CASITAS MUNICIPAL WATER DISTRICT

Marion Walker Pressure Filtration Plant (MWPFP)

Emergency Generator and ATS Replacement

Specification No. 24-471

January 29, 2025

Bids will be received via email to bids@casitaswater.com

until Wednesday, February 26, 2025 at 2:00 p.m.

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NOTICE INVITING BIDS

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

Specification No. 24-471

Sealed bids for the above referenced project and specification will be received by the Casitas Municipal Water District up to 2:00 p.m. on Wednesday, February 26, 2025 via email to bids@casitaswater.com, at which time they will be opened and publicly read aloud via conference call. Bidders interested in participating in the conference call shall email Lindsay Cao at lcao@casitaswater.com to receive call-in information at least one hour prior to bid opening. **The lowest three bidders must deliver their entire bid package within 24 hours of the bid opening at the District's office located at 1055 N. Ventura Avenue, Oak View CA 93022. Failure to do so may result in disqualification.**

Each bid shall be made out on a form to be obtained from the Casitas Municipal Water District. Each bid must be accompanied by a certified check, a cashier's check, or by a bid bond executed by a corporate surety satisfactory to the Casitas Municipal Water District, in the sum of not less than ten (10) percent of the total amount of the bid, as a guarantee that the Bidder will enter into the proposed contract, if it is awarded to them. The guarantee will be forfeited, should the Bidder to whom the contract is awarded fail to enter into the contract.

In accordance with the provisions of Section 1770-1784 of the California Labor Code, the Casitas Municipal Water District has ascertained the general prevailing rate of wages applicable to the work to be done. It shall be mandatory upon the Contractor to whom the contract is awarded, and upon the subcontractor(s) under them, to pay not less than the specified rates to all laborers and mechanics employed by them in the execution of the contract. The wage scale can be obtained on the internet at www.dir.ca.gov/dlsr/statistics_research.html.

All bidders and their subcontractors shall be registered with the California Department of Industrial Relations (DIR). Failure of the bidder or subcontractors to be registered with the DIR shall render their bid as non-responsive and will be rejected except where State code provides for exceptions to the registration requirements. All Contractors and their subcontractors shall furnish electronic certified payroll records directly to the Labor Commissioner, also known as Division of Labor Standards Enforcement.

