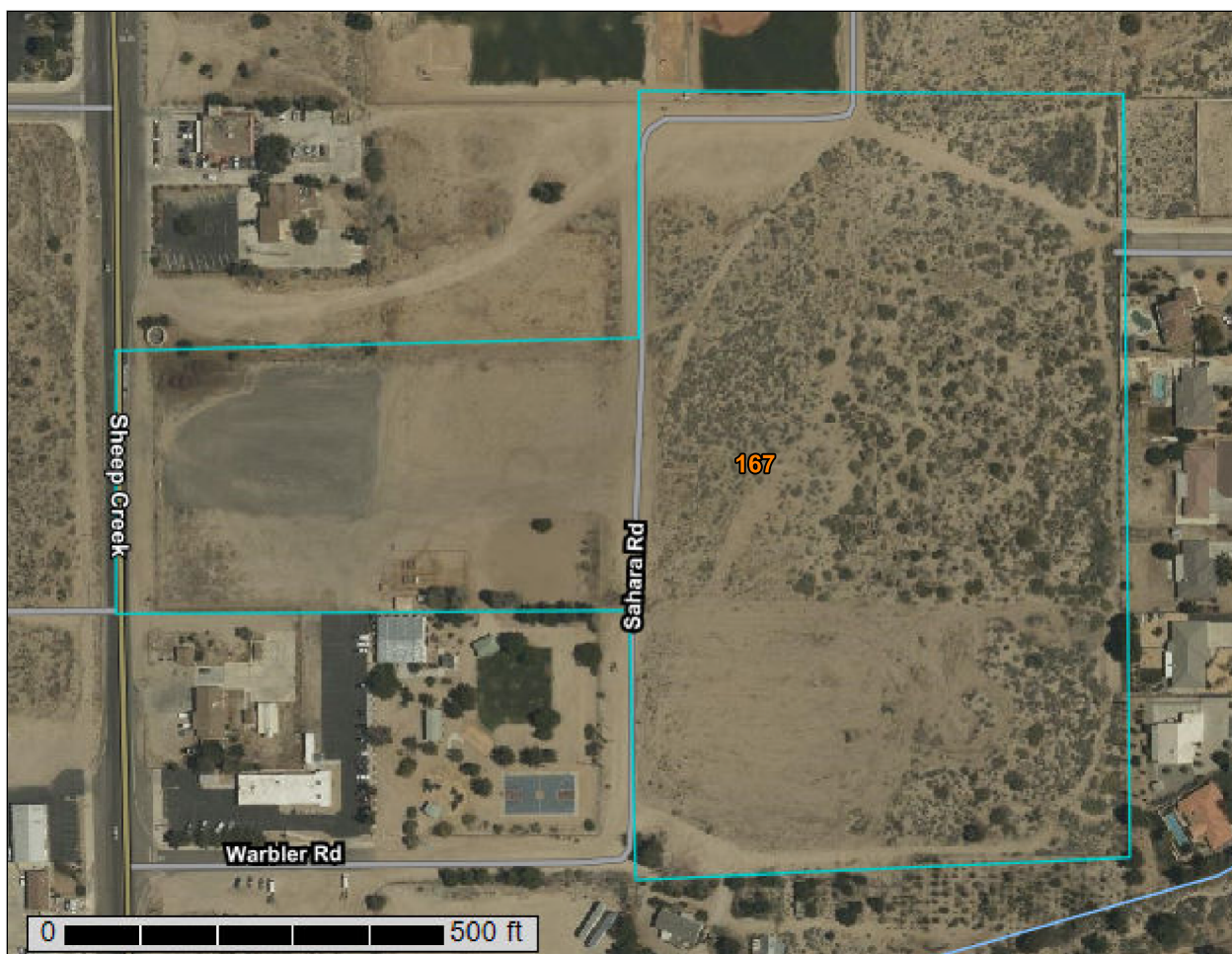
[Back to Top](#)

PF graphical

EXHIBIT D1 Custom Soil Resource Report for San Bernardino County, California, Mojave River Area

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
167	TUJUNGA SAND, COOL, 2 TO 9 PERCENT SLOPES	20.7	100.0%
Totals for Area of Interest		20.7	100.0%



San Bernardino County, California, Mojave River Area

167—TUJUNGA SAND, COOL, 2 TO 9 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkt9
Elevation: 2,700 to 4,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Tujunga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga

Setting

Landform: Fan aprons
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 14 inches: sand
H2 - 14 to 60 inches: stratified gravelly sand to gravelly loamy sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R030XE006CA - COARSE LOAMY
Hydric soil rating: No

Minor Components

Soboba

Percent of map unit: 4 percent

Hanford

Percent of map unit: 4 percent

EXHIBIT D2

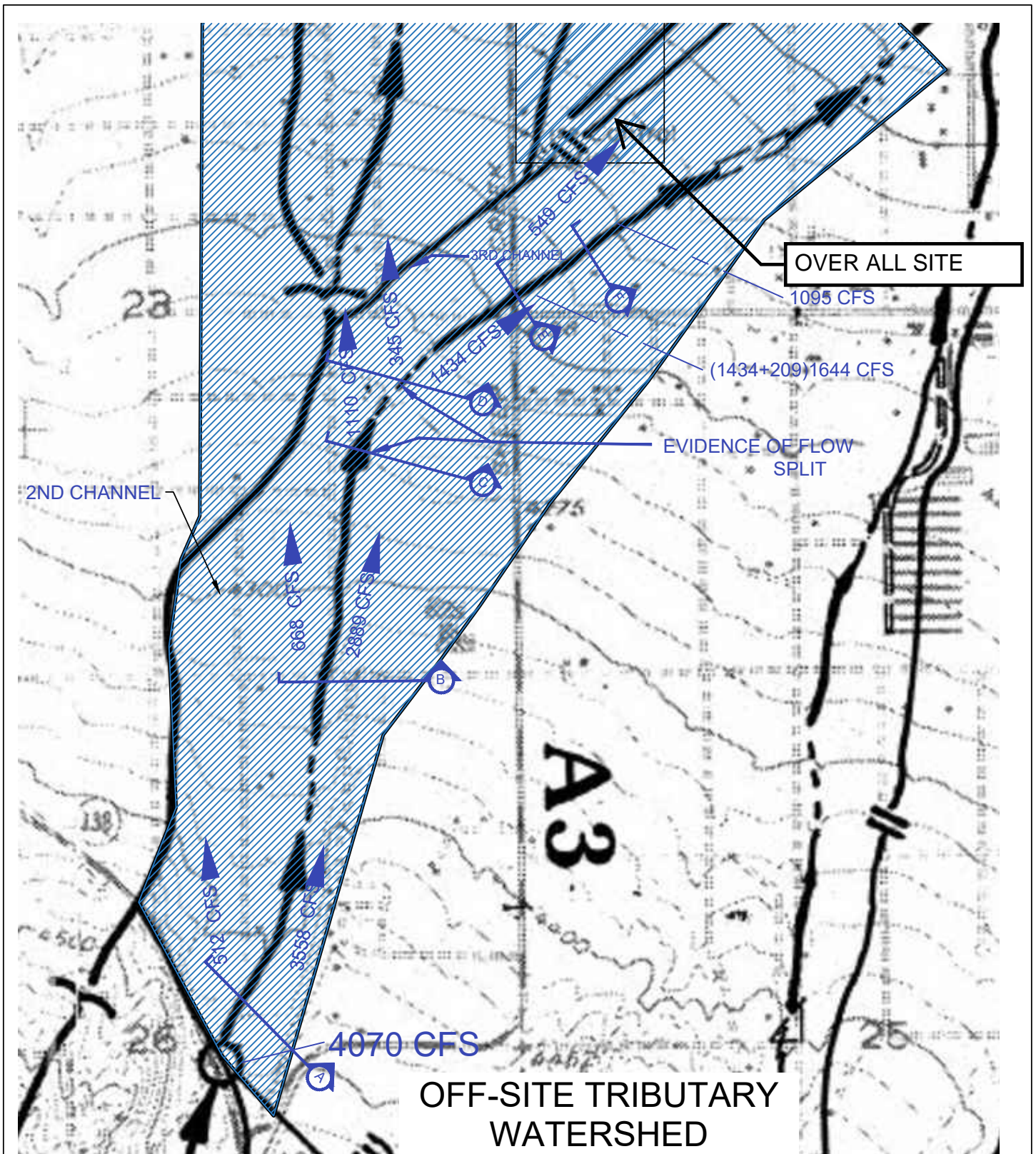
Curve (I) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>NATURAL COVERS -</u>					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
<u>URBAN COVERS -</u>					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79

Impervious areas shall be assigned a CN of 98. It is noted that for ultimately developed conditions, the CN for urban landscaping (turf) is provided in Figure C-3.

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

**CURVE NUMBERS
FOR
PERVIOUS AREAS**



OFF-SITE TRIBUTARY
WATERSHED

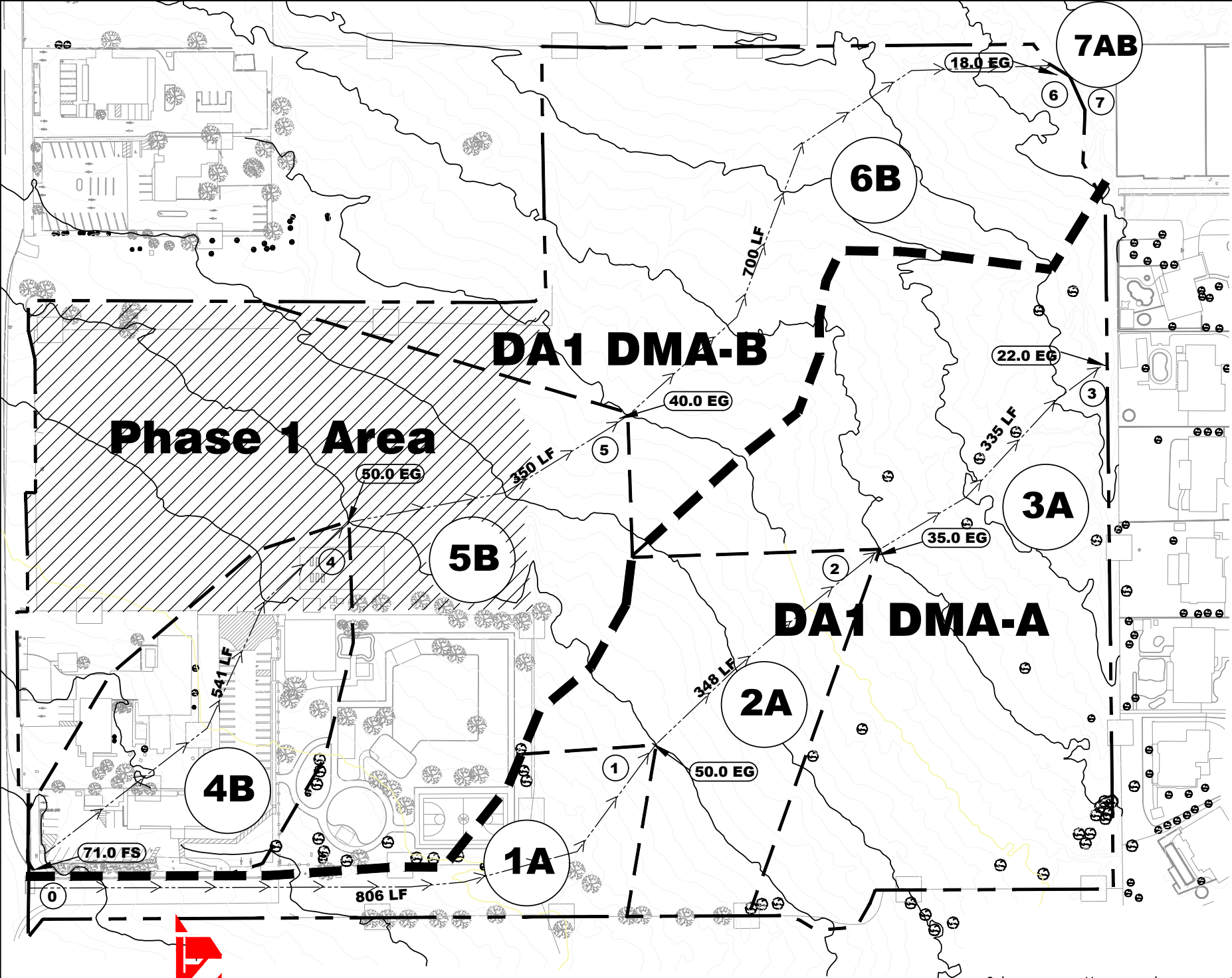


JOB: 20039
SCALE: 1" = 1000'
FILE:
DATE:

EXHIBIT E

SAN BERNARDINO FLOOD CONTROL DISTRICT
BSI ZONE 6-PHELAN AREA HYDROLOGY STUDY
PROJECT
PHELAN PINION HILLS PARK
HYDROLOGY STUDY





LEGEND:

SUB-AREA NUMBER

6B

SUB-AREA

##

22.0 XX.XX

NODE #

SPOT ELEVATION

----->

OVERALL BOUNDARY

SUBAREA BOUNDARY

SUBAREA FLOWLINE

EG

FG

FS

FF

IE

LF

EXISTING GRADE

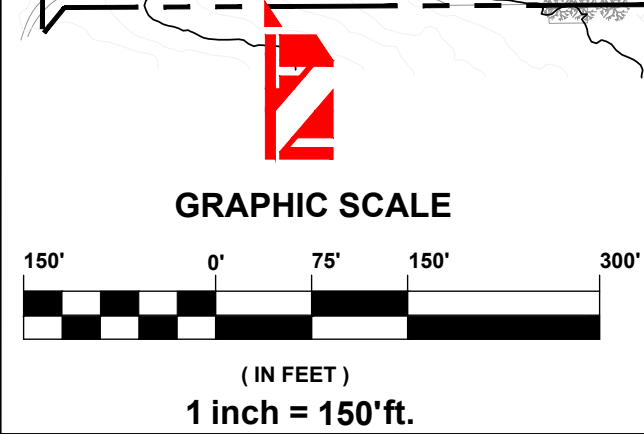
FINISH GRADE

FINISH SURFACE

FINISH FLOOR

INVERT ELEVATION

LINEAL FEET



DA1										
25-Year 1-Hour AMC II										
Subarea Confluence	Upper node	lower node	C N Type	Upper Elev	lower Elev	Conveyance Type	Distance	Area sf	Acres ac	Q ₂₅
1A	0	1	un-dev-p	71	50	Initial	806	64,024	1.470	2.34
2A	1	2	un-dev-p	50	35	n-Chan	348	100,498	2.307	4.82
3A	2	3	un-dev-p	35	22	n-Chan	335	282,573	6.487	11.18
Travel	3	6	Travel	22	18	n-Chan	346			11.18
AB21	3	7	Hold						10.260	11.18
4B	0	4	Com	71	50	Initial	541	100,868	2.316	8.31
5B	4	5	Com	50	40	n-Chan	350	312,114	7.165	23.23
6B	5	6	Com	40	18	n-Chan	700	246,480	5.658	26.28
AB22	5	6	Confluence	40	18				25.400	38.08

HYDROLOGY STUDY

ON-SITE TRIBUTARY WATERSHED AREA

FOR: PPHCSD

IN PHELAND SAN BERNARDINO COUNTY, CA

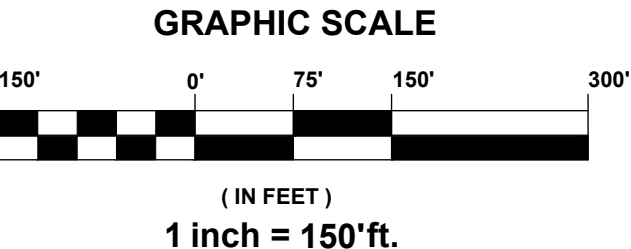
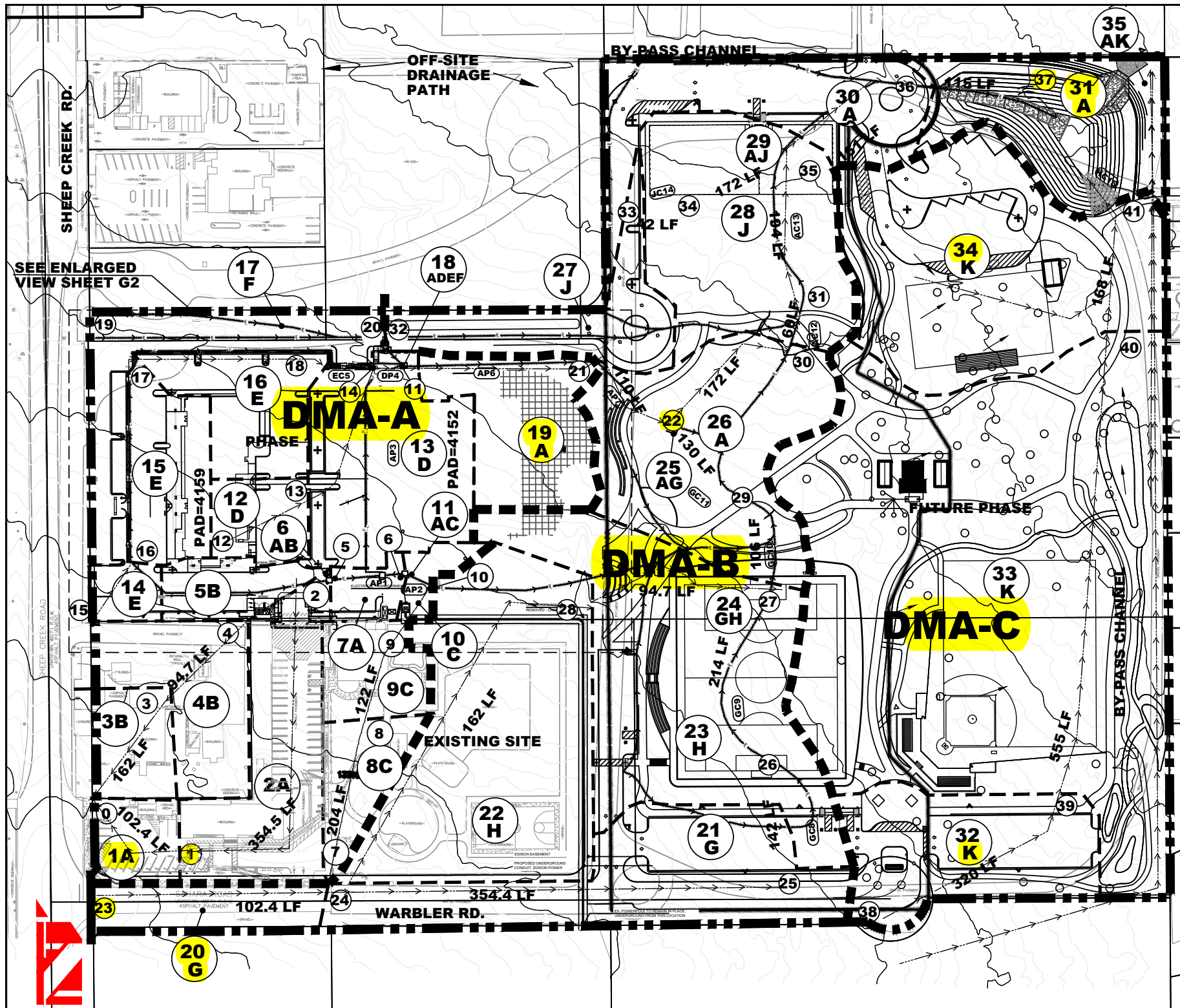
APN: 3066-261-08,10 3066-251-14

PRE-DEVELOPED CONDITION

RED BRICK SOLUTION

CONSULTING ENGINEERS & ARCHITECTS

EXHIBIT F



DA1
DMA-A = SUB-AREAS 1A-19A
DMA-B = SUB-AREAS 20G-31A
DMA-C = SUB-AREAS 32K-34K

LEGEND:

SUB-AREA
SEQUENTIAL
NUMBERING

6B

SUB-AREAS

##

A(p/c)##

NODE #

SUB-AREA CONVEYANCE
PIPE / CHANNEL #
OVERALL BOUNDARY
DMA BOUNDARY
SUBAREA BOUNDARY
SUBAREA FLOWLINE

EG
FG
FS
FF
IE
#p
#c

EXISTING GRADE
FINISH GRADE
FINISH SURFACE
FINISH FLOOR
INVERT ELEVATION
SUB-AREA FLOW PIPE
SUB-AREA FLOW CHANNEL

DA1											
100-Year 1-Hour AMC III											
Subarea	Upper	lower	C N	Upper	lower	Conveyance	Distance	Area	Acres	Q ₁₀₀	
Confluence	node	node	Type	Elev	Elev	Type		sf	ac		
1A	0	1	Com	69.8	66	Initial	102.4	10,585	0.243	1.94	
2A	1	2	Com	66	55.5	Im-Chan	354.5	38,583	0.886	6.77	
AB21	1	2	HOLD						1.290	6.77	
3B	0	3	Com	69.8	65	Initial	162	14,484	0.333	2.26	
4B	3	4	Com	65	57.7	Im-Chan	94.7	27,932	0.641	6.27	
5B	4	2	Com	57.7	55.5	Im-Chan	107.2	10,975	0.252	7.36	
6AB22	4	2	Confluence						2.350	14.12	
Ap1	2	5	Travel	55.5	47.42	pipe	3			14.12	
7A	5	6	Com	47.42	44.7	pipe	90	5,490	0.126	14.12	
AC21	5	6	HOLD						2.480	14.12	
8C	7	8	Com	65.4	58	Initial	204	1,310	0.030	0.192	
9C	8	9	Com	58	54	Im-Chan	122	13,531	0.311	1.96	
10C	9	10	Com	54	51.4	Im-Chan	56	4,708	0.108	2.51	
11AC22	9	10	Confluence	45.76	44.7				2.930	16.58	
Ap2	10	6	Travel	51.4	44.7	pipe	3			16.58	
Ap3	6	11	Travel	44.7	42.3	pipe	246			16.58	
ADEF41	6	11	HOLD						2.930	16.58	
12D	12	13	Com	59.5	56.95	Initial	170	11,066	0.254	1.54	
13D	13	14	Com	56.95	50.3	Im-Chan	188	42,434	0.974	6.67	
Dp4	14	11	Travel	50.3	42.3	pipe				6.67	
ADEF42	14	11	HOLD						1.280	6.67	
14E	15	16	Com	61	58.08	Initial	75	5,740	0.132	1.16	
15E	16	17	Com	58.08	56.39	Im-Chan	250	27,203	0.624	4.41	
16E	17	18	Com	56.39	51.89	Im-Chan	232	21,540	0.494	6.29	
Ec5	18	11	Travel	51.89	50.7	ST-Flow	100			6.29	
ADEF43	18	11	HOLD						1.250	6.29	
17F	19	20	Com	51.74	49.33	Initial	344	16,817	0.386	1.72	
18ADEF44	19	20	Confluence	49.33	42.3		46		5.790	30.59	
Ap6	14	21	Travel	42.3	38.5	pipe	226			30.59	
19A	14	21	Add Area	42.3	38.5			28,791	0.661	31.71	
Ap7	21	22	Travel	38.5	34	pipe	110			31.71	
AG21m	21	22	HOLD						6.46	31.71	
20G	23	24	Com	71	65.4	Initial	102.4	13,830	0.317	2.67	
21G	24	25	Com	65.4	50	Im-Chan	354.5	53,182	1.221	10.41	
Gc8	25	26	Travel	50	41	Im-Chan	142			10.41	
Gc9	26	27	Travel	41	40	Im-Chan	214			10.41	
GH21	26	27	HOLD						1.540	10.41	
22H	24	28	Park	65.4	49	Initial	162	14,484	0.333	1.76	
23H	28	27	Park	49	40	n-Chan	94.7	27,932	0.641	4.73	
24GH22	28	27	Confluence						2.510	14.47	
Gc10	27	29	Travel	40	34	n-Chan	106			14.47	
Gc11	29	22	Travel	34	33	n-Chan	130			14.47	
25AG22m	29	22	Confluence						8.970	45.52	
26A	22	30	Park	33	32	Initial	172	60,907	1.398	45.52	
Ac12	30	31	Travel	32	27	n-Chan	60			45.52	
Ac13	31	35	Travel	27	26	n-Chan	194			45.52	
AJ21	31	35	HOLD						10.368	45.52	
27J	32	33	Com	40	34	Initial	422	24,592	0.565	2.63	
Jc14	33	34	Travel	34	28	n-Chan	42			2.63	
28J	34	35	Park	28	26	n-Chan	172	59,540	1.367	6.66	
29AJ22	34	35	Confluence						12.300	52.17	
30A	35	36	Park	26	22	n-Chan	161	36,723	0.843	52.17	
31A	36	37	Park	22	16	n-Chan	115	101,516	2.330	52.17	
AK21	36	37	HOLD	48	16				15.474	52.17	
32K	38	39	Park	50	36	Initial	320	40,815	0.937	3.49	
33K	39	40	Park	36	25	n-Chan	555	228,712	5.251	16.32	
34K	40	41	Park	25	20	n-Chan	168	91,844	2.108	20.69	
Kc14	41	37	Travel	20	16	n-Chan			8.296	20.69	
35AK22	41	37	Confluence						23.77	72.17	

**HYDROLOGY
STUDY**

**ON-SITE
TRIBUTARY
WATERSHED AREA**

**FOR:
PPHCSD**

**IN
PHELAND
SAN BERNARDINO
COUNTY, CA**

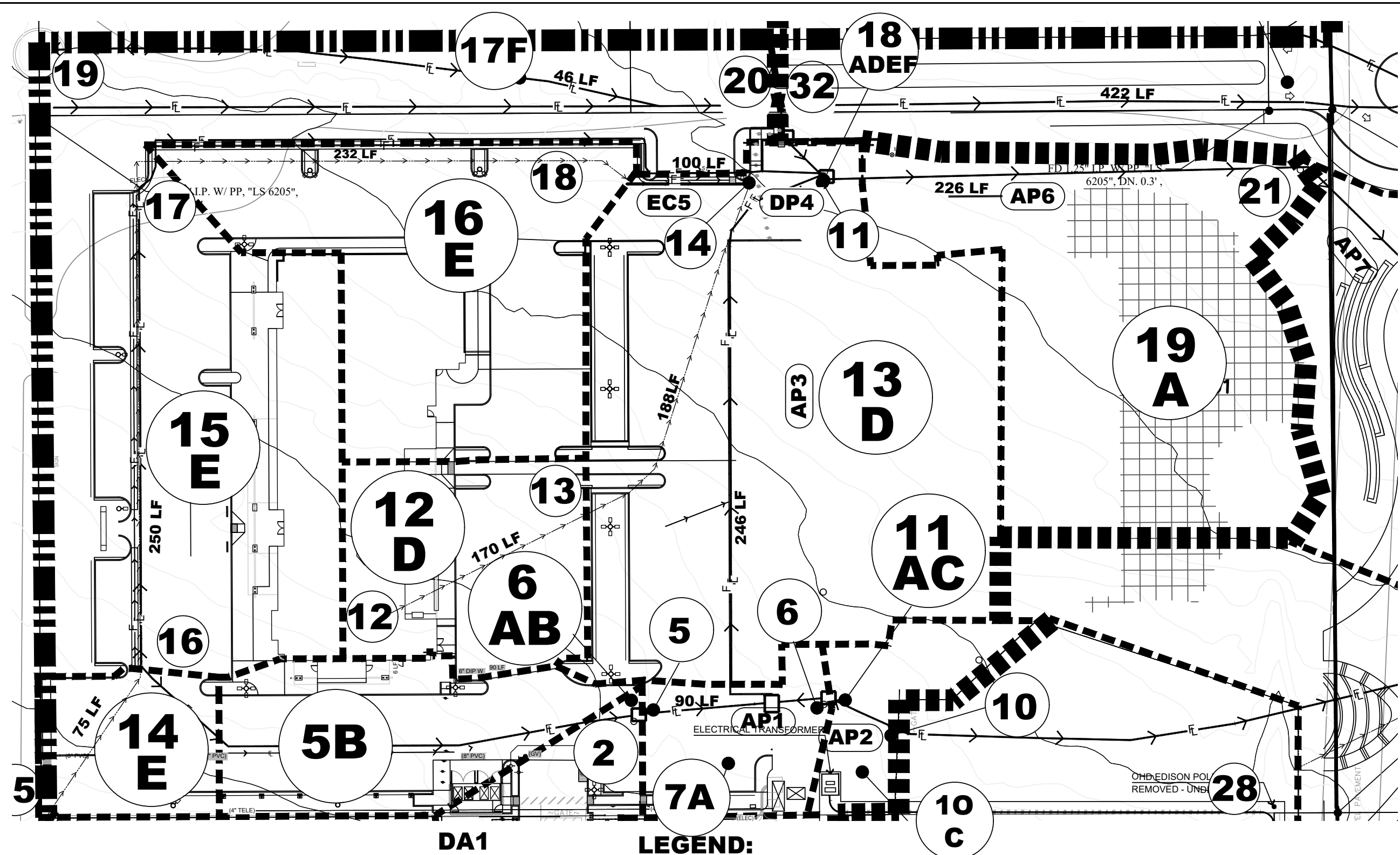
**APN:
3066-261-08,10
3066-251-14**

**POST-DEVELOPED
CONDITION
PHASE I**

**RED
BRICK
SOLUTION**

CONSULTING ENGINEERS
& ARCHITECTS

EXHIBIT G1



DMA-A = SUB-AREAS 1A-19A
 DMA-B = SUB-AREAS 20G-31A
 DMA-C = SUB-AREAS 32K-34K

SUB-AREA
 SEQUENTIAL
 NUMBERING

6B

SUB-AREAS

LEGEND:

##	NODE #	EG	EXISTING GRADE
A(p/c)##	SUB-AREA CONVEYANCE	FG	FINISH GRADE
	PIPE / CHANNEL #	FS	FINISH SURFACE
----	OVERALL BOUNDARY	FF	FINISH FLOOR
----	DMA BOUNDARY	IE	INVERT ELEVATION
----	SUBAREA BOUNDARY	#p	SUB-AREA FLOW PIPE
----	SUBAREA FLOWLINE	#c	SUB-AREA FLOW CHANNEL

HYDROLOGY STUDY

ON-SITE
TRIBUTARY
WATERSHED AREA

FOR:
PPHCSD

IN
PHELAND
SAN BERNARDINO
COUNTY, CA

APN:
3066-261-08,10
3066-251-14

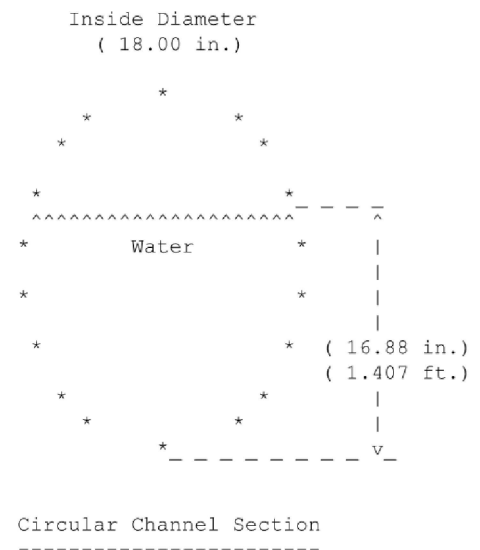
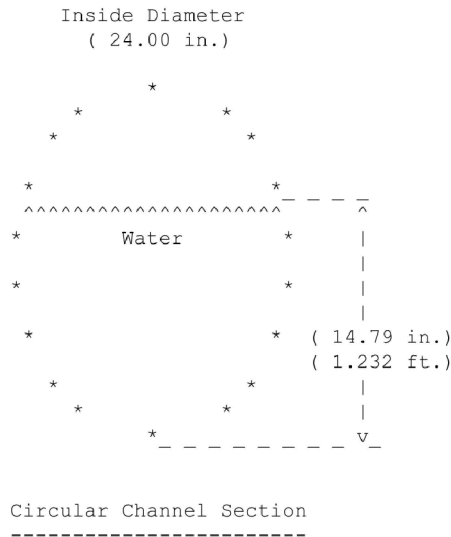
ENLARGED VIEW
POST-DEVELOPED
CONDITION
PHASE I

RED
BRICK
SOLUTION

CONSULTING ENGINEERS
& ARCHITECTS

EXHIBIT G2

GRAVITY STORM DRAIN CAPACITIES



Flowrate	32.000	CFS
Velocity	15.754	fps
Pipe Diameter	24.000	inches
Depth of Flow	14.787	inches
Depth of Flow	1.232	feet
Critical Depth	1.887	feet
Depth/Diameter (D/d)	0.616	
Slope of Pipe	4.090	%
X-Sectional Area	2.031	sq. ft.
Wetted Perimeter	3.610	feet
AR^(2/3)	1.384	
Mannings 'n'	0.013	
Min. Fric. Slope, 24 inch		
Pipe Flowing Full	2.001	%

Flowrate	7.990	CFS
Velocity	4.641	fps
Pipe Diameter	18.000	inches
Depth of Flow	16.884	inches
Depth of Flow	1.407	feet
Critical Depth	1.097	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	0.500	%
X-Sectional Area	1.722	sq. ft.
Wetted Perimeter	3.957	feet
AR^(2/3)	0.989	
Mannings 'n'	0.013	
Min. Fric. Slope, 18 inch		
Pipe Flowing Full	0.579	%

DATE: 03/15/2022

DRAWN BY: DWL

CHECKED BY: DWL

SCALE: NTS

EXHIBIT H

**PPHCSD-COMMUNITY CENTER
PHELAN - SAN BERNARDINO, CA
COUNTY, CA
APN: 3066-261-08,10
3066-251-14**



OFF-SITE FLOW BY-PASS CHANNEL

SEE REACH BETWEEN NODE 39 AND 41 ON EXHIBIT G

```
|<----- ( 46.72' ) ----->|
***** - - - - -Channel Depth ( 3.17')- - - - - *****
***
***
***
*** |<----- ( 36.72' ) ----->| ***
***^ ^ ^ ^ ^ Water Depth ( 2.17') ^ ^ ^ ^ ^ ***
***
***
***
*** |<----- ( 15.00' ) ----->| ***
*****
*****
```

Trapezoidal Channel

Flowrate	549.000	CFS
Velocity	9.774	fps
Depth of Flow	2.172	feet
Critical Depth	2.596	feet
Freeboard	1.000	feet
Total Depth	3.172	feet
Width at Water Surface	36.720	feet
Top Width	46.720	feet
Slope of Channel	2.244	%
Left Side Slope	5.000	: 1
Right Side Slope	5.000	: 1
Base Width	15.000	feet
X-Sectional Area	56.167	sq. ft.
Wetted Perimeter	37.150	feet
AR^(2/3)	73.989	
Mannings 'n'	0.030	

DATE: 03/15/2022

DRAWN BY: DWL

CHECKED BY: DWL

SCALE: NTS

EXHIBIT I

PPHCSD-COMMUNITY CENTER
PHELAN - SAN BERNARDINO, CA
COUNTY, CA
APN: 3066-261-08,10
3066-251-14



PROPOSED SLOPE CHANNEL

```

*****
***                                     *****
***                                     ***
***                                     ***
***                                     ***
*** |<----- ( 29.96') ----->| ***
***^^^^^^^^^ Water Depth ( 0.50') ^^^^^^^^^***
***                                     ***
***                                     ***
***                                     ***
*** |<----- ( 10.00') ----->| ***
*****
*****

```

Trapezoidal Channel

Flowrate	53.000	CFS
Velocity	5.316	fps
Depth of Flow	0.499	feet
Critical Depth	0.644	feet
Freeboard	0.000	feet
Total Depth	0.499	feet
Width at Water Surface	29.960	feet
Top Width	29.960	feet
Slope of Channel	20.000	%
Left Side Slope	20.000	: 1
Right Side Slope	20.000	: 1
Base Width	10.000	feet
X-Sectional Area	9.970	sq. ft.
Wetted Perimeter	29.985	feet
AR^(2/3)	4.785	
Mannings 'n'	0.060	

DATE: 03/15/2022

DRAWN BY: DWL

CHECKED BY: DWL

SCALE: NTS

EXHIBIT J1

PPHCSD-COMMUNITY CENTER
 PHELAN - SAN BERNARDINO, CA
 COUNTY, CA
 APN: 3066-261-08,10
 3066-251-14



PROPOSED SPILLWAY

```

*
*****
***
***
***
*** |<----- ( 21.97') ----->| ***
***^^^^^^^ Water Depth ( 0.70') ^^^^^^^
***
***
***
*** |<----- ( 15.00') ----->| ***
*****
*****

```

Trapezoidal Channel

Flowrate	92.000	CFS
Velocity	7.136	fps
Depth of Flow	0.697	feet
Critical Depth	0.941	feet
Freeboard	0.000	feet
Total Depth	0.697	feet
Width at Water Surface	21.974	feet
Top Width	21.974	feet
Slope of Channel	0.800	%
Left Side Slope	5.000	: 1
Right Side Slope	5.000	: 1
Base Width	15.000	feet
X-Sectional Area	12.893	sq. ft.
Wetted Perimeter	22.112	feet
AR^(2/3)	8.998	
Mannings 'n'	0.013	

DATE: 03/15/2022

DRAWN BY: DWL

CHECKED BY: DWL

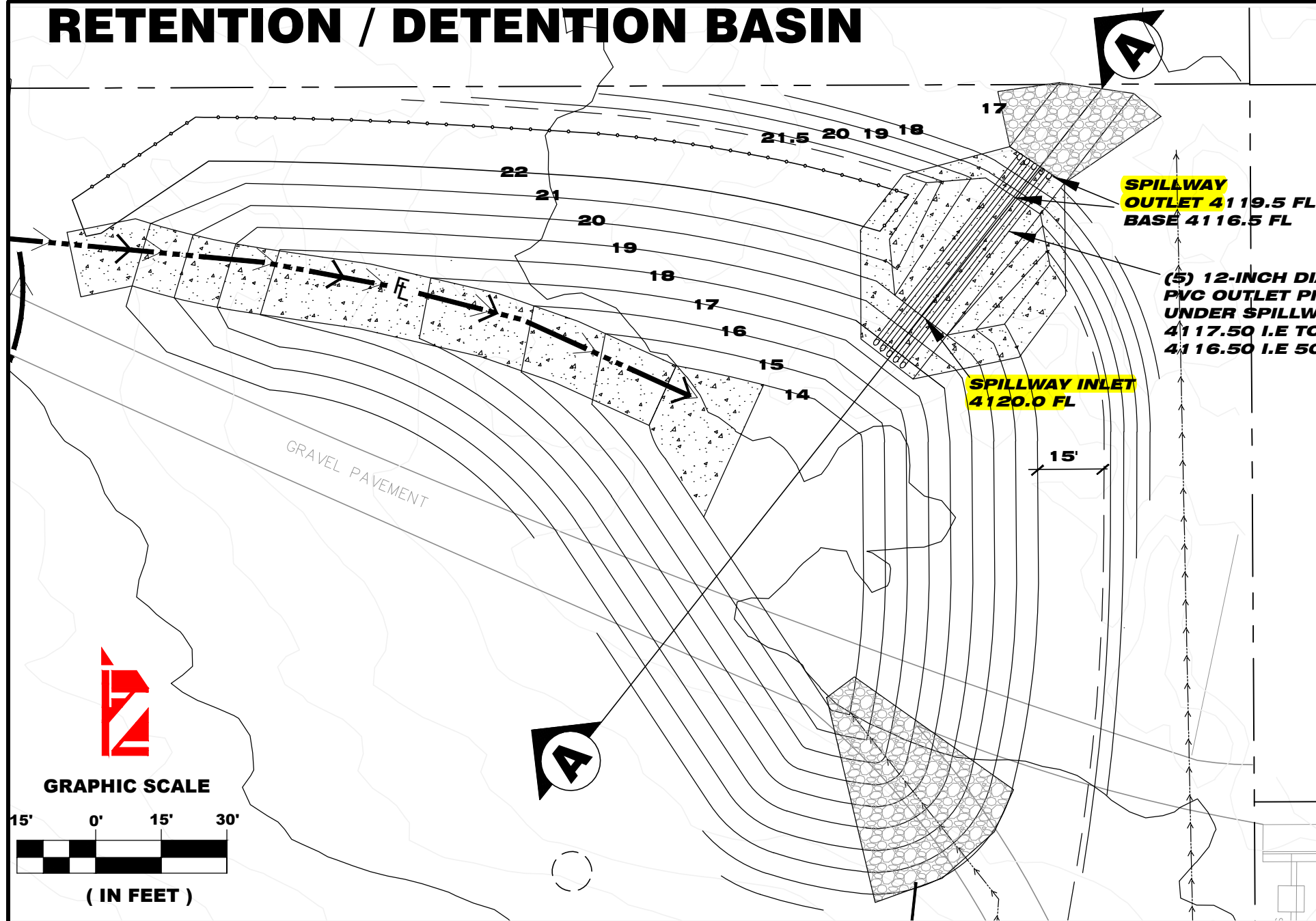
SCALE: NTS

EXHIBIT J2

PPHCSD-COMMUNITY CENTER
 PHELAN - SAN BERNARDINO, CA
 COUNTY, CA
 APN: 3066-261-08,10
 3066-251-14



RETENTION / DETENTION BASIN



BASIN DATA:

BOTTOM ELEV = 4114.0
SPILLWAY ELEV = 4120.0
RIM ELEV = 4122.0

100-YEAR STORM
WSE = 4120.00
DETENTION V=1.07 AC-FT
BOTTOM AREA = 2,247.4 SF
MID-VOLUME AREA = 5,684 SF

FROM FORM 4.3-3 3-HR
BASIN INFILTR. = 23,323 CF
CHANNEL INFILTR. = 8,109 CF

REQ'D DCV = 31,431>
REQ'D DCV = 28,468 CF

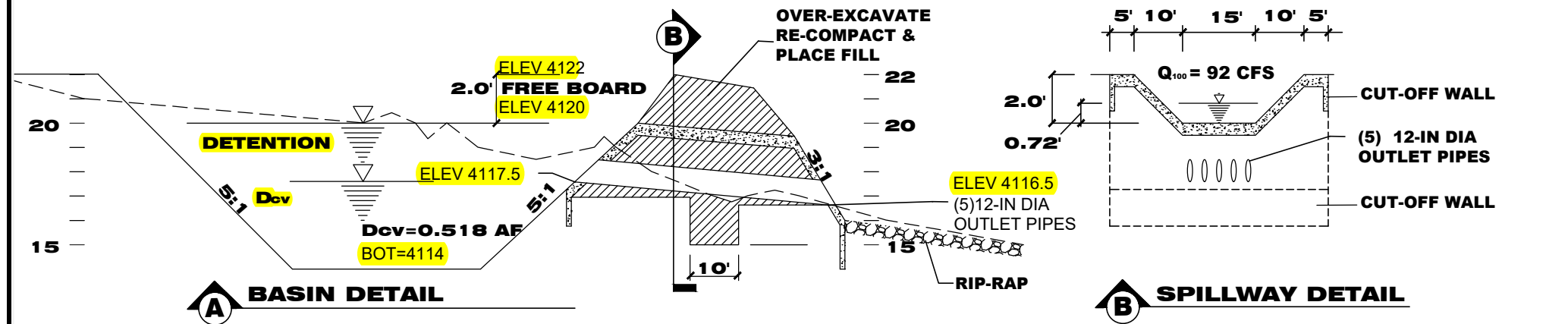
**DRAWDOWN TIME:
REQ'D < 48 HRS**

INFILTRATION RATE = 4.24 IN/HR
FS = 2 = 2.12 IN/HR

DEPTH = 4117.5-4114.0=3.5 FT
=3.5*12 = 42 IN

DRAWDOWN = 42/2.12 = 19.8 HR
<48 OK

		BASIN VOLUME/ FT ELEVATION			
	FT/ELEV	Area SF	Area Ac.	Vol Ac/ft per ft	Acc. Vol Ac.-Ft
21.5	7.5	19698.31	0.452211	0.216254	1.669949
21	7	17981.79	0.412805	0.378924	1.453695
20	6	15030.08	0.345043	0.313908	1.074771
19	5	12317.55	0.282772	0.253706	0.760863
18	4	9785.288	0.224639	0.195384	0.507157
17.5	3.5	8510.934	0.195384	0.090378	0.402151
17	3	7236.58	0.166129	0.143142	0.311773
16	2	5233.984	0.120156	0.101456	0.168631
15	1	3604.855	0.082756	0.067175	0.067175
14	0	2247.407	0.051593		



HYDROLOGY STUDY

ON-SITE TRIBUTARY WATERSHED AREA

**FOR:
PPHCSD**

**IN
PHELAN
SAN BERNARDINO
COUNTY, CA**

**APN:
3066-261-08,10
3066-251-14**

RETENTION/ DETENTION BASIN



**RED
BRICK
SOLUTION**

CONSULTING ENGINEERS
& ARCHITECTS

EXHIBIT K

APPENDIX B – Hydrologic Calculations

Pre-Developed 25-year Rational Method Analysis
Post-Developed 100-year Rational Method Analysis
Post-Developed 100-year Rational Method Analysis
Post-developed 100-year Unit Hydrograph Method Analysis



San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study Date: 02/06/23

**PRE-DEVELOPED
25-YEAR 1-HOUR
AMC II
2039p25**

Program License Serial Number 6434

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.927 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 0.000 to Point/Station 1.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(1 acre lot)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.8000 Max loss rate(Fm)= 0.782(In/Hr)
Initial subarea data:
Initial area flow distance = 806.000(Ft.)
Top (of initial area) elevation = 71.000(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.02605 s(%)= 2.61
 $TC = k(0.469)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 14.143 min.
Rainfall intensity = 2.549(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.624
Subarea runoff = 2.338(CFS)
Total initial stream area = 1.470(Ac.)
Pervious area fraction = 0.800
Initial area Fm value = 0.782(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 50.000(Ft.)
Downstream point elevation = 35.000(Ft.)

Channel length thru subarea = 348.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 3.619(CFS)
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 3.619(CFS)
 Depth of flow = 0.122(Ft.), Average velocity = 1.852(Ft/s)
 Channel flow top width = 22.154(Ft.)
 Flow Velocity = 1.85(Ft/s)
 Travel time = 3.13 min.
 Time of concentration = 17.27 min.
 Critical depth = 0.128(Ft.)
 Adding area flow to channel
 UNDEVELOPED (average cover) subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 50.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.810(In/Hr)
 Rainfall intensity = 2.216(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.576
 Subarea runoff = 2.480(CFS) for 2.307(Ac.)
 Total runoff = 4.818(CFS)
 Effective area this stream = 3.78(Ac.)
 Total Study Area (Main Stream No. 1) = 3.78(Ac.)
 Area averaged Fm value = 0.799(In/Hr)
 Depth of flow = 0.141(Ft.), Average velocity = 2.009(Ft/s)
 Critical depth = 0.150(Ft.)

++++++
 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 35.000(Ft.)
 Downstream point elevation = 22.000(Ft.)
 Channel length thru subarea = 335.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 8.031(CFS)
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 8.031(CFS)
 Depth of flow = 0.187(Ft.), Average velocity = 2.227(Ft/s)
 Channel flow top width = 28.656(Ft.)
 Flow Velocity = 2.23(Ft/s)
 Travel time = 2.51 min.
 Time of concentration = 19.78 min.
 Critical depth = 0.197(Ft.)
 Adding area flow to channel
 UNDEVELOPED (average cover) subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 50.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.810(In/Hr)
 Rainfall intensity = 2.016(In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.540
Subarea runoff = 6.360(CFS) for 6.487(Ac.)
Total runoff = 11.178(CFS)
Effective area this stream = 10.26(Ac.)
Total Study Area (Main Stream No. 1) = 10.26(Ac.)
Area averaged Fm value = 0.806(In/Hr)
Depth of flow = 0.219(Ft.), Average velocity = 2.435(Ft/s)
Critical depth = 0.234(Ft.)

+++++
Process from Point/Station 3.000 to Point/Station 6.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 22.000(Ft.)
Downstream point elevation = 18.000(Ft.)
Channel length thru subarea = 346.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Manning's 'N' = 0.033
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 11.178(CFS)
Depth of flow = 0.397(Ft.), Average velocity = 2.351(Ft/s)
Channel flow top width = 13.967(Ft.)
Flow Velocity = 2.35(Ft/s)
Travel time = 2.45 min.
Time of concentration = 22.23 min.
Critical depth = 0.320(Ft.)

+++++
Process from Point/Station 3.000 to Point/Station 6.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 10.264(Ac.)
Runoff from this stream = 11.178(CFS)
Time of concentration = 22.23 min.
Rainfall intensity = 1.857(In/Hr)
Area averaged loss rate (Fm) = 0.8056(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9714

+++++
Process from Point/Station 0.000 to Point/Station 4.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 541.000(Ft.)
Top (of initial area) elevation = 71.000(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.03882 s(%)= 3.88
 $TC = k(0.304) * [(length^3) / (elevation\ change)]^{0.2}$

Initial area time of concentration = 7.217 min.
Rainfall intensity = 4.083(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.878
Subarea runoff = 8.306(CFS)
Total initial stream area = 2.316(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 50.000(Ft.)
Downstream point elevation = 40.000(Ft.)
Channel length thru subarea = 350.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 40.000
Slope or 'Z' of right channel bank = 40.000
Estimated mean flow rate at midpoint of channel = 15.793(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 15.793(CFS)
Depth of flow = 0.291(Ft.), Average velocity = 2.508(Ft/s)
Channel flow top width = 33.279(Ft.)
Flow Velocity = 2.51(Ft/s)
Travel time = 2.33 min.
Time of concentration = 9.54 min.
Critical depth = 0.293(Ft.)
Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.810(In/Hr)
Rainfall intensity = 3.358(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.730
Subarea runoff = 14.919(CFS) for 7.165(Ac.)
Total runoff = 23.225(CFS)
Effective area this stream = 9.48(Ac.)
Total Study Area (Main Stream No. 1) = 19.74(Ac.)
Area averaged Fm value = 0.636(In/Hr)
Depth of flow = 0.349(Ft.), Average velocity = 2.778(Ft/s)
Critical depth = 0.355(Ft.)

+++++
Process from Point/Station 5.000 to Point/Station 6.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 40.000(Ft.)
Downstream point elevation = 18.000(Ft.)
Channel length thru subarea = 700.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 40.000
Slope or 'Z' of right channel bank = 40.000
Estimated mean flow rate at midpoint of channel = 24.781(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 24.781(CFS)

Depth of flow = 0.352(Ft.), Average velocity = 2.926(Ft/s)
 Channel flow top width = 38.143(Ft.)
 Flow Velocity = 2.93(Ft/s)
 Travel time = 3.99 min.
 Time of concentration = 13.53 min.
 Critical depth = 0.367(Ft.)
 Adding area flow to channel
 UNDEVELOPED (average cover) subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 50.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.810(In/Hr)
 Rainfall intensity = 2.630(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.660
 Subarea runoff = 3.057(CFS) for 5.658(Ac.)
 Total runoff = 26.283(CFS)
 Effective area this stream = 15.14(Ac.)
 Total Study Area (Main Stream No. 1) = 25.40(Ac.)
 Area averaged Fm value = 0.701(In/Hr)
 Depth of flow = 0.362(Ft.), Average velocity = 2.972(Ft/s)
 Critical depth = 0.379(Ft.)

++++++
 Process from Point/Station 5.000 to Point/Station 6.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2

Stream flow area = 15.139(Ac.)
 Runoff from this stream = 26.283(CFS)
 Time of concentration = 13.53 min.
 Rainfall intensity = 2.630(In/Hr)
 Area averaged loss rate (Fm) = 0.7006(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8623
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	-----------------	------------	----------	------------	----------------------------

1	11.18	10.264	22.23	0.806	1.857
2	26.28	15.139	13.53	0.701	2.630

Qmax(1) =

1.000 *	1.000 *	11.178)	+	
0.600 *	1.000 *	26.283)	+	= 26.937

Qmax(2) =

1.734 *	0.609 *	11.178)	+	
1.000 *	1.000 *	26.283)	+	= 38.080

Total of 2 streams to confluence:

Flow rates before confluence point:

11.178	26.283
--------	--------

Maximum flow rates at confluence using above data:

26.937	38.080
--------	--------

Area of streams before confluence:

10.264	15.139
--------	--------

Effective area values after confluence:

25.403	21.385
--------	--------

Results of confluence:

Total flow rate = 38.080(CFS)

Time of concentration = 13.529 min.
Effective stream area after confluence = 21.385 (Ac.)
Study area average Pervious fraction(A_p) = 0.906
Study area average soil loss rate(F_m) = 0.743 (In/Hr)
Study area total (this main stream) = 25.40 (Ac.)
End of computations, Total Study Area = 25.40 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.906

Area averaged SCS curve number = 47.3



San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study Date: 02/06/23

**PRE-DEVELOPED
100-YEAR 1-HOUR
AMC III**

2039p100

Program License Serial Number 6434

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.280 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

Process from Point/Station 0.000 to Point/Station 1.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(1 acre lot)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8000 Max loss rate(Fm)= 0.628(In/Hr)
Initial subarea data:
Initial area flow distance = 806.000(Ft.)
Top (of initial area) elevation = 71.000(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.02605 s(%)= 2.61
 $TC = k(0.469)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 14.143 min.
Rainfall intensity = 3.520(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.739
Subarea runoff = 3.826(CFS)
Total initial stream area = 1.470(Ac.)
Pervious area fraction = 0.800
Initial area Fm value = 0.628(In/Hr)

Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 50.000(Ft.)

Downstream point elevation = 35.000(Ft.)
 Channel length thru subarea = 348.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 6.282(CFS)
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 6.282(CFS)
 Depth of flow = 0.161(Ft.), Average velocity = 2.163(Ft/s)
 Channel flow top width = 26.094(Ft.)
 Flow Velocity = 2.16(Ft/s)
 Travel time = 2.68 min.
 Time of concentration = 16.82 min.
 Critical depth = 0.173(Ft.)
 Adding area flow to channel
 UNDEVELOPED (average cover) subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 50.00
 Adjusted SCS curve number for AMC 3 = 70.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
 Rainfall intensity = 3.117(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.736
 Subarea runoff = 4.834(CFS) for 2.307(Ac.)
 Total runoff = 8.660(CFS)
 Effective area this stream = 3.78(Ac.)
 Total Study Area (Main Stream No. 1) = 3.78(Ac.)
 Area averaged Fm value = 0.570(In/Hr)
 Depth of flow = 0.189(Ft.), Average velocity = 2.362(Ft/s)
 Critical depth = 0.205(Ft.)

++++++
 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 35.000(Ft.)
 Downstream point elevation = 22.000(Ft.)
 Channel length thru subarea = 335.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 15.094(CFS)
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 15.094(CFS)
 Depth of flow = 0.253(Ft.), Average velocity = 2.638(Ft/s)
 Channel flow top width = 35.275(Ft.)
 Flow Velocity = 2.64(Ft/s)
 Travel time = 2.12 min.
 Time of concentration = 18.94 min.
 Critical depth = 0.271(Ft.)
 Adding area flow to channel
 UNDEVELOPED (average cover) subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 50.00

Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
Rainfall intensity = 2.869(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.729
Subarea runoff = 12.798(CFS) for 6.487(Ac.)
Total runoff = 21.458(CFS)
Effective area this stream = 10.26(Ac.)
Total Study Area (Main Stream No. 1) = 10.26(Ac.)
Area averaged Fm value = 0.546(In/Hr)
Depth of flow = 0.298(Ft.), Average velocity = 2.894(Ft/s)
Critical depth = 0.324(Ft.)

+++++
Process from Point/Station 3.000 to Point/Station 6.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 22.000(Ft.)
Downstream point elevation = 18.000(Ft.)
Channel length thru subarea = 346.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Manning's 'N' = 0.033
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 21.458(CFS)
Depth of flow = 0.573(Ft.), Average velocity = 2.908(Ft/s)
Channel flow top width = 15.734(Ft.)
Flow Velocity = 2.91(Ft/s)
Travel time = 1.98 min.
Time of concentration = 20.92 min.
Critical depth = 0.480(Ft.)

+++++
Process from Point/Station 3.000 to Point/Station 6.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 10.264(Ac.)
Runoff from this stream = 21.458(CFS)
Time of concentration = 20.92 min.
Rainfall intensity = 2.676(In/Hr)
Area averaged loss rate (Fm) = 0.5462(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9714

+++++
Process from Point/Station 0.000 to Point/Station 4.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 541.000(Ft.)
Top (of initial area) elevation = 71.000(Ft.)

Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 21.000(Ft.)
Slope = 0.03882 s(%) = 3.88
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.217 min.
Rainfall intensity = 5.637(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff = 11.587(CFS)
Total initial stream area = 2.316(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 50.000(Ft.)
Downstream point elevation = 40.000(Ft.)
Channel length thru subarea = 350.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 40.000
Slope or 'Z' of right channel bank = 40.000
Estimated mean flow rate at midpoint of channel = 24.168(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 24.168(CFS)
Depth of flow = 0.355(Ft.), Average velocity = 2.807(Ft/s)
Channel flow top width = 38.440(Ft.)
Flow Velocity = 2.81(Ft/s)
Travel time = 2.08 min.
Time of concentration = 9.30 min.
Critical depth = 0.363(Ft.)
Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm) = 0.532(In/Hr)
Rainfall intensity = 4.722(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.820
Subarea runoff = 25.109(CFS) for 7.165(Ac.)
Total runoff = 36.696(CFS)
Effective area this stream = 9.48(Ac.)
Total Study Area (Main Stream No. 1) = 19.74(Ac.)
Area averaged Fm value = 0.422(In/Hr)
Depth of flow = 0.431(Ft.), Average velocity = 3.130(Ft/s)
Critical depth = 0.445(Ft.)

+++++
Process from Point/Station 5.000 to Point/Station 6.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 40.000(Ft.)
Downstream point elevation = 18.000(Ft.)
Channel length thru subarea = 700.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 40.000

Slope or 'Z' of right channel bank = 40.000
 Estimated mean flow rate at midpoint of channel = 40.951 (CFS)
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000 (Ft.)
 Flow(q) thru subarea = 40.951 (CFS)
 Depth of flow = 0.443 (Ft.), Average velocity = 3.336 (Ft/s)
 Channel flow top width = 45.433 (Ft.)
 Flow Velocity = 3.34 (Ft/s)
 Travel time = 3.50 min.
 Time of concentration = 12.79 min.
 Critical depth = 0.469 (Ft.)
 Adding area flow to channel
 UNDEVELOPED (average cover) subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil (AMC 2) = 50.00
 Adjusted SCS curve number for AMC 3 = 70.00
 Pervious ratio (Ap) = 1.0000 Max loss rate (Fm) = 0.532 (In/Hr)
 Rainfall intensity = 3.776 (In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.790
 Subarea runoff = 8.446 (CFS) for 5.658 (Ac.)
 Total runoff = 45.142 (CFS)
 Effective area this stream = 15.14 (Ac.)
 Total Study Area (Main Stream No. 1) = 25.40 (Ac.)
 Area averaged Fm value = 0.463 (In/Hr)
 Depth of flow = 0.463 (Ft.), Average velocity = 3.421 (Ft/s)
 Critical depth = 0.492 (Ft.)

++++++
 Process from Point/Station 5.000 to Point/Station 6.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2

Stream flow area = 15.139 (Ac.)
 Runoff from this stream = 45.142 (CFS)
 Time of concentration = 12.79 min.
 Rainfall intensity = 3.776 (In/Hr)
 Area averaged loss rate (Fm) = 0.4630 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8623
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	-----------------	------------	----------	------------	----------------------------

1	21.46	10.264	20.92	0.546	2.676
2	45.14	15.139	12.79	0.463	3.776

Qmax(1) =

1.000 * 1.000 * 21.458) +
 0.668 * 1.000 * 45.142) + = 51.609

Qmax(2) =

1.517 * 0.611 * 21.458) +
 1.000 * 1.000 * 45.142) + = 65.039

Total of 2 streams to confluence:

Flow rates before confluence point:

21.458 45.142

Maximum flow rates at confluence using above data:

51.609 65.039

Area of streams before confluence:

10.264 15.139

Effective area values after confluence:

25.403 21.414

Results of confluence:

Total flow rate = 65.039(CFS)

Time of concentration = 12.792 min.

Effective stream area after confluence = 21.414(Ac.)

Study area average Pervious fraction(A_p) = 0.906

Study area average soil loss rate(F_m) = 0.497(In/Hr)

Study area total (this main stream) = 25.40(Ac.)

End of computations, Total Study Area = 25.40 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.906

Area averaged SCS curve number = 47.3



San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study Date: 03/26/22

**POST-DEVELOPED
100-YEAR 1-HOUR
AMC III
2039OD**

Program License Serial Number 6434

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.280 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

Process from Point/Station 0.000 to Point/Station 1.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 102.000(Ft.)
Top (of initial area) elevation = 69.800(Ft.)
Bottom (of initial area) elevation = 66.000(Ft.)
Difference in elevation = 3.800(Ft.)
Slope = 0.03725 s(%)= 3.73
TC = $k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 3.733 min.
Rainfall intensity = 8.943(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.892
Subarea runoff = 1.939(CFS)
Total initial stream area = 0.243(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 66.000(Ft.)
Downstream point elevation = 55.500(Ft.)

Channel length thru subarea = 355.000(Ft.)
 Channel base width = 4.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 4.395(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 4.395(CFS)
 Depth of flow = 0.131(Ft.), Average velocity = 3.183(Ft/s)
 Channel flow top width = 17.092(Ft.)
 Flow Velocity = 3.18(Ft/s)
 Travel time = 1.86 min.
 Time of concentration = 5.59 min.
 Critical depth = 0.182(Ft.)
 Adding area flow to channel
 COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
 Rainfall intensity = 6.740(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.890
 Subarea runoff = 4.830(CFS) for 0.886(Ac.)
 Total runoff = 6.768(CFS)
 Effective area this stream = 1.13(Ac.)
 Total Study Area (Main Stream No. 1) = 1.13(Ac.)
 Area averaged Fm value = 0.079(In/Hr)
 Depth of flow = 0.159(Ft.), Average velocity = 3.560(Ft/s)
 Critical depth = 0.221(Ft.)

++++++
 Process from Point/Station 1.000 to Point/Station 2.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
 Stream flow area = 1.129(Ac.)
 Runoff from this stream = 6.768(CFS)
 Time of concentration = 5.59 min.
 Rainfall intensity = 6.740(In/Hr)
 Area averaged loss rate (Fm) = 0.0785(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000

++++++
 Process from Point/Station 0.000 to Point/Station 3.000
 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
 Initial subarea data:
 Initial area flow distance = 162.000(Ft.)
 Top (of initial area) elevation = 69.800(Ft.)

Bottom (of initial area) elevation = 65.000(Ft.)
Difference in elevation = 4.800(Ft.)
Slope = 0.02963 s(%) = 2.96
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 4.703 min.
Rainfall intensity = 7.608(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.891
Subarea runoff = 2.257(CFS)
Total initial stream area = 0.333(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

+++++
Process from Point/Station 3.000 to Point/Station 4.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 65.000(Ft.)
Downstream point elevation = 57.700(Ft.)
Channel length thru subarea = 95.000(Ft.)
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 4.306(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 4.306(CFS)
Depth of flow = 0.104(Ft.), Average velocity = 4.503(Ft/s)
Channel flow top width = 14.395(Ft.)
Flow Velocity = 4.50(Ft/s)
Travel time = 0.35 min.
Time of concentration = 5.05 min.
Critical depth = 0.180(Ft.)
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm) = 0.079(In/Hr)
Rainfall intensity = 7.234(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.890
Subarea runoff = 4.016(CFS) for 0.641(Ac.)
Total runoff = 6.272(CFS)
Effective area this stream = 0.97(Ac.)
Total Study Area (Main Stream No. 1) = 2.10(Ac.)
Area averaged Fm value = 0.079(In/Hr)
Depth of flow = 0.124(Ft.), Average velocity = 4.971(Ft/s)
Critical depth = 0.213(Ft.)

+++++
Process from Point/Station 4.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 57.700(Ft.)
Downstream point elevation = 55.000(Ft.)
Channel length thru subarea = 107.000(Ft.)
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 50.000

Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 6.849 (CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.000 (Ft.)
 Flow (q) thru subarea = 6.849 (CFS)
 Depth of flow = 0.166 (Ft.), Average velocity = 3.366 (Ft/s)
 Channel flow top width = 20.566 (Ft.)
 Flow Velocity = 3.37 (Ft/s)
 Travel time = 0.53 min.
 Time of concentration = 5.58 min.
 Critical depth = 0.223 (Ft.)
 Adding area flow to channel
 COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil (AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio (Ap) = 0.1000 Max loss rate (Fm) = 0.079 (In/Hr)
 Rainfall intensity = 6.746 (In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.890
 Subarea runoff = 1.085 (CFS) for 0.252 (Ac.)
 Total runoff = 7.357 (CFS)
 Effective area this stream = 1.23 (Ac.)
 Total Study Area (Main Stream No. 1) = 2.35 (Ac.)
 Area averaged Fm value = 0.079 (In/Hr)
 Depth of flow = 0.171 (Ft.), Average velocity = 3.428 (Ft/s)
 Critical depth = 0.230 (Ft.)

++++++
 Process from Point/Station 4.000 to Point/Station 2.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2

Stream flow area = 1.226 (Ac.)
 Runoff from this stream = 7.357 (CFS)
 Time of concentration = 5.58 min.
 Rainfall intensity = 6.746 (In/Hr)
 Area averaged loss rate (Fm) = 0.0785 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
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1	6.77	1.129	5.59	0.079	6.740
2	7.36	1.226	5.58	0.079	6.746

Qmax(1) =
 1.000 * 1.000 * 6.768) +
 0.999 * 1.000 * 7.357) + = 14.118
 Qmax(2) =
 1.001 * 0.999 * 6.768) +
 1.000 * 1.000 * 7.357) + = 14.123

Total of 2 streams to confluence:

Flow rates before confluence point:

6.768 7.357

Maximum flow rates at confluence using above data:

14.118 14.123

Area of streams before confluence:
 1.129 1.226
 Effective area values after confluence:
 2.355 2.353
 Results of confluence:
 Total flow rate = 14.123(CFS)
 Time of concentration = 5.584 min.
 Effective stream area after confluence = 2.353(Ac.)
 Study area average Pervious fraction(Ap) = 0.100
 Study area average soil loss rate(Fm) = 0.079(In/Hr)
 Study area total (this main stream) = 2.36(Ac.)

+++++
 Process from Point/Station 2.000 to Point/Station 5.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 55.000(Ft.)
 Downstream point/station elevation = 47.200(Ft.)
 Pipe length = 3.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 14.123(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 14.123(CFS)
 Normal flow depth in pipe = 4.66(In.)
 Flow top width inside pipe = 8.99(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 61.24(Ft/s)
 Travel time through pipe = 0.00 min.
 Time of concentration (TC) = 5.58 min.

+++++
 Process from Point/Station 5.000 to Point/Station 6.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.200(Ft.)
 Downstream point/station elevation = 44.700(Ft.)
 Pipe length = 90.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 14.123(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 14.123(CFS)
 Normal flow depth in pipe = 12.26(In.)
 Flow top width inside pipe = 16.78(In.)
 Critical Depth = 16.61(In.)
 Pipe flow velocity = 11.02(Ft/s)
 Travel time through pipe = 0.14 min.
 Time of concentration (TC) = 5.72 min.

+++++
 Process from Point/Station 5.000 to Point/Station 6.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
 Stream flow area = 2.353(Ac.)
 Runoff from this stream = 14.123(CFS)
 Time of concentration = 5.72 min.
 Rainfall intensity = 6.633(In/Hr)
 Area averaged loss rate (Fm) = 0.0785(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000

+++++

Process from Point/Station 7.000 to Point/Station 8.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 204.000(Ft.)
Top (of initial area) elevation = 65.400(Ft.)
Bottom (of initial area) elevation = 59.000(Ft.)
Difference in elevation = 6.400(Ft.)
Slope = 0.03137 s(%)= 3.14
TC = $k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 5.098 min.
Rainfall intensity = 7.190(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff = 0.192(CFS)
Total initial stream area = 0.030(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

+++++
Process from Point/Station 8.000 to Point/Station 9.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 59.000(Ft.)
Downstream point elevation = 54.000(Ft.)
Channel length thru subarea = 122.000(Ft.)
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 1.106(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 1.106(CFS)
Depth of flow = 0.063(Ft.), Average velocity = 2.480(Ft/s)
Channel flow top width = 10.257(Ft.)
Flow Velocity = 2.48(Ft/s)
Travel time = 0.82 min.
Time of concentration = 5.92 min.
Critical depth = 0.092(Ft.)

Adding area flow to channel

COMMERCIAL subarea type

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Rainfall intensity = 6.477(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.889
Subarea runoff = 1.772(CFS) for 0.311(Ac.)
Total runoff = 1.964(CFS)
Effective area this stream = 0.34(Ac.)
Total Study Area (Main Stream No. 1) = 2.70(Ac.)

Area averaged Fm value = 0.079(In/Hr)
Depth of flow = 0.083(Ft.), Average velocity = 2.901(Ft/s)
Critical depth = 0.123(Ft.)

+++++
Process from Point/Station 9.000 to Point/Station 10.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 54.000(Ft.)
Downstream point elevation = 51.400(Ft.)
Channel length thru subarea = 56.000(Ft.)
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 20.000
Slope or 'Z' of right channel bank = 20.000
Estimated mean flow rate at midpoint of channel = 2.275(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 2.275(CFS)
Depth of flow = 0.100(Ft.), Average velocity = 3.794(Ft/s)
Channel flow top width = 7.998(Ft.)
Flow Velocity = 3.79(Ft/s)
Travel time = 0.25 min.
Time of concentration = 6.16 min.
Critical depth = 0.164(Ft.)
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Rainfall intensity = 6.295(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.889
Subarea runoff = 0.548(CFS) for 0.108(Ac.)
Total runoff = 2.512(CFS)
Effective area this stream = 0.45(Ac.)
Total Study Area (Main Stream No. 1) = 2.80(Ac.)
Area averaged Fm value = 0.079(In/Hr)
Depth of flow = 0.105(Ft.), Average velocity = 3.906(Ft/s)
Critical depth = 0.173(Ft.)

+++++
Process from Point/Station 9.000 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 0.449(Ac.)
Runoff from this stream = 2.512(CFS)
Time of concentration = 6.16 min.
Rainfall intensity = 6.295(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	-----------------	------------	----------	------------	----------------------------

1	14.12	2.353	5.72	0.079	6.633
2	2.51	0.449	6.16	0.079	6.295

Qmax(1) =

1.000 *	1.000 *	14.123) +	
1.054 *	0.928 *	2.512) + =	16.581

Qmax(2) =

0.948 *	1.000 *	14.123) +	
1.000 *	1.000 *	2.512) + =	15.907

Total of 2 streams to confluence:
Flow rates before confluence point:
14.123 2.512
Maximum flow rates at confluence using above data:
16.581 15.907
Area of streams before confluence:
2.353 0.449
Effective area values after confluence:
2.770 2.802
Results of confluence:
Total flow rate = 16.581(CFS)
Time of concentration = 5.721 min.
Effective stream area after confluence = 2.770(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.079(In/Hr)
Study area total (this main stream) = 2.80(Ac.)

Process from Point/Station 10.000 to Point/Station 6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 51.400(Ft.)
Downstream point/station elevation = 44.700(Ft.)
Pipe length = 3.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 16.581(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 16.581(CFS)
Normal flow depth in pipe = 5.39(In.)
Flow top width inside pipe = 8.82(In.)
Critical depth could not be calculated.
Pipe flow velocity = 59.98(Ft/s)
Travel time through pipe = 0.00 min.
Time of concentration (TC) = 5.72 min.

Process from Point/Station 6.000 to Point/Station 11.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.700(Ft.)
Downstream point/station elevation = 42.300(Ft.)
Pipe length = 246.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 16.581(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 16.581(CFS)
Normal flow depth in pipe = 15.40(In.)
Flow top width inside pipe = 23.02(In.)
Critical Depth = 17.61(In.)
Pipe flow velocity = 7.79(Ft/s)
Travel time through pipe = 0.53 min.
Time of concentration (TC) = 6.25 min.

+++++
Process from Point/Station 6.000 to Point/Station 11.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 2.770(Ac.)
Runoff from this stream = 16.581(CFS)
Time of concentration = 6.25 min.
Rainfall intensity = 6.236(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
Process from Point/Station 12.000 to Point/Station 13.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 170.000(Ft.)
Top (of initial area) elevation = 59.500(Ft.)
Bottom (of initial area) elevation = 56.950(Ft.)
Difference in elevation = 2.550(Ft.)
Slope = 0.01500 s(%)= 1.50
TC = $k(0.304)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 5.493 min.
Rainfall intensity = 6.824(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff = 1.542(CFS)
Total initial stream area = 0.254(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

+++++
Process from Point/Station 13.000 to Point/Station 14.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 56.950(Ft.)
Downstream point elevation = 50.300(Ft.)
Channel length thru subarea = 188.000(Ft.)
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 4.131(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 4.131(CFS)
Depth of flow = 0.122(Ft.), Average velocity = 3.347(Ft/s)
Channel flow top width = 16.214(Ft.)
Flow Velocity = 3.35(Ft/s)
Travel time = 0.94 min.
Time of concentration = 6.43 min.
Critical depth = 0.176(Ft.)
Adding area flow to channel
COMMERCIAL subarea type

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Rainfall intensity = 6.112(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.888
Subarea runoff = 5.126(CFS) for 0.974(Ac.)
Total runoff = 6.668(CFS)
Effective area this stream = 1.23(Ac.)
Total Study Area (Main Stream No. 1) = 4.03(Ac.)
Area averaged Fm value = 0.079(In/Hr)
Depth of flow = 0.152(Ft.), Average velocity = 3.789(Ft/s)
Critical depth = 0.221(Ft.)

+++++
Process from Point/Station 14.000 to Point/Station 11.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.300(Ft.)
Downstream point/station elevation = 42.300(Ft.)
Pipe length = 35.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.668(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 6.668(CFS)
Normal flow depth in pipe = 6.33(In.)
Flow top width inside pipe = 8.22(In.)
Critical depth could not be calculated.
Pipe flow velocity = 20.07(Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 6.46 min.

+++++
Process from Point/Station 14.000 to Point/Station 11.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 1.228(Ac.)
Runoff from this stream = 6.668(CFS)
Time of concentration = 6.46 min.
Rainfall intensity = 6.093(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
Process from Point/Station 15.000 to Point/Station 16.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:

Initial area flow distance = 75.000(Ft.)
 Top (of initial area) elevation = 61.000(Ft.)
 Bottom (of initial area) elevation = 58.100(Ft.)
 Difference in elevation = 2.900(Ft.)
 Slope = 0.03867 s(%)= 3.87
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 3.277 min.
 Rainfall intensity = 9.797(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.893
 Subarea runoff = 1.155(CFS)
 Total initial stream area = 0.132(Ac.)
 Pervious area fraction = 0.100
 Initial area Fm value = 0.079(In/Hr)

++++++
 Process from Point/Station 16.000 to Point/Station 17.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 58.100(Ft.)
 Downstream point elevation = 56.400(Ft.)
 Channel length thru subarea = 250.000(Ft.)
 Channel base width = 4.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 2.827(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 2.827(CFS)
 Depth of flow = 0.150(Ft.), Average velocity = 1.647(Ft/s)
 Channel flow top width = 18.954(Ft.)
 Flow Velocity = 1.65(Ft/s)
 Travel time = 2.53 min.
 Time of concentration = 5.81 min.
 Critical depth = 0.146(Ft.)
 Adding area flow to channel
 COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
 Rainfall intensity = 6.564(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.889
 Subarea runoff = 3.258(CFS) for 0.624(Ac.)
 Total runoff = 4.413(CFS)
 Effective area this stream = 0.76(Ac.)
 Total Study Area (Main Stream No. 1) = 4.79(Ac.)
 Area averaged Fm value = 0.079(In/Hr)
 Depth of flow = 0.182(Ft.), Average velocity = 1.847(Ft/s)
 Critical depth = 0.182(Ft.)

++++++
 Process from Point/Station 17.000 to Point/Station 18.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 56.400(Ft.)
 Downstream point elevation = 51.900(Ft.)
 Channel length thru subarea = 232.000(Ft.)

Channel base width = 4.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 5.386(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 5.386(CFS)
 Depth of flow = 0.158(Ft.), Average velocity = 2.870(Ft/s)
 Channel flow top width = 19.783(Ft.)
 Flow Velocity = 2.87(Ft/s)
 Travel time = 1.35 min.
 Time of concentration = 7.15 min.
 Critical depth = 0.199(Ft.)
 Adding area flow to channel
 COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm) = 0.079(In/Hr)
 Rainfall intensity = 5.672(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.888
 Subarea runoff = 1.880(CFS) for 0.494(Ac.)
 Total runoff = 6.293(CFS)
 Effective area this stream = 1.25(Ac.)
 Total Study Area (Main Stream No. 1) = 5.28(Ac.)
 Area averaged Fm value = 0.079(In/Hr)
 Depth of flow = 0.169(Ft.), Average velocity = 2.987(Ft/s)
 Critical depth = 0.215(Ft.)

++++++
 Process from Point/Station 18.000 to Point/Station 11.000
 **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 51.900(Ft.)
 End of street segment elevation = 50.700(Ft.)
 Length of street segment = 134.000(Ft.)
 Height of curb above gutter flowline = 6.0(In.)
 Width of half street (curb to crown) = 20.000(Ft.)
 Distance from crown to crossfall grade break = 18.000(Ft.)
 Slope from gutter to grade break (v/hz) = 0.020
 Slope from grade break to crown (v/hz) = 0.020
 Street flow is on [2] side(s) of the street
 Distance from curb to property line = 10.000(Ft.)
 Slope from curb to property line (v/hz) = 0.020
 Gutter width = 2.000(Ft.)
 Gutter hike from flowline = 2.000(In.)
 Manning's N in gutter = 0.0150
 Manning's N from gutter to grade break = 0.0150
 Manning's N from grade break to crown = 0.0150
 Estimated mean flow rate at midpoint of street = 6.356(CFS)
 Depth of flow = 0.352(Ft.), Average velocity = 2.280(Ft/s)
 Streetflow hydraulics at midpoint of street travel:
 Halfstreet flow width = 11.256(Ft.)
 Flow velocity = 2.28(Ft/s)
 Travel time = 0.98 min. TC = 8.13 min.
 Adding area flow to street
 COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000

Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
 The area added to the existing stream causes a
 a lower flow rate of Q = 6.204(CFS)
 therefore the upstream flow rate of Q = 6.293(CFS) is being used
 Rainfall intensity = 5.185(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.886
 Subarea runoff = 0.000(CFS) for 0.100 (Ac.)
 Total runoff = 6.293(CFS)
 Effective area this stream = 1.35 (Ac.)
 Total Study Area (Main Stream No. 1) = 5.38 (Ac.)
 Area averaged Fm value = 0.079(In/Hr)
 Street flow at end of street = 6.293(CFS)
 Half street flow at end of street = 3.146(CFS)
 Depth of flow = 0.351(Ft.), Average velocity = 2.275 (Ft/s)
 Flow width (from curb towards crown)= 11.208(Ft.)

 Process from Point/Station 18.000 to Point/Station 11.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 3
 Stream flow area = 1.350 (Ac.)
 Runoff from this stream = 6.293(CFS)
 Time of concentration = 8.13 min.
 Rainfall intensity = 5.185(In/Hr)
 Area averaged loss rate (Fm) = 0.0785(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000

 Process from Point/Station 19.000 to Point/Station 20.000
 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
 Initial subarea data:
 Initial area flow distance = 344.000(Ft.)
 Top (of initial area) elevation = 51.800(Ft.)
 Bottom (of initial area) elevation = 49.400(Ft.)
 Difference in elevation = 2.400(Ft.)
 Slope = 0.00698 s(%)= 0.70
 TC = k(0.304)*[(length^3)/(elevation change)]^0.2
 Initial area time of concentration = 8.487 min.
 Rainfall intensity = 5.032(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
 Subarea runoff = 1.721(CFS)
 Total initial stream area = 0.386(Ac.)
 Pervious area fraction = 0.100
 Initial area Fm value = 0.079(In/Hr)

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Process from Point/Station      19.000 to Point/Station      20.000
**** CONFLUENCE OF MINOR STREAMS ****

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Along Main Stream number: 1 in normal stream number 4

Stream flow area = 0.386(Ac.)
 Runoff from this stream = 1.721(CFS)
 Time of concentration = 8.49 min.
 Rainfall intensity = 5.032(In/Hr)
 Area averaged loss rate (Fm) = 0.0785(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	16.58	2.770	6.25	0.079	6.236
2	6.67	1.228	6.46	0.079	6.093
3	6.29	1.350	8.13	0.079	5.185
4	1.72	0.386	8.49	0.079	5.032

Qmax(1) =
 1.000 * 1.000 * 16.581) +
 1.024 * 0.967 * 6.668) +
 1.206 * 0.768 * 6.293) +
 1.243 * 0.736 * 1.721) + = 30.589
 Qmax(2) =
 0.977 * 1.000 * 16.581) +
 1.000 * 1.000 * 6.668) +
 1.178 * 0.794 * 6.293) +
 1.214 * 0.761 * 1.721) + = 30.339
 Qmax(3) =
 0.829 * 1.000 * 16.581) +
 0.849 * 1.000 * 6.668) +
 1.000 * 1.000 * 6.293) +
 1.031 * 0.958 * 1.721) + = 27.404
 Qmax(4) =
 0.805 * 1.000 * 16.581) +
 0.824 * 1.000 * 6.668) +
 0.970 * 1.000 * 6.293) +
 1.000 * 1.000 * 1.721) + = 26.659

Total of 4 streams to confluence:
 Flow rates before confluence point:
 16.581 6.668 6.293 1.721
 Maximum flow rates at confluence using above data:
 30.589 30.339 27.404 26.659
 Area of streams before confluence:
 2.770 1.228 1.350 0.386
 Effective area values after confluence:
 5.279 5.364 5.718 5.734
 Results of confluence:
 Total flow rate = 30.589(CFS)
 Time of concentration = 6.248 min.
 Effective stream area after confluence = 5.279(Ac.)
 Study area average Pervious fraction(Ap) = 0.100
 Study area average soil loss rate(Fm) = 0.079(In/Hr)
 Study area total (this main stream) = 5.73(Ac.)

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Process from Point/Station      14.000 to Point/Station      21.000

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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 42.300(Ft.)
Downstream point/station elevation = 38.500(Ft.)
Pipe length = 226.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 30.589(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 30.589(CFS)
Normal flow depth in pipe = 17.63(In.)
Flow top width inside pipe = 25.71(In.)
Critical Depth = 22.95(In.)
Pipe flow velocity = 11.12(Ft/s)
Travel time through pipe = 0.34 min.
Time of concentration (TC) = 6.59 min.

+++++
Process from Point/Station 14.000 to Point/Station 21.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Time of concentration = 6.59 min.
Rainfall intensity = 6.010(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method) (Q=KCIA) is C = 0.888
Subarea runoff = 1.120(CFS) for 0.661(Ac.)
Total runoff = 31.709(CFS)
Effective area this stream = 5.94(Ac.)
Total Study Area (Main Stream No. 1) = 6.43(Ac.)
Area averaged Fm value = 0.079(In/Hr)

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 38.500(Ft.)
Downstream point/station elevation = 34.000(Ft.)
Pipe length = 110.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 31.709(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 31.709(CFS)
Normal flow depth in pipe = 17.02(In.)
Flow top width inside pipe = 16.47(In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.19(Ft/s)
Travel time through pipe = 0.12 min.
Time of concentration (TC) = 6.71 min.