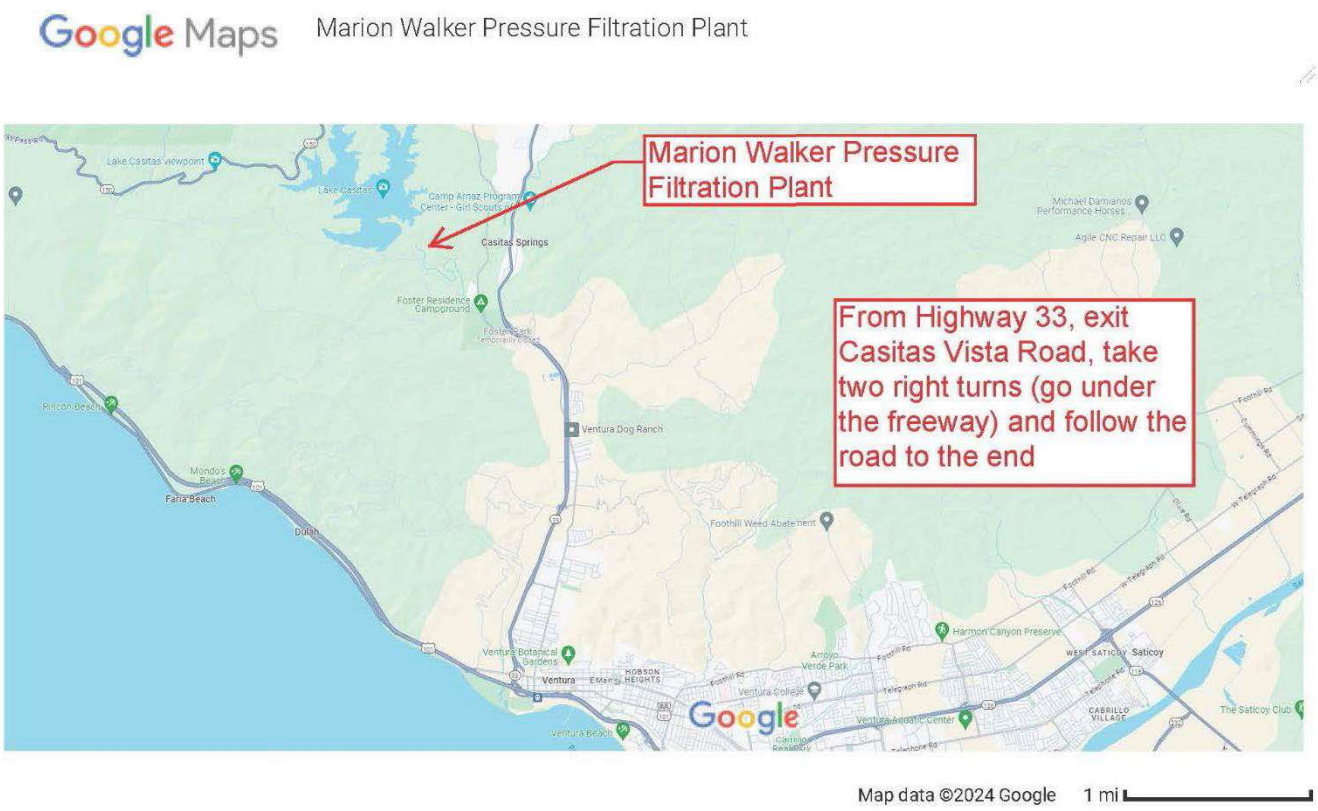
The District reserves the right to waive any formalities which, in the opinion of the Board of Directors, do not materially affect the relationship of the various proposals. The District reserves the right to retain all bids for a period of sixty (60) days and to reject any and all bids for any reason at the sole discretion of the District, with or without cause.

The contract documents shall consist of this Notice Inviting Bids, the Instructions to Bidders, Formal Proposal with Bidding Sheet and Bidder's Plan for Construction, Form of Agreement, Specifications and Drawings, and any changes made by issuance of a supplemental notice.

A mandatory pre-bid conference and site visit is scheduled for this project at Marion R. Walker Pressure Filtration Plant, 1892 Casitas Vista Road, Ventura, CA 93001 (type 1273 Casitas Vista Road, Ventura, CA 93001 into Google Maps) on Wednesday, February 12, 2024, at 10:00 a.m. PST. Bids will not be accepted from bidders who were not represented at the pre-bid meeting and site visit.

A complete bid package (plans and specifications) may be examined and downloaded free of charge from our website at: https://www.casitaswater.org/i-want-to/do-business-with-cmwd

Bidders may contact Lindsay Cao at lcao@casitaswater.com with any questions.



INSTRUCTIONS TO BIDDERS

Proposal. The proposal shall be submitted on the separate bid forms accompanying these specifications, designated "Proposal" and made a part of these specifications. The proposal shall be submitted via email to bids@casitaswater.com and shall be endorsed with the name of the project as set forth in the Notice Inviting Bids.

The sealed proposals will be publicly opened and read via conference call at the time stated in the Notice Inviting Bids. Bidders, or their authorized agents, are invited to be present and shall request call-in information from Lindsay Cao at lcao@casitaswater.com at least one hour prior to bid opening. **The three lowest bidders must deliver their hardcopy bid to the District office at 1055 N. Ventura Avenue, Oak View CA 93023, within 24 hours of the bid opening. Failure to do so may result in disqualification.**

The proposal shall give the price, both in words and in figures, for which the Bidder proposes to do the work required by the Specifications and the accompanying Drawings. In the event of disagreement between words and figures, the words will govern and the figures will be disregarded. In the event the unit price and the total amount named by any Bidder for any item are not in agreement, the unit price shall govern and the totals shall be corrected to conform thereto. The Bidder shall fill out all the blanks of the proposal forms as therein required.

Unauthorized conditions, limitations, or provisions attached to a proposal will render it informal, and may cause its rejection. The completed proposal forms shall be without interlineations, alterations, or erasures. Alternate proposals will not be considered unless asked for. No oral or telephonic proposals or modifications will be considered.

The District reserves the right to waive any informalities which, in the opinion of the Board of Directors, do not materially affect the relationship of the various proposals. The District reserves the right to reject any and all bids for any reason at the sole discretion of the District, with or without cause.

The proposal may be withdrawn upon request by the Bidder without prejudice to themselves prior to, but not after, the time fixed for opening of bids, provided the request is in writing, has been executed by the Bidder or their duly authorized representative, and is filed with Casitas Municipal Water District.

Proposal Signature. If the proposal is made by an individual, it shall be signed and proposer's full name and address shall be given; if it is made by a partnership, it shall be signed with the partnership name by a member of the firm, who shall sign their own name, and the name and address of each member shall be given; and if it is made by a corporation, the name of the corporation shall be signed by its duly authorized officer or officers, attested by the corporate seal, and the names and titles of all officers of the corporation shall be given.

Protests. Protests by unsuccessful bidders to the selection of award shall be submitted in writing to the Engineering Manager within five business days of the bid opening. Failure to submit a timely written protest to the Engineering Manager shall bar consideration of such protest. The Engineering Manager shall consider

the merits of the protest and make a determination that shall be immediately communicated to the protesting bidder. Any appeal concerning the determination of the Engineering Manager shall be submitted in writing to the General Manager no later than five business days after the original determination is communicated to the Bidder. The General Manager shall hear the documented arguments of the protest and a written determination will be made and returned to the affected bidder(s). Determinations by the General Manager concerning protests are final.

Bidders' Plan for Construction. As part of the proposal, Bidders must furnish a detailed statement of the plan or layout for performing the work. As preparation for the foregoing, each Bidder shall examine carefully the site of the proposed work and the contract documents therefore. It will be assumed the Bidder has investigated, and is satisfied as to, the conditions to be encountered; the characters, quality, and quantities of work to be performed; the quality and quantities of the materials to be furnished, and the requirements of the contract, specifications, and drawings.

Subcontracts. Subcontracts will be permitted, subject to the following provisions. No subcontract will be permitted which has the effect of avoiding the residence or wage requirements, or any other provision of the main contract. Individual subcontractors, or members of the contracting or subcontracting organizations personally engaged upon the work, shall be subject to all the requirements of these specifications applicable to employees working for wages, including but not limited to wages, hours of work, character of workmen and certified payrolls.

Reference is hereby made to the provisions of Chapter 2 of Division 5 of Title 1 of the Government Code of the State of California, commencing with Section 4100, also known as the "Subletting and Subcontracting Fair Practices Act", which is incorporated herein and made a part hereof by reference, and the Contractor is bound thereby and shall be made subject to the consequences named in sections 4110 and 4111 of said Act, in the event of their violation thereof. Each Bidder shall, in their bid or offer, set forth: (1) the name and the location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement, in an amount in excess of one-half of one percent of the Contractor's total bid, or a subcontractor licensed by the State of California who, under subcontract to the prime Contractor, specifically fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the Prime Contractor's total bid; and (2) the portion of the work which will be done by each such subcontractor under said Act. The Contractor shall list only one subcontract for each such portion as defined by the Contractor in their bid. If the Contractor fails to specify a subcontractor, or if the Contractor specifies more than one subcontractor for the same portion of the work to be performed under this contract in excess of one-half of one percent of the Contractor's total bid, the Contractor agrees they are fully qualified to perform that portion, and they shall perform that portion themselves.