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1

Stream flow area = 5.940(Ac.)
Runoff from this stream = 31.709(CFS)
Time of concentration = 6.71 min.
Rainfall intensity = 5.934(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 23.000 to Point/Station 24.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 102.400(Ft.)
Top (of initial area) elevation = 71.000(Ft.)
Bottom (of initial area) elevation = 65.400(Ft.)
Difference in elevation = 5.600(Ft.)
Slope = 0.05469 s(%)= 5.47
TC = $k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 3.463 min.
Rainfall intensity = 9.426(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.893
Subarea runoff = 2.667(CFS)
Total initial stream area = 0.317(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

+++++
Process from Point/Station 24.000 to Point/Station 25.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 65.400(Ft.)
Downstream point elevation = 50.000(Ft.)
Channel length thru subarea = 354.500(Ft.)
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 1.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 6.585(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 6.585(CFS)
Depth of flow = 0.168(Ft.), Average velocity = 4.740(Ft/s)
Channel flow top width = 12.558(Ft.)
Flow Velocity = 4.74(Ft/s)
Travel time = 1.25 min.
Time of concentration = 4.71 min.
Critical depth = 0.266(Ft.)
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000

SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Rainfall intensity = 7.601(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method) (Q=KCIA) is C = 0.891
Subarea runoff = 7.746(CFS) for 1.221(Ac.)
Total runoff = 10.412(CFS)
Effective area this stream = 1.54(Ac.)
Total Study Area (Main Stream No. 2) = 7.97(Ac.)
Area averaged Fm value = 0.079(In/Hr)
Depth of flow = 0.209(Ft.), Average velocity = 5.354(Ft/s)
Critical depth = 0.332(Ft.)

+++++
Process from Point/Station 25.000 to Point/Station 26.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 50.000(Ft.)
Downstream point elevation = 41.000(Ft.)
Channel length thru subarea = 143.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 10.000
Slope or 'Z' of right channel bank = 10.000
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 10.412(CFS)
Depth of flow = 0.227(Ft.), Average velocity = 3.746(Ft/s)
Channel flow top width = 14.532(Ft.)
Flow Velocity = 3.75(Ft/s)
Travel time = 0.64 min.
Time of concentration = 5.35 min.
Critical depth = 0.293(Ft.)

+++++
Process from Point/Station 26.000 to Point/Station 27.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 41.000(Ft.)
Downstream point elevation = 40.000(Ft.)
Channel length thru subarea = 214.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 5.000
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 10.412(CFS)
Depth of flow = 0.397(Ft.), Average velocity = 1.255(Ft/s)
Channel flow top width = 31.821(Ft.)
Flow Velocity = 1.26(Ft/s)
Travel time = 2.84 min.
Time of concentration = 8.19 min.
Critical depth = 0.254(Ft.)

+++++
Process from Point/Station 26.000 to Point/Station 27.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 1.538(Ac.)

Runoff from this stream = 10.412(CFS)
Time of concentration = 8.19 min.
Rainfall intensity = 5.161(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
Process from Point/Station 24.000 to Point/Station 28.000
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
Initial subarea data:
Initial area flow distance = 162.000(Ft.)
Top (of initial area) elevation = 65.400(Ft.)
Bottom (of initial area) elevation = 49.000(Ft.)
Difference in elevation = 16.400(Ft.)
Slope = 0.10123 s(%)= 10.12
TC = $k(0.483)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 5.844 min.
Rainfall intensity = 6.535(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.808
Subarea runoff = 1.758(CFS)
Total initial stream area = 0.333(Ac.)
Pervious area fraction = 0.850
Initial area Fm value = 0.667(In/Hr)

+++++
Process from Point/Station 28.000 to Point/Station 27.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 49.000(Ft.)
Downstream point elevation = 40.000(Ft.)
Channel length thru subarea = 95.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 3.269(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 3.269(CFS)
Depth of flow = 0.094(Ft.), Average velocity = 2.377(Ft/s)
Channel flow top width = 19.368(Ft.)
Flow Velocity = 2.38(Ft/s)
Travel time = 0.67 min.
Time of concentration = 6.51 min.
Critical depth = 0.121(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00

Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
 Rainfall intensity = 6.059(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.801
 Subarea runoff = 2.968(CFS) for 0.641(Ac.)
 Total runoff = 4.726(CFS)
 Effective area this stream = 0.97(Ac.)
 Total Study Area (Main Stream No. 2) = 8.94(Ac.)
 Area averaged Fm value = 0.667(In/Hr)
 Depth of flow = 0.114(Ft.), Average velocity = 2.648(Ft/s)
 Critical depth = 0.148(Ft.)

++++++
 Process from Point/Station 28.000 to Point/Station 27.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2

Stream flow area = 0.974(Ac.)
 Runoff from this stream = 4.726(CFS)
 Time of concentration = 6.51 min.
 Rainfall intensity = 6.059(In/Hr)
 Area averaged loss rate (Fm) = 0.6674(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8500
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
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1	10.41	1.538	8.19	0.079	5.161
2	4.73	0.974	6.51	0.667	6.059

Qmax(1) =
 1.000 * 1.000 * 10.412) +
 0.833 * 1.000 * 4.726) + = 14.351
 Qmax(2) =
 1.177 * 0.795 * 10.412) +
 1.000 * 1.000 * 4.726) + = 14.469

Total of 2 streams to confluence:
 Flow rates before confluence point:
 10.412 4.726
 Maximum flow rates at confluence using above data:
 14.351 14.469
 Area of streams before confluence:
 1.538 0.974
 Effective area values after confluence:
 2.512 2.197

Results of confluence:
 Total flow rate = 14.469(CFS)
 Time of concentration = 6.510 min.
 Effective stream area after confluence = 2.197(Ac.)
 Study area average Pervious fraction(Ap) = 0.391
 Study area average soil loss rate(Fm) = 0.307(In/Hr)
 Study area total (this main stream) = 2.51(Ac.)

++++++
 Process from Point/Station 27.000 to Point/Station 29.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 40.000(Ft.)
 Downstream point elevation = 34.000(Ft.)

Channel length thru subarea = 106.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 14.469(CFS)
 Depth of flow = 0.281(Ft.), Average velocity = 4.021(Ft/s)
 Channel flow top width = 15.618(Ft.)
 Flow Velocity = 4.02(Ft/s)
 Travel time = 0.44 min.
 Time of concentration = 6.95 min.
 Critical depth = 0.355(Ft.)

++++++
 Process from Point/Station 29.000 to Point/Station 22.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 34.000(Ft.)
 Downstream point elevation = 33.000(Ft.)
 Channel length thru subarea = 130.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 14.469(CFS)
 Depth of flow = 0.484(Ft.), Average velocity = 2.014(Ft/s)
 Channel flow top width = 19.682(Ft.)
 Flow Velocity = 2.01(Ft/s)
 Travel time = 1.08 min.
 Time of concentration = 8.03 min.
 Critical depth = 0.355(Ft.)

++++++
 Process from Point/Station 29.000 to Point/Station 22.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 2.197(Ac.)
 Runoff from this stream = 14.469(CFS)
 Time of concentration = 8.03 min.
 Rainfall intensity = 5.234(In/Hr)
 Area averaged loss rate (Fm) = 0.3068(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.3908
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	31.71	5.940	6.71	0.079	5.934
2	14.47	2.197	8.03	0.307	5.234
Qmax(1) =					
	1.000 *	1.000 *	31.709)	+	
	1.142 *	0.836 *	14.469)	+	45.521
Qmax(2) =					
	0.880 *	1.000 *	31.709)	+	
	1.000 *	1.000 *	14.469)	+	42.387

Total of 2 main streams to confluence:
Flow rates before confluence point:
32.709 15.469
Maximum flow rates at confluence using above data:
45.521 42.387
Area of streams before confluence:
5.940 2.197
Effective area values after confluence:
7.777 8.137

Results of confluence:
Total flow rate = 45.521(CFS)
Time of concentration = 6.708 min.
Effective stream area after confluence = 7.777(Ac.)
Study area average Pervious fraction(Ap) = 0.179
Study area average soil loss rate(Fm) = 0.140(In/Hr)
Study area total = 8.14(Ac.)

+++++
Process from Point/Station 22.000 to Point/Station 30.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 33.000(Ft.)
Downstream point elevation = 32.000(Ft.)
Channel length thru subarea = 172.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 45.553(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 45.553(CFS)
Depth of flow = 0.632(Ft.), Average velocity = 1.734(Ft/s)
Channel flow top width = 73.168(Ft.)
Flow Velocity = 1.73(Ft/s)
Travel time = 1.65 min.
Time of concentration = 8.36 min.
Critical depth = 0.465(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 40.172(CFS)
therefore the upstream flow rate of Q = 45.521(CFS) is being used
Rainfall intensity = 5.086(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.861
Subarea runoff = 0.000(CFS) for 1.398(Ac.)
Total runoff = 45.521(CFS)
Effective area this stream = 9.17(Ac.)
Total Study Area (Main Stream No. 1) = 10.34(Ac.)
Area averaged Fm value = 0.220(In/Hr)
Depth of flow = 0.631(Ft.), Average velocity = 1.734(Ft/s)
Critical depth = 0.465(Ft.)

+++++
Process from Point/Station 30.000 to Point/Station 31.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 32.000 (Ft.)
Downstream point elevation = 27.000 (Ft.)
Channel length thru subarea = 60.000 (Ft.)
Channel base width = 10.000 (Ft.)
Slope or 'Z' of left channel bank = 10.000
Slope or 'Z' of right channel bank = 10.000
Manning's 'N' = 0.033
Maximum depth of channel = 1.000 (Ft.)
Flow(q) thru subarea = 45.521 (CFS)
Depth of flow = 0.473 (Ft.), Average velocity = 6.541 (Ft/s)
Channel flow top width = 19.452 (Ft.)
Flow Velocity = 6.54 (Ft/s)
Travel time = 0.15 min.
Time of concentration = 8.51 min.
Critical depth = 0.684 (Ft.)

+++++
Process from Point/Station 31.000 to Point/Station 35.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 27.000 (Ft.)
Downstream point elevation = 26.000 (Ft.)
Channel length thru subarea = 194.000 (Ft.)
Channel base width = 10.000 (Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Manning's 'N' = 0.033
Maximum depth of channel = 1.000 (Ft.)
Flow(q) thru subarea = 45.521 (CFS)
Depth of flow = 0.648 (Ft.), Average velocity = 1.658 (Ft/s)
Channel flow top width = 74.780 (Ft.)
Flow Velocity = 1.66 (Ft/s)
Travel time = 1.95 min.
Time of concentration = 10.46 min.
Critical depth = 0.465 (Ft.)

+++++
Process from Point/Station 31.000 to Point/Station 35.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 9.175 (Ac.)
Runoff from this stream = 45.521 (CFS)
Time of concentration = 10.46 min.
Rainfall intensity = 4.346 (In/Hr)
Area averaged loss rate (Fm) = 0.2205 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.2808

+++++
Process from Point/Station 32.000 to Point/Station 33.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
 Initial subarea data:
 Initial area flow distance = 422.000(Ft.)
 Top (of initial area) elevation = 40.000(Ft.)
 Bottom (of initial area) elevation = 34.000(Ft.)
 Difference in elevation = 6.000(Ft.)
 Slope = 0.01422 s(%)= 1.42
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 7.988 min.
 Rainfall intensity = 5.251(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
 Subarea runoff = 2.630(CFS)
 Total initial stream area = 0.565(Ac.)
 Pervious area fraction = 0.100
 Initial area Fm value = 0.079(In/Hr)

++++++
 Process from Point/Station 33.000 to Point/Station 34.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 34.000(Ft.)
 Downstream point elevation = 28.000(Ft.)
 Channel length thru subarea = 42.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 2.630(CFS)
 Depth of flow = 0.081(Ft.), Average velocity = 3.023(Ft/s)
 Channel flow top width = 11.610(Ft.)
 Flow Velocity = 3.02(Ft/s)
 Travel time = 0.23 min.
 Time of concentration = 8.22 min.
 Critical depth = 0.123(Ft.)

++++++
 Process from Point/Station 34.000 to Point/Station 35.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 28.000(Ft.)
 Downstream point elevation = 26.000(Ft.)
 Channel length thru subarea = 172.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 50.000
 Slope or 'Z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 4.688(CFS)
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 4.688(CFS)
 Depth of flow = 0.193(Ft.), Average velocity = 1.241(Ft/s)
 Channel flow top width = 29.252(Ft.)
 Flow Velocity = 1.24(Ft/s)
 Travel time = 2.31 min.
 Time of concentration = 10.53 min.
 Critical depth = 0.148(Ft.)
 Adding area flow to channel

PARK subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
 Rainfall intensity = 4.327(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.797
 Subarea runoff = 4.033(CFS) for 1.367(Ac.)
 Total runoff = 6.663(CFS)
 Effective area this stream = 1.93(Ac.)
 Total Study Area (Main Stream No. 1) = 12.27(Ac.)
 Area averaged Fm value = 0.495(In/Hr)
 Depth of flow = 0.228(Ft.), Average velocity = 1.364(Ft/s)
 Critical depth = 0.178(Ft.)

+++++
 Process from Point/Station 34.000 to Point/Station 35.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 1.932(Ac.)
 Runoff from this stream = 6.663(CFS)
 Time of concentration = 10.53 min.
 Rainfall intensity = 4.327(In/Hr)
 Area averaged loss rate (Fm) = 0.4952(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.6307
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
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1	45.52	9.175	10.46	0.220	4.346
2	6.66	1.932	10.53	0.495	4.327

Qmax(1) =
 1.000 * 1.000 * 45.521) +
 1.005 * 0.994 * 6.663) + = 52.175
 Qmax(2) =
 0.995 * 1.000 * 45.521) +
 1.000 * 1.000 * 6.663) + = 51.974

Total of 2 streams to confluence:
 Flow rates before confluence point:
 45.521 6.663
 Maximum flow rates at confluence using above data:
 52.175 51.974
 Area of streams before confluence:
 9.175 1.932
 Effective area values after confluence:
 11.094 11.107
 Results of confluence:
 Total flow rate = 52.175(CFS)
 Time of concentration = 10.464 min.
 Effective stream area after confluence = 11.094(Ac.)
 Study area average Pervious fraction(Ap) = 0.342
 Study area average soil loss rate(Fm) = 0.268(In/Hr)
 Study area total (this main stream) = 11.11(Ac.)

+++++
Process from Point/Station 35.000 to Point/Station 36.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 26.000(Ft.)
Downstream point elevation = 22.000(Ft.)
Channel length thru subarea = 161.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 50.000
Estimated mean flow rate at midpoint of channel = 52.206(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 52.206(CFS)
Depth of flow = 0.490(Ft.), Average velocity = 3.085(Ft/s)
Channel flow top width = 59.026(Ft.)
Flow Velocity = 3.09(Ft/s)
Travel time = 0.87 min.
Time of concentration = 11.33 min.
Critical depth = 0.492(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 40.973(CFS)
therefore the upstream flow rate of Q = 52.175(CFS) is being used
Rainfall intensity = 4.110(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.835
Subarea runoff = 0.000(CFS) for 0.843(Ac.)
Total runoff = 52.175(CFS)
Effective area this stream = 11.94(Ac.)
Total Study Area (Main Stream No. 1) = 13.11(Ac.)
Area averaged Fm value = 0.296(In/Hr)
Depth of flow = 0.490(Ft.), Average velocity = 3.085(Ft/s)
Critical depth = 0.492(Ft.)

+++++
Process from Point/Station 36.000 to Point/Station 37.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 22.000(Ft.)
Downstream point elevation = 16.000(Ft.)
Channel length thru subarea = 115.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 10.000
Slope or 'Z' of right channel bank = 10.000
Estimated mean flow rate at midpoint of channel = 52.215(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 52.215(CFS)
Depth of flow = 0.575(Ft.), Average velocity = 5.768(Ft/s)
Channel flow top width = 21.496(Ft.)
Flow Velocity = 5.77(Ft/s)
Travel time = 0.33 min.

Time of concentration = 11.67 min.
Critical depth = 0.734(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 47.136(CFS)
therefore the upstream flow rate of Q = 52.175(CFS) is being used
Rainfall intensity = 4.028(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.820
Subarea runoff = 0.000(CFS) for 2.330(Ac.)
Total runoff = 52.175(CFS)
Effective area this stream = 14.27(Ac.)
Total Study Area (Main Stream No. 1) = 15.44(Ac.)
Area averaged Fm value = 0.357(In/Hr)
Depth of flow = 0.575(Ft.), Average velocity = 5.767(Ft/s)
Critical depth = 0.734(Ft.)

+++++
Process from Point/Station 36.000 to Point/Station 37.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 14.267(Ac.)
Runoff from this stream = 52.175(CFS)
Time of concentration = 11.67 min.
Rainfall intensity = 4.028(In/Hr)
Area averaged loss rate (Fm) = 0.3570(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4547

+++++
Process from Point/Station 38.000 to Point/Station 39.000
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
Initial subarea data:
Initial area flow distance = 320.000(Ft.)
Top (of initial area) elevation = 50.000(Ft.)
Bottom (of initial area) elevation = 36.000(Ft.)
Difference in elevation = 14.000(Ft.)
Slope = 0.04375 s(%)= 4.38
 $TC = k(0.483)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 9.074 min.
Rainfall intensity = 4.802(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.775
Subarea runoff = 3.487(CFS)
Total initial stream area = 0.937(Ac.)

Pervious area fraction = 0.850
Initial area Fm value = 0.667(In/Hr)

+++++
Process from Point/Station 39.000 to Point/Station 40.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 36.000(Ft.)
Downstream point elevation = 25.000(Ft.)
Channel length thru subarea = 555.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 50.000
Slope or 'Z' of right channel bank = 20.000
Estimated mean flow rate at midpoint of channel = 9.938(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 9.938(CFS)
Depth of flow = 0.261(Ft.), Average velocity = 1.994(Ft/s)
Channel flow top width = 28.245(Ft.)
Flow Velocity = 1.99(Ft/s)
Travel time = 4.64 min.
Time of concentration = 13.71 min.
Critical depth = 0.238(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
Rainfall intensity = 3.597(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.733
Subarea runoff = 12.828(CFS) for 5.251(Ac.)
Total runoff = 16.315(CFS)
Effective area this stream = 6.19(Ac.)
Total Study Area (Main Stream No. 1) = 21.63(Ac.)
Area averaged Fm value = 0.667(In/Hr)
Depth of flow = 0.331(Ft.), Average velocity = 2.279(Ft/s)
Critical depth = 0.309(Ft.)

+++++
Process from Point/Station 40.000 to Point/Station 41.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 25.000(Ft.)
Downstream point elevation = 20.000(Ft.)
Channel length thru subarea = 168.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 20.000
Slope or 'Z' of right channel bank = 20.000
Estimated mean flow rate at midpoint of channel = 18.541(CFS)
Manning's 'N' = 0.033
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 18.541(CFS)
Depth of flow = 0.353(Ft.), Average velocity = 3.079(Ft/s)
Channel flow top width = 24.120(Ft.)
Flow Velocity = 3.08(Ft/s)
Travel time = 0.91 min.

Time of concentration = 14.62 min.
 Critical depth = 0.371(Ft.)
 Adding area flow to channel
 PARK subarea
 Decimal fraction soil group A = 1.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 32.00
 Adjusted SCS curve number for AMC 3 = 52.00
 Pervious ratio(Ap) = 0.8500 Max loss rate(Fm)= 0.667(In/Hr)
 Rainfall intensity = 3.439(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.725
 Subarea runoff = 4.377(CFS) for 2.108(Ac.)
 Total runoff = 20.692(CFS)
 Effective area this stream = 8.30(Ac.)
 Total Study Area (Main Stream No. 1) = 23.74(Ac.)
 Area averaged Fm value = 0.667(In/Hr)
 Depth of flow = 0.373(Ft.), Average velocity = 3.175(Ft/s)
 Critical depth = 0.391(Ft.)

++++++
 Process from Point/Station 41.000 to Point/Station 37.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 20.000(Ft.)
 Downstream point elevation = 16.000(Ft.)
 Channel length thru subarea = 40.000(Ft.)
 Channel base width = 10.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Manning's 'N' = 0.033
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 20.692(CFS)
 Depth of flow = 0.293(Ft.), Average velocity = 5.471(Ft/s)
 Channel flow top width = 15.852(Ft.)
 Flow Velocity = 5.47(Ft/s)
 Travel time = 0.12 min.
 Time of concentration = 14.74 min.
 Critical depth = 0.438(Ft.)