Bidders must furnish as a part of the proposal, a complete listing of names, addresses, Department of Labor Relations Registration Number (DIR No.) and Contractor license number of all subcontractors who will perform work in an amount in excess of one-half (1/2) of one percent (1%) of the total bid price, and a statement of the work which will be done by each subcontractor. The required statement shall be on the form of Bidder's Statement of Subcontractors, accompanying these specifications.

Prevailing Rate at Per Diem Wages. In accordance with the provisions of Section 1770-1784 of the California Labor Code, the District has ascertained the general prevailing rates of wages applicable to the work to be done. It shall be mandatory upon the Contractor to whom the contract is awarded, and upon any subcontractor under Contractor, to pay not less than the specified rates to all laborers, surveyors and mechanics employed by Contractor in the execution of the contract. The wage can be viewed on the internet at www.dir.ca.gov/dlsr/statistics_research.html. Final payment for services provided shall not be distributed until receipt of proof of prevailing wage payments.

The Contractor and all subcontractors shall be subject to Executive Order 12549, "Debarment and Suspension" and Department of Commerce regulations published at 15 CFR Part 26, Subparts A through E, "Governmentwide Debarment and Suspension (Nonprocurement)" for a drug-free workplace.

Disqualification of Bidders. More than one proposal from an individual, partnership, corporation, or association under the same or different names will not be considered. Reasonable grounds for believing any Bidder is interested in more than one proposal for the work contemplated will cause the rejection of all proposals in which said Bidder is interested. If there is reason for believing collusion exists among Bidders, all bids will be rejected, and none of the participants in such collusion will be considered in future proposals.

Return of Proposal Guarantee. Proposal guarantees will be held until the contract has been executed. They will be returned to the respective Bidders whose proposals they accompany upon request.

Insurance and Bonds. The Bidder to whom award is made shall promptly secure Workmen's Compensation Insurance, in accordance with the provisions of the California Labor Code and all amendments thereto, and also shall furnish to the District certificate of insurance showing they have taken out the insurance of the kinds and in the amounts required under the specifications. The successful Bidder shall also promptly secure, with a reasonable corporate surety or corporate sureties, satisfactory bonds conditioned upon faithful performance by the said Bidder of all requirements under the Contract and upon the payment of claims of materialmen and laborers there under. Refer to Summary of Insurance, Bond and Payment Requirements for Various Construction Contracts attached.

Licensing of Contractors. All Contractors submitting bids shall be licensed in accordance with the provisions of Chapter 9, Division 3, of the Business and Professions Code of the State of California. Effective January 1, 1990, Contractors submitting bids must state, under penalty of perjury, the Contractor's license number and expiration date. Any bid not containing this information shall be considered non-responsive and shall be rejected by Casitas (Business & Professions Code 7028.15). The license required for this project is either an **A-General Engineering Contractor or C-10 Electrical.**

Failure of the Bidder to meet either of the criteria above shall deem the bid proposal non-responsive and the bid proposal will be rejected.

Supplemental Notices. Full consideration shall be given to all Supplemental Notices in the preparation of Bids, as Supplemental Notices form a part of the Contract Documents. Bidders shall verify the number of Supplemental Notices in the bid. Failure to acknowledge may cause the Bid to be rejected.

Pre-bid Information Requests. All requests for information and questions regarding this bid proposal, the specifications, permits, or the plans shall be submitted to the District. **The request can be emailed to Lindsay Cao, lcao@casitaswater.com**. The District will make a reasonable attempt to respond to the request prior to the bid opening. All questions shall be submitted via email by **4:00 p.m. on Monday, February 17, 2025.** If questions are received after that time they will not be answered.

Award of Contract. The award of the contract by the Board of Directors of the Casitas Municipal Water District, if it is awarded, will be to the lowest responsible Bidder or Bidders whose proposal complies with all requirements presented herein. Casitas maintains the right to reject any and all bids for any reason and to waive minor irregularities.

Execution of Contract. The Bidder to whom award is made shall execute a written contract with the Casitas Municipal Water District in the form of agreement provided, and shall furnish certificate of Workmen's Compensation Insurance and good and approved bonds as required in the preceding paragraphs, within seven (7) days from the date of the mailing of a notice from the Casitas Municipal Water District to the Bidder, to the address given by them, of the acceptance of their proposal. At this time Contractor shall also provide District with a completed IRS W-9 form (Request of Taxpayer Identification Number and Certification.)

Failure or refusal to enter into a contract as herein provided, or to conform to any of the stipulated requirements in connection therewith, shall be just cause for the annulment of the award and the forfeiture of the proposal guarantee. If the successful Bidder refuses or fails to execute the contract, the Casitas Municipal Water District may award the contract to the second lowest responsible Bidder.

Notice to Proceed shall be issued by the District within three (3) days of the receipt of the bonds, insurance and agreement documents satisfactory to the District and the execution of the Agreement by the District. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the District and the Bidder. If the Notice to Proceed has not been issued within the period stated herein, the Bidder may terminate the Agreement without further liability on the part of either party.

Time for Completion and Forfeiture Due to Delay

The work for this contract shall be completed within 100 calendar days from and after the date of the Notice to Proceed. Pursuant to Government Code 53069.85, forfeiture for each day completion is delayed beyond the time allowed will be at a rate of $1,000 per day.

PROPOSAL

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
Specification No. 24-471

TO: Casitas Municipal Water District
1055 Ventura Avenue, Oak View, California 93022

The undersigned proposes to furnish all materials and labor and provide all necessary tools and machinery for the completion of the above referenced project and specification, and to perform and complete all the work in the manner set forth, described, and shown in the specifications or on the drawings for the work and in the form of agreement.

The Bidder agrees that, upon receipt of written notice of the acceptance of this proposal within seven (7) days after the opening of the bids, Bidder will execute the contract in accordance with the proposal as accepted and furnish the required bonds and will secure the required insurance, all within seven (7) days from the date of mailing of said notice of acceptance to them at their address as given below; and that, upon failure to do so within said time, then the proposal guarantee accompanying this proposal shall become the property of the Casitas Municipal Water District as liquidated damages for such failure, and shall be deposited as monies belonging to the Casitas Municipal Water District. If said Bidder shall execute the contract, furnish the required bonds, and secure the required insurance, the proposal guarantee check or bond shall be returned to them within five (5) days thereafter.

The Bidder declares they have read the Notice Inviting Bids and the Instructions to Bidders, and agrees to all the stipulations contained therein; they have examined the site of the work, the form of agreement, the specifications and the drawings therein referred to; they propose and agree, in the event their bid as submitted in the attached Bid Schedule be accepted, to enter into a contract to perform all the work mentioned in the agreement and the specifications, and to complete the same within the time stipulated therein; and they will accept in full payment therefore the amount named in said Bid Schedule.

The Bidder further declares the surety or sureties named in the space provided below have agreed to furnish bonds in the form and amounts set forth in the Instructions to Bidders, in the event the contact is awarded on the basis of this proposal.

Dated: _____ Bidder _____

(Corporate Seal) By: _____

Title: _____

Telephone No. _____

Corporation organized under

the laws of the State of _____

Bidder's post office address:

_____

_____

Contractor's License Number:

_____

Date of Expiration: _____

Surety or Sureties agreeing to furnish bond:

Names and addresses of all members of the partnership, or names and titles of all officers of the corporation:

_____ _____

_____ _____

_____ _____

_____ _____

BID SCHEDULE

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

Specification No. 24-471

Schedule of prices for all work, materials and site cleanup for the above-mentioned project and specification in accordance with these specifications. Any item not specifically mentioned shall be considered incidental to the item to which it pertains. The Bidder shall list prices for all bid items. Bids received which do not list prices in succession shall be rejected.