++++++
 Process from Point/Station 41.000 to Point/Station 37.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 8.296(Ac.)
 Runoff from this stream = 20.692(CFS)
 Time of concentration = 14.74 min.
 Rainfall intensity = 3.419(In/Hr)
 Area averaged loss rate (Fm) = 0.6674(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8500
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	52.18	14.267	11.67	0.357	4.028
2	20.69	8.296	14.74	0.667	3.419

$Q_{max}(1) =$
 $1.000 * 1.000 * 52.175) +$
 $1.221 * 0.791 * 20.692) + = 72.171$
 $Q_{max}(2) =$
 $0.834 * 1.000 * 52.175) +$
 $1.000 * 1.000 * 20.692) + = 64.211$

Total of 2 streams to confluence:

Flow rates before confluence point:

52.175 20.692

Maximum flow rates at confluence using above data:

72.171 64.211

Area of streams before confluence:

14.267 8.296

Effective area values after confluence:

20.831 22.563

Results of confluence:

Total flow rate = 72.171(CFS) = 62.8

Time of concentration = 11.666 min.

Effective stream area after confluence = 20.831(Ac.)

Study area average Pervious fraction(A_p) = 0.600

Study area average soil loss rate(F_m) = 0.471(In/Hr)

Study area total (this main stream) = 22.56(Ac.)

End of computations, Total Study Area = 23.74 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.580

Area averaged SCS curve number = 32.0

100-yr, 1-hr

100-yr, 24-hr = 68.04 cfs



Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0

Study date 08/25/22

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6434

UNIT HYDROGRAPH

100-year 24-hour

AMC III

POST-DEV

2039UD

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
-------------------	---------------------	-------------------

Rainfall data for year 100

25.40	1	1.28
-------	---	------

Rainfall data for year 100

25.40	6	2.74
-------	---	------

Rainfall data for year 100

25.40	24	5.53
-------	----	------

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***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	SCS curve NO. (AMC 3)	Area (Ac.)	Area Fraction	Fp (Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	25.40	1.000	0.785	0.590	0.463

Area-averaged adjusted loss rate Fm (In/Hr) = 0.463

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
14.99	0.590	32.0	52.0	9.23	0.190
10.41	0.410	98.0	98.0	0.20	0.957

Area-averaged catchment yield fraction, Y = 0.504
 Area-averaged low loss fraction, Yb = 0.496
 User entry of time of concentration = 0.190 (hours)
 ++++++
 Watershed area = 25.40 (Ac.)
 Catchment Lag time = 0.152 hours
 Unit interval = 5.000 minutes
 Unit interval percentage of lag time = 54.7718
 Hydrograph baseflow = 0.00 (CFS)
 Average maximum watershed loss rate (Fm) = 0.463 (In/Hr)
 Average low loss rate fraction (Yb) = 0.496 (decimal)
 DESERT S-Graph Selected
 Computed peak 5-minute rainfall = 0.607 (In)
 Computed peak 30-minute rainfall = 1.040 (In)
 Specified peak 1-hour rainfall = 1.280 (In)
 Computed peak 3-hour rainfall = 2.041 (In)
 Specified peak 6-hour rainfall = 2.740 (In)
 Specified peak 24-hour rainfall = 5.530 (In)

Rainfall depth area reduction factors:
 Using a total area of 25.40 (Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.607 (In)
30-minute factor = 0.999	Adjusted rainfall = 1.038 (In)
1-hour factor = 0.999	Adjusted rainfall = 1.278 (In)
3-hour factor = 1.000	Adjusted rainfall = 2.041 (In)
6-hour factor = 1.000	Adjusted rainfall = 2.740 (In)
24-hour factor = 1.000	Adjusted rainfall = 5.530 (In)

U n i t H y d r o g r a p h
 ++++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 307.18 (CFS))		
1	4.665	14.330
2	35.951	96.104
3	64.493	87.676
4	76.722	37.565
5	83.849	21.894
6	88.649	14.745
7	91.853	9.841
8	94.242	7.338
9	95.994	5.384
10	97.262	3.895
11	98.051	2.422
12	98.659	1.867
13	99.308	1.996
14	99.746	1.346
15	100.000	0.779

Total soil rain loss = 2.44 (In)

Total effective rainfall = 3.09(In)
Peak flow rate in flood hydrograph = 68.04(CFS)

+++++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0005		0.07 Q					
0+10	0.0042		0.54 Q					
0+15	0.0109		0.97 Q					
0+20	0.0189		1.16 Q					
0+25	0.0277		1.27 Q					
0+30	0.0370		1.35 Q					
0+35	0.0466		1.40 Q					
0+40	0.0565		1.44 Q					
0+45	0.0666		1.47 Q					
0+50	0.0769		1.49 Q					
0+55	0.0873		1.51 Q					
1+ 0	0.0978		1.52 Q					
1+ 5	0.1083		1.54 Q					
1+10	0.1190		1.55 Q					
1+15	0.1297		1.55 Q					
1+20	0.1404		1.56 Q					
1+25	0.1512		1.56 Q					
1+30	0.1620		1.57 Q					
1+35	0.1728		1.57 QV					
1+40	0.1836		1.58 QV					
1+45	0.1945		1.58 QV					
1+50	0.2054		1.58 QV					
1+55	0.2164		1.59 QV					
2+ 0	0.2274		1.59 QV					
2+ 5	0.2384		1.60 QV					
2+10	0.2494		1.60 QV					
2+15	0.2605		1.61 QV					
2+20	0.2716		1.61 QV					
2+25	0.2827		1.62 QV					
2+30	0.2939		1.62 QV					
2+35	0.3051		1.63 QV					
2+40	0.3163		1.63 QV					
2+45	0.3276		1.64 Q V					
2+50	0.3389		1.64 Q V					
2+55	0.3503		1.65 Q V					
3+ 0	0.3616		1.65 Q V					
3+ 5	0.3730		1.66 Q V					
3+10	0.3845		1.66 Q V					
3+15	0.3960		1.67 Q V					
3+20	0.4075		1.67 Q V					
3+25	0.4190		1.68 Q V					
3+30	0.4306		1.68 Q V					
3+35	0.4423		1.69 Q V					
3+40	0.4539		1.69 Q V					
3+45	0.4656		1.70 Q V					
3+50	0.4774		1.71 Q V					
3+55	0.4892		1.71 Q V					
4+ 0	0.5010		1.72 Q V					
4+ 5	0.5129		1.72 Q V					
4+10	0.5248		1.73 Q V					
4+15	0.5367		1.73 Q V					

4+20	0.5487	1.74	Q	V				
4+25	0.5607	1.75	Q	V				
4+30	0.5728	1.75	IQ	V				
4+35	0.5849	1.76	IQ	V				
4+40	0.5970	1.76	IQ	V				
4+45	0.6092	1.77	IQ	V				
4+50	0.6215	1.78	IQ	V				
4+55	0.6338	1.78	IQ	V				
5+ 0	0.6461	1.79	IQ	V				
5+ 5	0.6585	1.80	IQ	V				
5+10	0.6709	1.80	IQ	V				
5+15	0.6834	1.81	IQ	V				
5+20	0.6959	1.82	IQ	V				
5+25	0.7084	1.82	IQ	V				
5+30	0.7210	1.83	IQ	V				
5+35	0.7337	1.84	IQ	V				
5+40	0.7464	1.84	IQ	V				
5+45	0.7592	1.85	IQ	V				
5+50	0.7720	1.86	IQ	V				
5+55	0.7848	1.87	IQ	V				
6+ 0	0.7977	1.87	IQ	V				
6+ 5	0.8107	1.88	IQ	V				
6+10	0.8237	1.89	IQ	V				
6+15	0.8368	1.90	IQ	V				
6+20	0.8499	1.90	IQ	V				
6+25	0.8630	1.91	IQ	V				
6+30	0.8763	1.92	IQ	V				
6+35	0.8896	1.93	IQ	V				
6+40	0.9029	1.94	IQ	V				
6+45	0.9163	1.95	IQ	V				
6+50	0.9297	1.95	IQ	V				
6+55	0.9433	1.96	IQ	V				
7+ 0	0.9568	1.97	IQ	V				
7+ 5	0.9705	1.98	IQ	V				
7+10	0.9842	1.99	IQ	V				
7+15	0.9979	2.00	IQ	V				
7+20	1.0117	2.01	IQ	V				
7+25	1.0256	2.02	IQ	V				
7+30	1.0396	2.03	IQ	V				
7+35	1.0536	2.03	IQ	V				
7+40	1.0677	2.04	IQ	V				
7+45	1.0818	2.05	IQ	V				
7+50	1.0960	2.06	IQ	V				
7+55	1.1103	2.07	IQ	V				
8+ 0	1.1247	2.09	IQ	V				
8+ 5	1.1391	2.10	IQ	V				
8+10	1.1536	2.11	IQ	V				
8+15	1.1682	2.12	IQ	V				
8+20	1.1829	2.13	IQ	V				
8+25	1.1976	2.14	IQ	V				
8+30	1.2124	2.15	IQ	V				
8+35	1.2273	2.16	IQ	V				
8+40	1.2422	2.17	IQ	V				
8+45	1.2573	2.18	IQ	V				
8+50	1.2724	2.20	IQ	V				
8+55	1.2876	2.21	IQ	V				
9+ 0	1.3029	2.22	IQ	V				
9+ 5	1.3183	2.23	IQ	V				
9+10	1.3338	2.25	IQ	V				
9+15	1.3494	2.26	IQ	V				
9+20	1.3650	2.27	IQ	V				
9+25	1.3808	2.29	IQ	V				
9+30	1.3966	2.30	IQ	V				

9+35	1.4126	2.31	Q	V				
9+40	1.4286	2.33	Q	V				
9+45	1.4447	2.34	Q	V				
9+50	1.4610	2.36	Q	V				
9+55	1.4773	2.37	Q	V				
10+ 0	1.4938	2.39	Q	V				
10+ 5	1.5104	2.40	Q	V				
10+10	1.5270	2.42	Q	V				
10+15	1.5438	2.44	Q	V				
10+20	1.5607	2.45	Q	V				
10+25	1.5777	2.47	Q	V				
10+30	1.5949	2.49	Q	V				
10+35	1.6122	2.51	Q	V				
10+40	1.6295	2.53	Q	V				
10+45	1.6471	2.54	Q	V				
10+50	1.6647	2.56	Q	V				
10+55	1.6825	2.58	Q	V				
11+ 0	1.7004	2.60	Q	V				
11+ 5	1.7185	2.62	Q	V				
11+10	1.7367	2.64	Q	V				
11+15	1.7551	2.67	Q	V				
11+20	1.7736	2.69	Q	V				
11+25	1.7922	2.71	Q	V				
11+30	1.8111	2.73	Q	V				
11+35	1.8301	2.76	Q	V				
11+40	1.8492	2.78	Q	V				
11+45	1.8685	2.81	Q	V				
11+50	1.8881	2.83	Q	V				
11+55	1.9077	2.86	Q	V				
12+ 0	1.9276	2.89	Q	V				
12+ 5	1.9475	2.89	Q	V				
12+10	1.9666	2.77	Q	V				
12+15	1.9850	2.66	Q	V				
12+20	2.0031	2.63	Q	V				
12+25	2.0212	2.63	Q	V				
12+30	2.0394	2.64	Q	V				
12+35	2.0577	2.66	Q	V				
12+40	2.0762	2.68	Q	V				
12+45	2.0948	2.71	Q	V				
12+50	2.1137	2.74	Q	V				
12+55	2.1328	2.77	Q	V				
13+ 0	2.1522	2.81	Q	V				
13+ 5	2.1718	2.85	Q	V				
13+10	2.1917	2.89	Q	V				
13+15	2.2119	2.94	Q	V				
13+20	2.2325	2.98	Q	V				
13+25	2.2534	3.03	Q	V				
13+30	2.2746	3.09	Q	V				
13+35	2.2963	3.14	Q	V				
13+40	2.3183	3.20	Q	V				
13+45	2.3407	3.26	Q	V				
13+50	2.3636	3.32	Q	V				
13+55	2.3869	3.39	Q	V				
14+ 0	2.4108	3.46	Q	V				
14+ 5	2.4351	3.53	Q	V				
14+10	2.4600	3.62	Q	V				
14+15	2.4855	3.70	Q	V				
14+20	2.5117	3.80	Q	V				
14+25	2.5385	3.89	Q	V				
14+30	2.5660	4.00	Q	V				
14+35	2.5943	4.11	Q	V				
14+40	2.6235	4.24	Q	V				
14+45	2.6536	4.36	Q	V				

14+50	2.6846	4.51	Q		V			
14+55	2.7168	4.67	Q		V			
15+ 0	2.7502	4.85	Q		V			
15+ 5	2.7848	5.04	Q		V			
15+10	2.8211	5.26	Q		V			
15+15	2.8589	5.50	Q		V			
15+20	2.8988	5.79	Q		V			
15+25	2.9402	6.01	Q		V			
15+30	2.9798	5.75	Q		V			
15+35	3.0182	5.57	Q		V			
15+40	3.0585	5.85	Q		V			
15+45	3.1021	6.34	Q		V			
15+50	3.1516	7.18	Q		V			
15+55	3.2106	8.57	Q		V			
16+ 0	3.2955	12.33		Q	V			
16+ 5	3.4732	25.80			Q	V		
16+10	3.9418	68.04				V		Q
16+15	4.3563	60.19				V		Q
16+20	4.5720	31.32			Q	V		
16+25	4.7160	20.90		Q		V		
16+30	4.8270	16.12		Q		V		
16+35	4.9158	12.90		Q		V		
16+40	4.9905	10.84		Q		V		
16+45	5.0535	9.15		Q		V		
16+50	5.1071	7.79		Q		V		
16+55	5.1524	6.58		Q		V		
17+ 0	5.1932	5.92		Q		V		
17+ 5	5.2320	5.64		Q		V		
17+10	5.2663	4.97		Q		V		
17+15	5.2964	4.38		Q		V		
17+20	5.3223	3.75		Q		V		
17+25	5.3469	3.57		Q		V		
17+30	5.3704	3.42		Q		V		
17+35	5.3930	3.28		Q		V		
17+40	5.4148	3.16		Q		V		
17+45	5.4357	3.05		Q		V		
17+50	5.4560	2.94		Q		V		
17+55	5.4757	2.85		Q		V		
18+ 0	5.4947	2.77		Q		V		
18+ 5	5.5134	2.71		Q		V		
18+10	5.5327	2.79		Q		V		
18+15	5.5524	2.86		Q		V		
18+20	5.5721	2.86		Q		V		
18+25	5.5916	2.83		Q		V		
18+30	5.6109	2.80		Q		V		
18+35	5.6300	2.77		Q		V		
18+40	5.6487	2.73		Q		V		
18+45	5.6673	2.69		Q		V		
18+50	5.6855	2.65		Q		V		
18+55	5.7035	2.61		Q		V		
19+ 0	5.7212	2.57		Q		V		
19+ 5	5.7387	2.54		Q		V		
19+10	5.7559	2.50		Q		V		
19+15	5.7729	2.47		Q		V		
19+20	5.7897	2.43		Q		V		
19+25	5.8062	2.40		Q		V		
19+30	5.8226	2.37		Q		V		
19+35	5.8387	2.34		Q		V		
19+40	5.8546	2.31		Q		V		
19+45	5.8703	2.28		Q		V		
19+50	5.8859	2.26		Q		V		
19+55	5.9013	2.23		Q		V		
20+ 0	5.9165	2.21		Q		V		

20+ 5	5.9315	2.18	Q				V	
20+10	5.9464	2.16	Q				V	
20+15	5.9611	2.14	Q				V	
20+20	5.9756	2.11	Q				V	
20+25	5.9900	2.09	Q				V	
20+30	6.0043	2.07	Q				V	
20+35	6.0184	2.05	Q				V	
20+40	6.0324	2.03	Q				V	
20+45	6.0463	2.01	Q				V	
20+50	6.0601	2.00	Q				V	
20+55	6.0737	1.98	Q				V	
21+ 0	6.0872	1.96	Q				V	
21+ 5	6.1006	1.94	Q				V	
21+10	6.1138	1.93	Q				V	
21+15	6.1270	1.91	Q				V	
21+20	6.1400	1.89	Q				V	
21+25	6.1530	1.88	Q				V	
21+30	6.1658	1.86	Q				V	
21+35	6.1786	1.85	Q				V	
21+40	6.1912	1.84	Q				V	
21+45	6.2037	1.82	Q				V	
21+50	6.2162	1.81	Q				V	
21+55	6.2286	1.79	Q				V	
22+ 0	6.2408	1.78	Q				V	
22+ 5	6.2530	1.77	Q				V	
22+10	6.2651	1.76	Q				V	
22+15	6.2771	1.74	Q				V	
22+20	6.2891	1.73	Q				V	
22+25	6.3009	1.72	Q				V	
22+30	6.3127	1.71	Q				V	
22+35	6.3244	1.70	Q				V	
22+40	6.3360	1.69	Q				V	
22+45	6.3475	1.68	Q				V	
22+50	6.3590	1.67	Q				V	
22+55	6.3704	1.66	Q				V	
23+ 0	6.3818	1.65	Q				V	
23+ 5	6.3930	1.64	Q				V	
23+10	6.4042	1.63	Q				V	
23+15	6.4153	1.62	Q				V	
23+20	6.4264	1.61	Q				V	
23+25	6.4374	1.60	Q				V	
23+30	6.4483	1.59	Q				V	
23+35	6.4592	1.58	Q				V	
23+40	6.4700	1.57	Q				V	
23+45	6.4808	1.56	Q				V	
23+50	6.4915	1.55	Q				V	
23+55	6.5021	1.54	Q				V	
24+ 0	6.5127	1.54	Q				V	
24+ 5	6.5227	1.46	Q				V	
24+10	6.5295	0.98	Q				V	
24+15	6.5332	0.54	Q				V	
24+20	6.5357	0.36	Q				V	
24+25	6.5374	0.25	Q				V	
24+30	6.5386	0.17	Q				V	
24+35	6.5394	0.12	Q				V	
24+40	6.5400	0.09	Q				V	
24+45	6.5404	0.06	Q				V	
24+50	6.5407	0.04	Q				V	
24+55	6.5409	0.03	Q				V	
25+ 0	6.5411	0.02	Q				V	
25+ 5	6.5411	0.01	Q				V	
25+10	6.5412	0.00	Q				V	

APPENDIX C – Retarding Basin Calculations



FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
Study date: 01/28/23

2039RTE

DEVELOPED
100-YEAR 24-HOUR REDUCED TO 90 PRE-DEVELOPED
(5)-12-in DIA OUTLETS

Program License Serial Number 6434

***** HYDROGRAPH INFORMATION *****

From study/file name: 2039ud.rte

*****HYDROGRAPH DATA*****

Number of intervals = 302
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 68.042 (CFS)
Total volume = 6.541 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 37.000 to Point/Station 42.000
**** RETARDING BASIN ROUTING ****

Program computation of outflow v. depth

CALCULATED OUTFLOW DATA AT DEPTH = 1.00 (Ft.))
Total outflow at this depth = 0.00 (CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.00 (Ft.))
Total outflow at this depth = 0.00 (CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.00 (Ft.))
Total outflow at this depth = 0.00 (CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.50 (Ft.))
Total outflow at this depth = 0.00 (CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.00(Ft.))
Pipe length = 50.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 5
Given pipe size = 12.00(In.)
Calculated individual pipe flow = 1.398(CFS)
Normal flow depth in pipe = 4.32(In.)
Flow top width inside pipe = 11.52(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 6.988(CFS)

Total outflow at this depth = 6.99(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.00(Ft.))
Pipe length = 50.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 5
Given pipe size = 12.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 2.500(Ft.)
Pipe friction loss = 1.277(Ft.)
Minor friction loss = 1.224(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 28.467(CFS)

Total outflow at this depth = 28.47(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.00(Ft.))
Pipe length = 50.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 5
Given pipe size = 12.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.788(Ft.)
Minor friction loss = 1.714(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 33.683(CFS)

Total outflow at this depth = 33.68(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.00(Ft.))
Pipe length = 50.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 5
Given pipe size = 12.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 2.298(Ft.)
Minor friction loss = 2.203(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 38.193(CFS)

Total outflow at this depth = 38.19(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.50(Ft.))
Pipe length = 50.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 5
Given pipe size = 12.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)

Pipe friction loss = 2.554(Ft.)
 Minor friction loss = 2.448(Ft.) K-factor = 1.50
 Calculated flow rate through pipe(s) = 40.259(CFS)

Total outflow at this depth = 40.26(CFS)

 Total number of inflow hydrograph intervals = 302
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

 Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

 Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth Storage Outflow (S-O*dt/2) (S+O*dt/2)
 (Ft.) (Ac.Ft) (CFS) (Ac.Ft) (Ac.Ft)

0.000	0.000	0.000	0.000	0.000
1.000	0.067	0.000	0.067	0.067
2.000	0.169	0.000	0.169	0.169
3.000	0.312	0.000	0.312	0.312
3.500	0.402	0.000	0.402	0.402
4.000	0.507	6.988	0.483	0.531
5.000	0.761	28.467	0.663	0.859
6.000	1.075	33.683	0.959	1.191
7.000	1.454	38.193	1.322	1.586
7.500	1.670	40.259	1.531	1.809

 Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	17.0	34.02	51.03	68.04	Depth (Ft.)
0.083	0.07	0.00	0.000	O					0.00
0.167	0.54	0.00	0.002	O					0.04
0.250	0.97	0.00	0.008	O					0.11
0.333	1.16	0.00	0.015	O					0.22
0.417	1.27	0.00	0.023	O					0.35
0.500	1.35	0.00	0.032	O					0.48
0.583	1.40	0.00	0.042	O					0.62
0.667	1.44	0.00	0.052	O					0.77
0.750	1.47	0.00	0.062	O					0.92
0.833	1.49	0.00	0.072	O					1.05
0.917	1.51	0.00	0.082	O					1.15
1.000	1.52	0.00	0.093	O					1.25
1.083	1.54	0.00	0.103	O					1.35
1.167	1.55	0.00	0.114	O					1.46
1.250	1.55	0.00	0.124	O					1.56
1.333	1.56	0.00	0.135	O					1.67
1.417	1.56	0.00	0.146	O					1.77
1.500	1.57	0.00	0.157	O					1.88
1.583	1.57	0.00	0.167	O					1.98
1.667	1.58	0.00	0.178	O					2.06
1.750	1.58	0.00	0.189	O					2.14
1.833	1.58	0.00	0.200	O					2.22
1.917	1.59	0.00	0.211	O					2.29
2.000	1.59	0.00	0.222	O					2.37

2.083	1.60	0.00	0.233	O					2.45
2.167	1.60	0.00	0.244	O					2.52
2.250	1.61	0.00	0.255	O					2.60
2.333	1.61	0.00	0.266	O					2.68
2.417	1.62	0.00	0.277	O					2.76
2.500	1.62	0.00	0.288	O					2.83
2.583	1.63	0.00	0.299	O					2.91
2.667	1.63	0.00	0.311	O					2.99
2.750	1.64	0.00	0.322	O					3.06
2.833	1.64	0.00	0.333	O					3.12
2.917	1.65	0.00	0.345	O					3.18
3.000	1.65	0.00	0.356	O					3.24
3.083	1.66	0.00	0.367	O					3.31
3.167	1.66	0.00	0.379	O					3.37
3.250	1.67	0.00	0.390	O					3.43
3.333	1.67	0.00	0.402	O					3.50
3.417	1.68	0.61	0.411	O					3.54
3.500	1.68	1.01	0.417	O					3.57
3.583	1.69	1.26	0.421	O					3.59
3.667	1.69	1.42	0.423	O					3.60
3.750	1.70	1.52	0.425	O					3.61
3.833	1.71	1.59	0.426	O					3.61
3.917	1.71	1.63	0.427	O					3.62
4.000	1.72	1.66	0.427	O					3.62
4.083	1.72	1.68	0.427	O					3.62
4.167	1.73	1.70	0.428	O					3.62
4.250	1.73	1.71	0.428	O					3.62
4.333	1.74	1.72	0.428	O					3.62
4.417	1.75	1.73	0.428	O					3.62
4.500	1.75	1.74	0.428	O					3.62
4.583	1.76	1.74	0.428	O					3.62
4.667	1.76	1.75	0.428	O					3.63
4.750	1.77	1.76	0.428	O					3.63
4.833	1.78	1.76	0.428	O					3.63
4.917	1.78	1.77	0.429	O					3.63
5.000	1.79	1.78	0.429	O					3.63
5.083	1.80	1.78	0.429	O					3.63
5.167	1.80	1.79	0.429	O					3.63
5.250	1.81	1.80	0.429	O					3.63
5.333	1.82	1.80	0.429	O					3.63
5.417	1.82	1.81	0.429	O					3.63
5.500	1.83	1.82	0.429	O					3.63
5.583	1.84	1.82	0.429	O					3.63
5.667	1.84	1.83	0.429	O					3.63
5.750	1.85	1.84	0.430	O					3.63
5.833	1.86	1.84	0.430	O					3.63
5.917	1.87	1.85	0.430	O					3.63
6.000	1.87	1.86	0.430	O					3.63
6.083	1.88	1.87	0.430	O					3.63
6.167	1.89	1.87	0.430	O					3.63
6.250	1.90	1.88	0.430	O					3.63
6.333	1.90	1.89	0.430	O					3.64
6.417	1.91	1.90	0.430	O					3.64
6.500	1.92	1.90	0.431	O					3.64
6.583	1.93	1.91	0.431	O					3.64
6.667	1.94	1.92	0.431	O					3.64
6.750	1.95	1.93	0.431	O					3.64
6.833	1.95	1.94	0.431	O					3.64
6.917	1.96	1.94	0.431	O					3.64
7.000	1.97	1.95	0.431	O					3.64
7.083	1.98	1.96	0.431	O					3.64
7.167	1.99	1.97	0.432	O					3.64
7.250	2.00	1.98	0.432	O					3.64

7.333	2.01	1.99	0.432	O					3.64
7.417	2.02	2.00	0.432	O					3.64
7.500	2.03	2.01	0.432	O					3.64
7.583	2.03	2.01	0.432	O					3.64
7.667	2.04	2.02	0.432	O					3.64
7.750	2.05	2.03	0.433	O					3.65
7.833	2.06	2.04	0.433	O					3.65
7.917	2.07	2.05	0.433	O					3.65
8.000	2.09	2.06	0.433	O					3.65
8.083	2.10	2.07	0.433	O					3.65
8.167	2.11	2.08	0.433	O					3.65
8.250	2.12	2.09	0.433	O					3.65
8.333	2.13	2.10	0.434	OI					3.65
8.417	2.14	2.12	0.434	OI					3.65
8.500	2.15	2.13	0.434	OI					3.65
8.583	2.16	2.14	0.434	IO					3.65
8.667	2.17	2.15	0.434	IO					3.65
8.750	2.18	2.16	0.434	IO					3.65
8.833	2.20	2.17	0.435	IO					3.66
8.917	2.21	2.18	0.435	IO					3.66
9.000	2.22	2.20	0.435	IO					3.66
9.083	2.23	2.21	0.435	IO					3.66
9.167	2.25	2.22	0.435	IO					3.66
9.250	2.26	2.23	0.436	IO					3.66
9.333	2.27	2.25	0.436	IO					3.66
9.417	2.29	2.26	0.436	IO					3.66
9.500	2.30	2.27	0.436	IO					3.66
9.583	2.31	2.29	0.436	IO					3.66
9.667	2.33	2.30	0.437	IO					3.66
9.750	2.34	2.31	0.437	IO					3.67
9.833	2.36	2.33	0.437	IO					3.67
9.917	2.37	2.34	0.437	IO					3.67
10.000	2.39	2.36	0.437	IO					3.67
10.083	2.40	2.37	0.438	IO					3.67
10.167	2.42	2.39	0.438	IO					3.67
10.250	2.44	2.40	0.438	IO					3.67
10.333	2.45	2.42	0.438	IO					3.67
10.417	2.47	2.44	0.439	IO					3.67
10.500	2.49	2.45	0.439	IO					3.68
10.583	2.51	2.47	0.439	IO					3.68
10.667	2.53	2.49	0.439	IO					3.68
10.750	2.54	2.50	0.440	IO					3.68
10.833	2.56	2.52	0.440	IO					3.68
10.917	2.58	2.54	0.440	IO					3.68
11.000	2.60	2.56	0.440	IO					3.68
11.083	2.62	2.58	0.441	IO					3.68
11.167	2.64	2.60	0.441	IO					3.69
11.250	2.67	2.62	0.441	IO					3.69
11.333	2.69	2.64	0.442	IO					3.69
11.417	2.71	2.66	0.442	IO					3.69
11.500	2.73	2.68	0.442	IO					3.69
11.583	2.76	2.71	0.443	IO					3.69
11.667	2.78	2.73	0.443	IO					3.70
11.750	2.81	2.75	0.443	IO					3.70
11.833	2.83	2.78	0.444	IO					3.70
11.917	2.86	2.80	0.444	IO					3.70
12.000	2.89	2.83	0.445	IO					3.70
12.083	2.89	2.85	0.445	IO					3.70
12.167	2.77	2.84	0.445	IO					3.70
12.250	2.66	2.80	0.444	IO					3.70
12.333	2.63	2.74	0.443	IO					3.70
12.417	2.63	2.70	0.443	IO					3.69
12.500	2.64	2.68	0.442	IO					3.69

12.583	2.66	2.67	0.442	O					3.69
12.667	2.68	2.67	0.442	O					3.69
12.750	2.71	2.68	0.442	O					3.69
12.833	2.74	2.69	0.442	O					3.69
12.917	2.77	2.72	0.443	O					3.69
13.000	2.81	2.75	0.443	O					3.70
13.083	2.85	2.78	0.444	O					3.70
13.167	2.89	2.81	0.444	O					3.70
13.250	2.94	2.85	0.445	O					3.70
13.333	2.98	2.89	0.445	O					3.71
13.417	3.03	2.94	0.446	O					3.71
13.500	3.09	2.98	0.447	O					3.71
13.583	3.14	3.03	0.448	O					3.72
13.667	3.20	3.08	0.448	O					3.72
13.750	3.26	3.14	0.449	O					3.72
13.833	3.32	3.19	0.450	O					3.73
13.917	3.39	3.25	0.451	O					3.73
14.000	3.46	3.32	0.452	O					3.74
14.083	3.53	3.38	0.453	O					3.74
14.167	3.62	3.46	0.454	O					3.75
14.250	3.70	3.53	0.455	O					3.75
14.333	3.80	3.61	0.456	O					3.76
14.417	3.89	3.70	0.458	O					3.76
14.500	4.00	3.79	0.459	O					3.77
14.583	4.11	3.89	0.460	O					3.78
14.667	4.24	4.00	0.462	O					3.79
14.750	4.36	4.11	0.464	OI					3.79
14.833	4.51	4.23	0.466	OI					3.80
14.917	4.67	4.37	0.468	O					3.81
15.000	4.85	4.51	0.470	O					3.82
15.083	5.04	4.67	0.472	O					3.83
15.167	5.26	4.85	0.475	O					3.85
15.250	5.50	5.05	0.478	O					3.86
15.333	5.79	5.27	0.481	O					3.88
15.417	6.01	5.50	0.485	O					3.89
15.500	5.75	5.64	0.487	O					3.90
15.583	5.57	5.65	0.487	O					3.90
15.667	5.85	5.67	0.487	O					3.91
15.750	6.34	5.83	0.490	O					3.92
15.833	7.18	6.18	0.495	OI					3.94
15.917	8.57	6.81	0.504	OI					3.99
16.000	12.33	8.41	0.524	O I					4.07
16.083	25.80	13.22	0.581	O I					4.29
16.167	68.04	28.42	0.760	O				I	5.00
16.250	60.19	32.32	0.993	O		I			5.74
16.333	31.32	33.61	1.080	IO					6.00
16.417	20.90	32.95	1.031	I O					5.86
16.500	16.12	31.38	0.937	I O					5.56
16.583	12.90	29.56	0.827	I O					5.21
16.667	10.84	25.03	0.720	I O					4.84
16.750	9.15	18.25	0.640	I O					4.52
16.833	7.79	13.84	0.588	I O					4.32
16.917	6.58	10.84	0.553	I O					4.18
17.000	5.92	8.77	0.528	I O					4.08
17.083	5.64	7.42	0.512	IO					4.02
17.167	4.97	6.56	0.501	IO					3.97
17.250	4.38	5.86	0.490	O					3.92
17.333	3.75	5.19	0.480	IO					3.87
17.417	3.57	4.62	0.471	IO					3.83
17.500	3.42	4.20	0.465	O					3.80
17.583	3.28	3.88	0.460	O					3.78
17.667	3.16	3.64	0.457	O					3.76
17.750	3.05	3.44	0.454	O					3.75

17.833	2.94	3.27	0.451	IO					3.73
17.917	2.85	3.13	0.449	IO					3.72
18.000	2.77	3.01	0.447	IO					3.72
18.083	2.71	2.91	0.446	IO					3.71
18.167	2.79	2.85	0.445	IO					3.70
18.250	2.86	2.84	0.445	IO					3.70
18.333	2.86	2.85	0.445	IO					3.70
18.417	2.83	2.85	0.445	IO					3.70
18.500	2.80	2.84	0.445	IO					3.70
18.583	2.77	2.82	0.444	IO					3.70
18.667	2.73	2.79	0.444	IO					3.70
18.750	2.69	2.76	0.443	IO					3.70
18.833	2.65	2.73	0.443	IO					3.70
18.917	2.61	2.69	0.442	IO					3.69
19.000	2.57	2.65	0.442	IO					3.69
19.083	2.54	2.62	0.441	IO					3.69
19.167	2.50	2.58	0.441	IO					3.68
19.250	2.47	2.55	0.440	IO					3.68
19.333	2.43	2.51	0.440	IO					3.68
19.417	2.40	2.48	0.439	IO					3.68
19.500	2.37	2.44	0.439	IO					3.67
19.583	2.34	2.41	0.438	IO					3.67
19.667	2.31	2.38	0.438	IO					3.67
19.750	2.28	2.35	0.437	IO					3.67
19.833	2.26	2.32	0.437	IO					3.67
19.917	2.23	2.29	0.436	IO					3.66
20.000	2.21	2.26	0.436	IO					3.66
20.083	2.18	2.24	0.436	IO					3.66
20.167	2.16	2.21	0.435	IO					3.66
20.250	2.14	2.19	0.435	IO					3.66
20.333	2.11	2.16	0.435	IO					3.65
20.417	2.09	2.14	0.434	IO					3.65
20.500	2.07	2.12	0.434	O					3.65
20.583	2.05	2.10	0.434	O					3.65
20.667	2.03	2.08	0.433	O					3.65
20.750	2.01	2.06	0.433	O					3.65
20.833	2.00	2.04	0.433	O					3.65
20.917	1.98	2.02	0.432	O					3.64
21.000	1.96	2.00	0.432	O					3.64
21.083	1.94	1.98	0.432	O					3.64
21.167	1.93	1.96	0.432	O					3.64
21.250	1.91	1.95	0.431	O					3.64
21.333	1.89	1.93	0.431	O					3.64
21.417	1.88	1.91	0.431	O					3.64
21.500	1.86	1.90	0.431	O					3.64
21.583	1.85	1.88	0.430	O					3.63
21.667	1.84	1.87	0.430	O					3.63
21.750	1.82	1.85	0.430	O					3.63
21.833	1.81	1.84	0.430	O					3.63
21.917	1.79	1.83	0.429	O					3.63
22.000	1.78	1.81	0.429	O					3.63
22.083	1.77	1.80	0.429	O					3.63
22.167	1.76	1.78	0.429	O					3.63
22.250	1.74	1.77	0.429	O					3.63
22.333	1.73	1.76	0.428	O					3.63
22.417	1.72	1.75	0.428	O					3.63
22.500	1.71	1.74	0.428	O					3.62
22.583	1.70	1.72	0.428	O					3.62
22.667	1.69	1.71	0.428	O					3.62
22.750	1.68	1.70	0.428	O					3.62
22.833	1.67	1.69	0.427	O					3.62
22.917	1.66	1.68	0.427	O					3.62
23.000	1.65	1.67	0.427	O					3.62

23.083	1.64	1.66	0.427	O					3.62
23.167	1.63	1.65	0.427	O					3.62
23.250	1.62	1.64	0.427	O					3.62
23.333	1.61	1.63	0.426	O					3.62
23.417	1.60	1.62	0.426	O					3.62
23.500	1.59	1.61	0.426	O					3.62
23.583	1.58	1.60	0.426	O					3.61
23.667	1.57	1.59	0.426	O					3.61
23.750	1.56	1.58	0.426	O					3.61
23.833	1.55	1.57	0.426	O					3.61
23.917	1.54	1.56	0.425	O					3.61
24.000	1.54	1.55	0.425	O					3.61
24.083	1.46	1.53	0.425	O					3.61
24.167	0.98	1.42	0.423	O					3.60
24.250	0.54	1.17	0.420	O					3.58
24.333	0.36	0.90	0.416	O					3.56
24.417	0.25	0.68	0.412	O					3.55
24.500	0.17	0.50	0.410	O					3.54
24.583	0.12	0.37	0.408	O					3.53
24.667	0.09	0.27	0.406	O					3.52
24.750	0.06	0.20	0.405	O					3.51
24.833	0.04	0.14	0.404	O					3.51
24.917	0.03	0.10	0.404	O					3.51
25.000	0.02	0.07	0.403	O					3.51
25.083	0.01	0.05	0.403	O					3.50
25.167	0.00	0.04	0.403	O					3.50
25.250	0.00	0.02	0.402	O					3.50
25.333	0.00	0.01	0.402	O					3.50
25.417	0.00	0.01	0.402	O					3.50
25.500	0.00	0.01	0.402	O					3.50
25.583	0.00	0.00	0.402	O					3.50
25.667	0.00	0.00	0.402	O					3.50
25.750	0.00	0.00	0.402	O					3.50
25.833	0.00	0.00	0.402	O					3.50

Remaining water in basin = 0.40 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 310

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 33.748 (CFS)

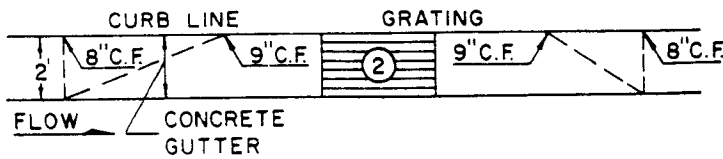
Total volume = 6.139 (Ac.Ft)

Status of hydrographs being held in storage

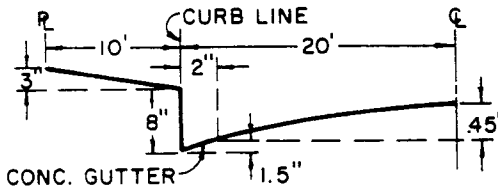
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

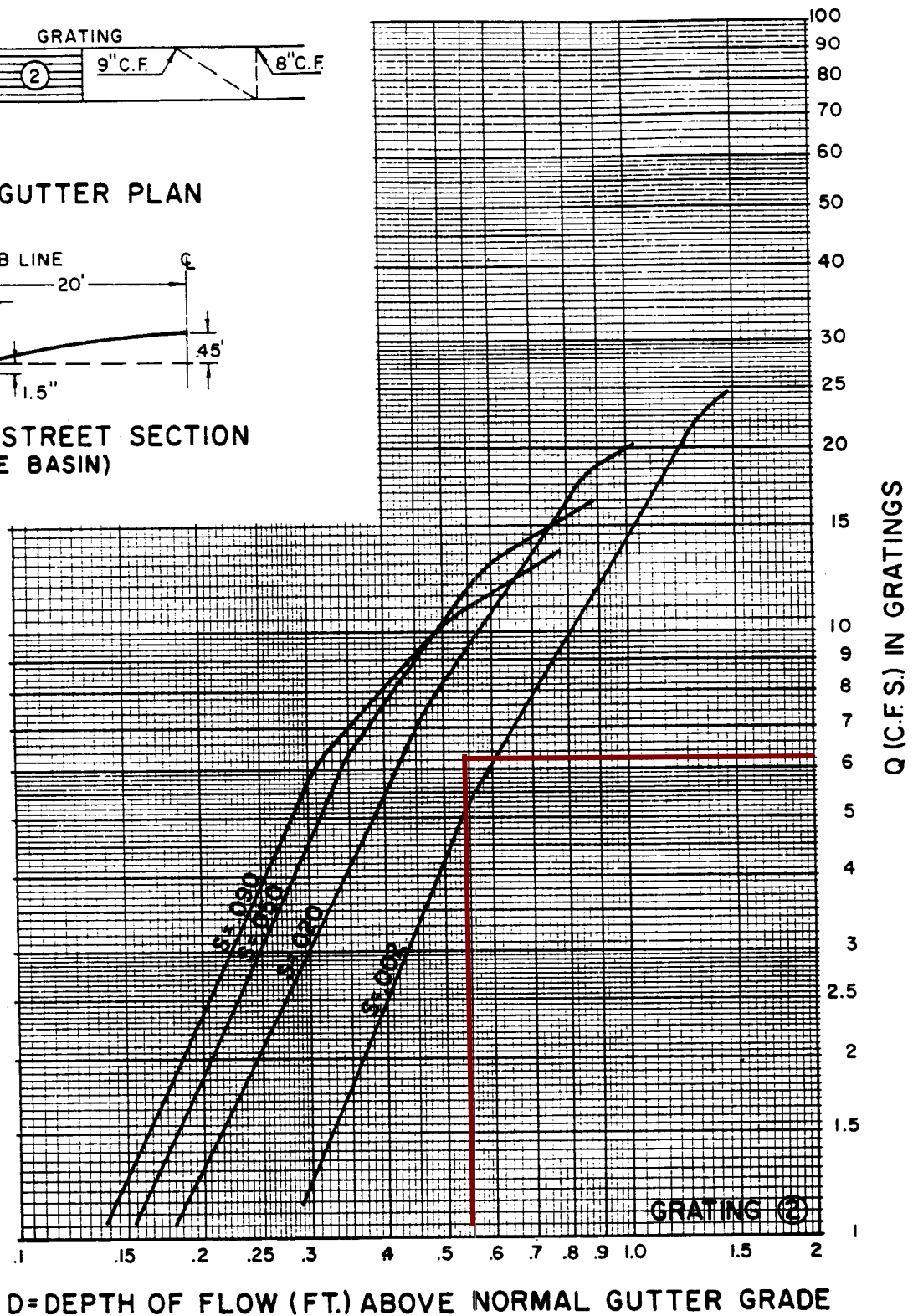
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000



GRATING & GUTTER PLAN

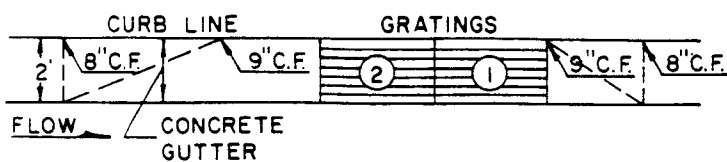


TYPICAL HALF STREET SECTION
(ABOVE BASIN)

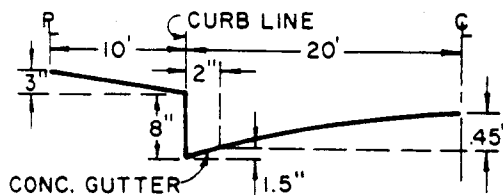


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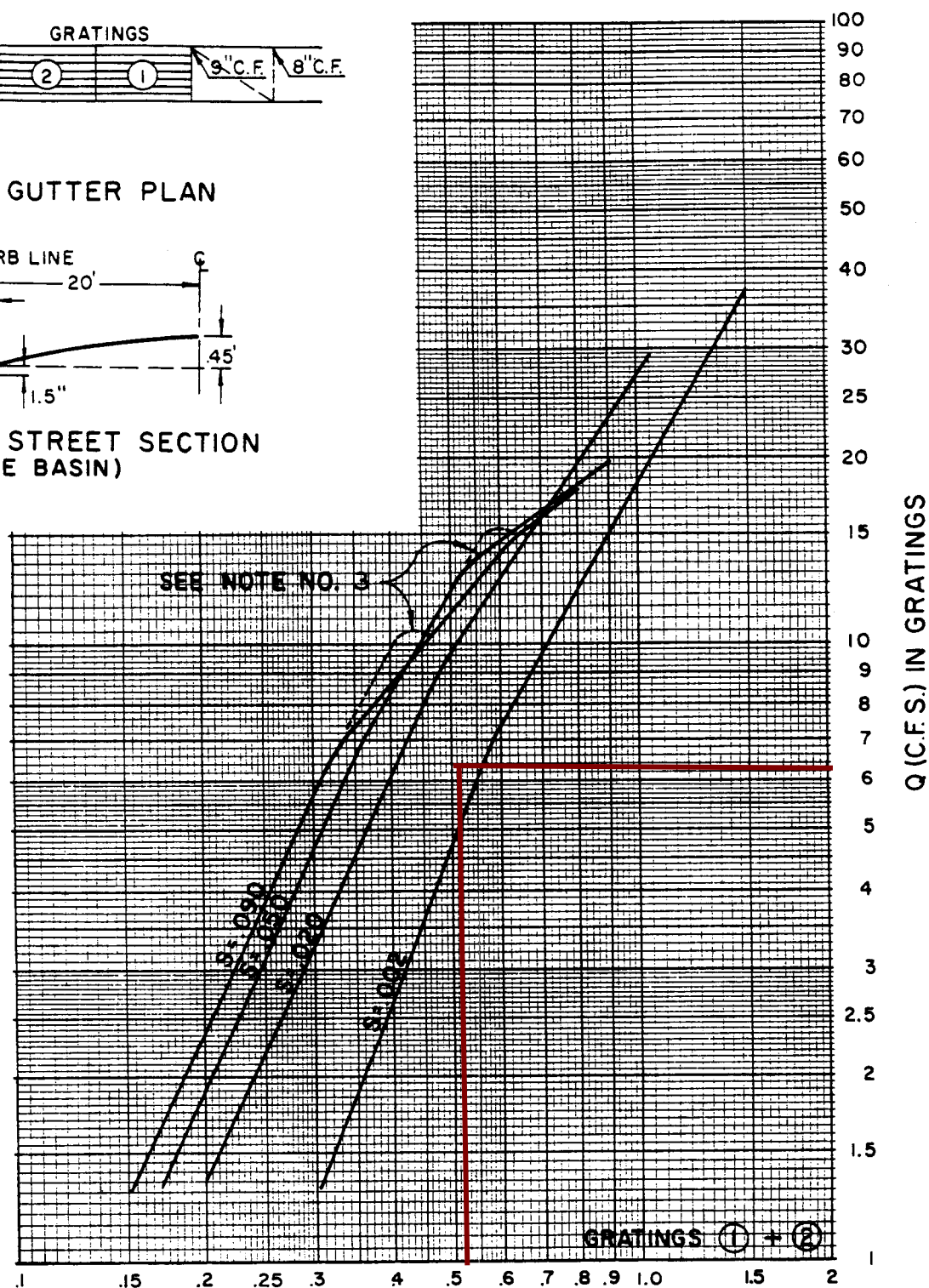
GRATING CAPACITIES
To Be Used For C.B. Nos. 4, 5 & 7



GRATING & GUTTER PLAN



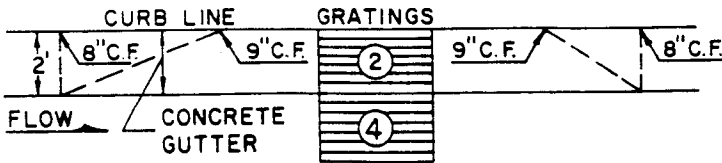
TYPICAL HALF STREET SECTION
(ABOVE BASIN)



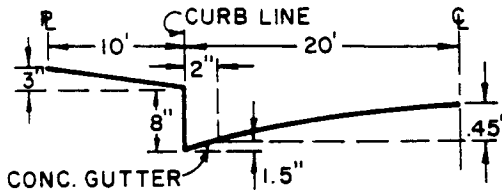
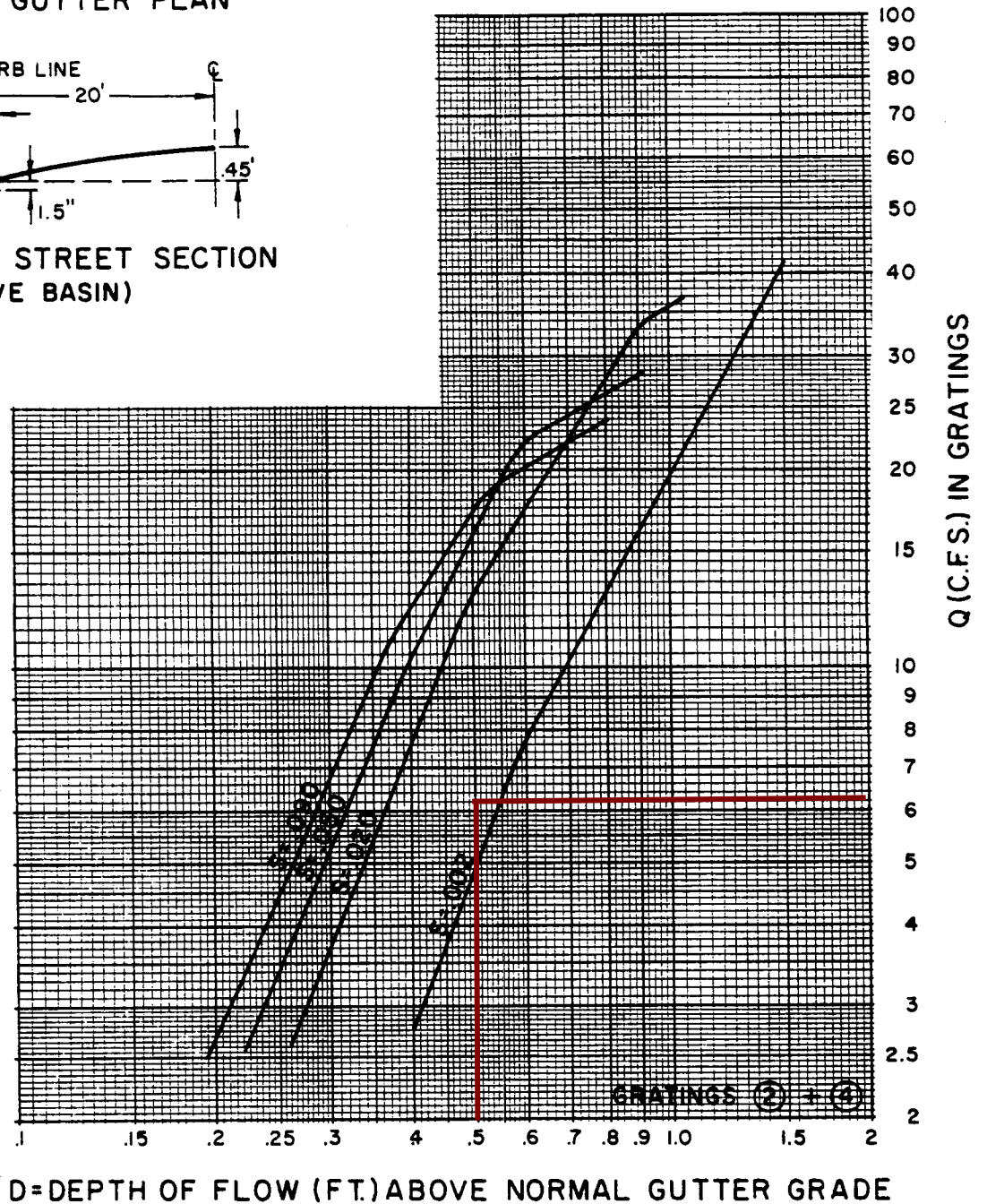
D=DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

Los Angeles County Flood Control District

GRATING CAPACITIES
To Be Used For C.B. Nos. 4, 5 & 7



GRATING & GUTTER PLAN


TYPICAL HALF STREET SECTION
(ABOVE BASIN)


Los Angeles County Flood Control District

GRATING CAPACITIES
To Be Used For C.B. Nos. 4, 5 & 7

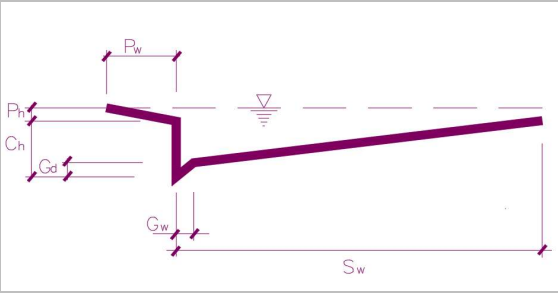
30FT HALF STREET FLOW CALCULATIONS

Given:

Half Street CL to Curb	Sw	20 Ft
Street X-Slope	Cs =	0.02 Ft/Ft
Gutter Width	Gw =	2 Ft
Gutter Depth	Gd =	0.17 Ft
Parkway width	Pw =	10 Ft
Curb Height	Ch =	0.5 Ft

Slope of Street	s =	0.005 Ft/Ft
Manning's Coeficient	n=	0.015

Then:	Ph =	0.2
	Ch-Gd =	0.33
	Ch-Gd+Ph	0.53
	Sw1	16.5
	Sw2	26.5



ROW Street Capacity

AREA	A =	7.53 SF
WETTED PERIMETER	Wp =	32.51 FT
R= A/P	R =	0.231607
	Q =	19.85 CFS

CF Street Capacity

AREA	A =	4.13 SF
WETTED PERIMETER	Wp =	22.51 FT
R= A/P	R =	0.183475
	Q =	9.31 CFS



Manufacture	Size	Product	Style	Model
EJ	24x24	45624032	bar/flat	V5624

RECTANGULAR DRAINAGE GRATE FLOW CALCULATOR

Depth of Flow d= 6 in

Up to 4-inches Weir Calculator $Q=3.33Lp(d)^{1.5}$

Grate Width Gw= 25.75 in
Grate Length Gl= 25.75 in
Perimeter Lp= 8.58 ft^2

Flow Rate Q= 0.00 cfs

Over 4-inches Orifice Calculator $Q=CA(2gd)^{.5}$

Coefficient C= 0.67
Opening Area Ao= 295 in ^2 (see Manufacture)
Gravity Acc g= 32.2 ft/sec^2

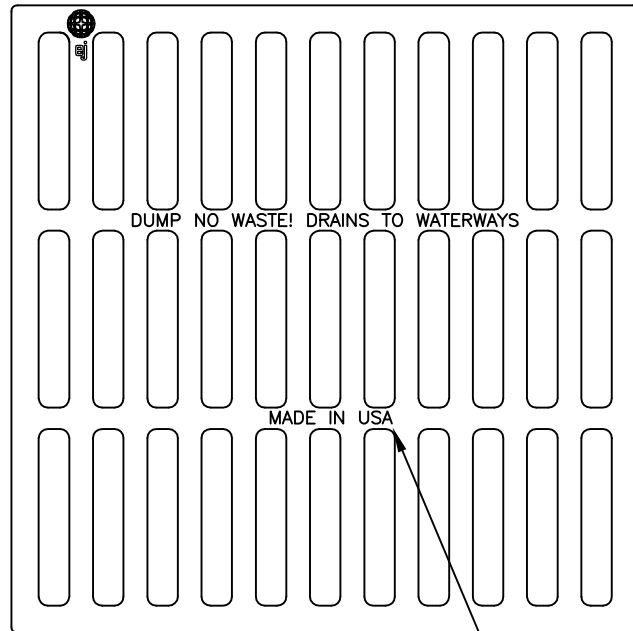
Flow Rate Q= 7.79

Depth
d (in)

1	0.69
1.5	1.26
2	1.94
2.5	2.72
3	3.57
3.5	4.50
4	6.36
4.5	6.75
5	7.11
5.5	7.46
6	7.79
6.5	8.11
7	8.41
7.5	8.71
8	8.99
8.5	9.27
9	9.54
9.2	9.64
10	10.06

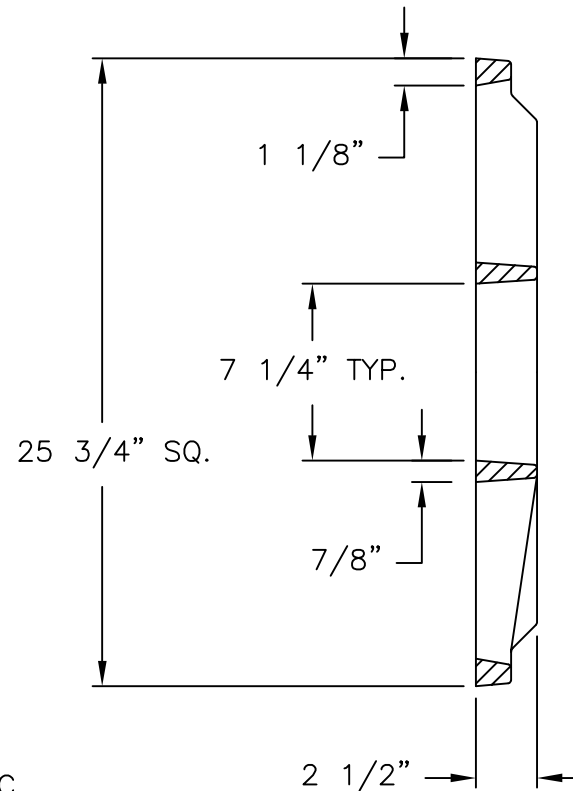
Q= 7.79

V5624 Grate

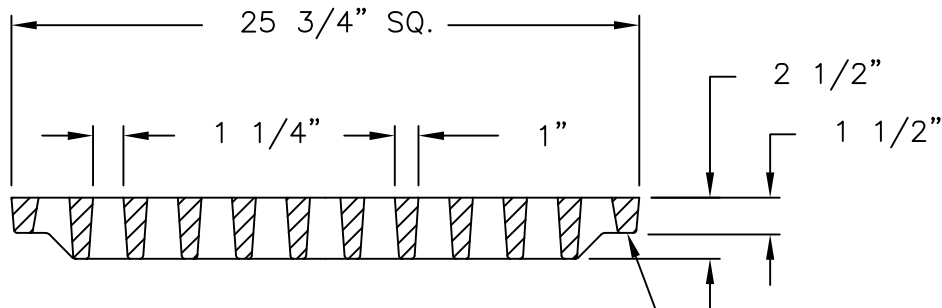


PLAN VIEW

1/2" TYP.
SHARP FACE GOTHIC



GRATE SECTION



GRATE SECTION

PROD NO.
V5624
MO/DY/YR X
ASTM A536 DI

Product Number

45624032

Design Features

- Materials
 - Ductile Iron (70-50-05)
- Design Load
 - Extra Heavy Duty
- Open Area
 - 295 sq in
- Coating
 - Undipped
- ✓ Designates Machined Surface

Certification

- ASTM A536
-
-
- Country of Origin: USA

Drawing Revision

03/27/2003 Designer: SBB
8/21/2018 Revised By: MAH

Disclaimer

Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

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Contact

800 626 4653
ejco.com

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*****
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*** |<----- ( 25.64' )----->| ***
***^^^^^W.S. ( 0.26' )^^^^^***
***
***
***
***
***
***
*****
**

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Channel Jc14, Ec5

Triangular Channel

Flowrate	6.750	CFS
Velocity	2.055	fps
Depth of Flow	0.256	feet
Critical Depth	0.257	feet
Freeboard	0.000	feet
Total Depth	0.256	feet
Width at Water Surface	25.640	feet
Top Width	25.640	feet
Slope of Channel	0.500	%
Left Side Slope	50.000	: 1
Right Side Slope	50.000	: 1
X-Sectional Area	3.287	sq. ft.
Wetted Perimeter	25.645	feet
AR^(2/3)	0.836	
Mannings 'n'	0.013	

```

*****
***
***
***
*** |<----- ( 22.51' )----->| ***
***^^^^^W.S. ( 0.23' )^^^^^***
***
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Channel Jc14, Ec5

Triangular Channel

Flowrate	6.750	CFS
Velocity	2.665	fps
Depth of Flow	0.225	feet
Critical Depth	0.257	feet
Freeboard	0.000	feet
Total Depth	0.225	feet
Width at Water Surface	22.511	feet
Top Width	22.511	feet
Slope of Channel	1.000	%
Left Side Slope	50.000	: 1
Right Side Slope	50.000	: 1
X-Sectional Area	2.534	sq. ft.
Wetted Perimeter	22.515	feet
AR^(2/3)	0.591	
Mannings 'n'	0.013	

INFILTRATION RATE CALCULATIONS

The observed infiltration rate (I_t) was converted from the data collected at the final percolation test interval using the Porchet Method equation presented below:

$$I_t = \frac{\Delta H \pi r^2 60}{\Delta t (\pi r^2 + 2 \pi r H_{avg})} = \frac{\Delta H 60 r}{\Delta t (r + 2 H_{avg})}$$

Where:

- I_t = observed infiltration rate, inches per hour
- ΔH = change in head over the time interval, inches
- Δt = time interval, minutes
- r = effective radius of the test hole H_{avg}

P-1 - The observed infiltration rate for Boring P-3 was calculated as follows:

- Time interval, Δt = 10 minutes
- Final depth to water, D_f = 101.7 inches
- Test hole radius, r = 4 inches
- Initial depth to water, D_0 = 93.0 inches
- The total depth of the test hole, D_t = 120 inches

The conversion equation is used:

$$I_t = \frac{\Delta H 60 r}{\Delta t (r + 2 H_{avg})}$$

$$H_0 = D_t - D_0 = 120 \text{ inches} - 93.0 \text{ inches} = 27.0 \text{ inches}$$

$$H_f = D_t - D_f = 120 \text{ inches} - 101.7 \text{ inches} = 18.3 \text{ inches}$$

$$\Delta H = \Delta D = H_0 - H_f = 27.0 \text{ inches} - 18.3 \text{ inches} = 8.7 \text{ inches}$$

$$H_{avg} = (H_0 + H_f) / 2 = (27.0 + 18.3) / 2 = 22.65 \text{ inches}$$

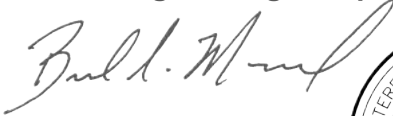
$$\text{P-3 } I_t = \frac{\Delta H 60 r}{\Delta t (r + 2 H_{avg})} = \frac{(8.7 \text{ in})(60 \text{ min/hr})(4 \text{ in})}{10 \text{ min } ((4 \text{ in} + 2 (22.65 \text{ in})))} = 4.24 \text{ in/hr}$$

Summary of Results				
Test Boring	Boring Depth (inches)	Soil Type	Measured Percolation Rate (min/in)	Observed Infiltration Rate (in/hr)
P-3	120	Silty Sand (SM)	1.15	4.24

We appreciate this opportunity to be of service. Should you have questions, please contact our office.

Sincerely,

Merrell Engineering Company, Inc.



Brad S. Merrell, P.E.

President

R.C.E. 49423



Enclosure 1 – Site Vicinity Map and Google Earth Image

Enclosure 2 – Site Plan Indicating Test Boring Locations

Enclosure 3 – Percolation Test Data Sheet

April 27, 2022

Observed Infiltration Rates Derived Using the Porchet Method

Proposed Park, Warbler Road, East of Sheepcreek Road, Phelan, CA

MJ Project No. 3103.006.500

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