Bid Item #	Quantity & Unit	Description & Price in Words	Unit Price
1	LS	Mobilization/Demobilization for the lump sum price of: _____Dollars.	$_____/LS
2	LS	Site Clearing, Demolition, and Relocation required to execute the project work for the lump sum price of: _____Dollars.	$_____/LS
3	LS	Environmental controls to comply with federal, state, and local regulations pertaining to water, air, solid waste, and noise pollution (including preparation of Environmental Protection Plan) for the lump sum price of: _____Dollars.	$_____/LS
4	LS	Removing and salvaging the existing Diesel Generator, providing the cables penetration in the wall and ATS (Automatic Transfer Switch) for Temporary Generator for the lump sum price of: _____Dollars.	$_____/LS
5	LS	Generator and ATS Foundation Earthwork for the lump sum price of: _____Dollars.	$_____/LS
6	LS	Generator and ATS Foundation, running underground conduits, installing grounding wire, and ground rods for the lump sum price of: _____Dollars.	$_____/LS

Bid Item #	Quantity & Unit	Description & Price in Words	Unit Price
7	LS	Concrete, AC Pavement, and Miscellaneous Concrete Work for the lump sum price of: _____Dollars.	$_____/LS
8	LS	Furnish and Install Protection Posts for the lump sum price of: _____Dollars.	$_____/LS
9	LS	Install Diesel Generator package for the lump sum price of: _____Dollars.	$_____/LS
10	LS	Install ATS for the lump sum price of: _____Dollars.	$_____/LS
11	LS	Furnish and Install Wiring, Conduit, Grounding termination, and Misc. Electrical work, and demolish of the existing ATS for the lump sum price of: _____Dollars.	$_____/LS
12	LS	Facility Start-Up, Commissioning, Closeout Documents, and Training for the lump sum price of: _____Dollars.	$_____/LS

TOTAL BID AMOUNT (Items 1 – 12) $_____ (Figures)

_____

_____(Words)

The above quantities are based on a lump sum price, measurement and payment for each bid item per Part D of these General Specifications. Bidder will not be released on account of errors. When a discrepancy occurs between the written price and the number listed, the written price shall govern. The Bidder understands that the District reserves the right to reject any or all bids, and to waive any informalities in the bidding. Pursuant to and in compliance with the Notice Inviting Bids and the other documents relating thereto, the undersigned bidder, being fully familiar with the terms of the Contract Documents, local conditions affecting the performance of the contract, the character, quality, quantities, and scope of the work, and the cost of the work at the place where the work is to be done, hereby proposes and agrees to perform within the time stipulated in the contract, including all of its component parts and everything required to be performed, and to furnish any and all of the labor, material, tools, equipment, transportation, services, permits, utilities, and all other items necessary to perform the contract and

complete in a conformity with the plans and specifications and other contract documents, including **Addenda Nos. ____, ____, ____, and ____,** for the prices hereinafter set forth.

Date: _____

(**CORPORATE SEAL**)

BIDDER:_____

By:_____

Title:_____

License No. _____Expiration Date: _____

License Classifications: _____DIR No. _____

Telephone. No: _____Cell No_____

Email:_____

Address:_____

_____

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BIDDER'S PLAN FOR CONSTRUCTION

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
Specification No. 24-471

1. The location for the proposed work was examined on _____(Date)

by _____ on behalf of the Bidder.

(Name and Title)

2. Explain briefly your plan and tentative schedule for performing the proposed work.

BIDDER'S STATEMENT OF SUBCONTRACTORS

The bidder is required to state the name and address of each subcontractor who will perform work in an amount in excess of one-half (1/2) of one percent (1%) of the total bid price and the portion of the work which each subcontractor will do.

The undersigned submits herewith a list of subcontractors whom they proposes to employ on the work, with the proper firm name and business address of each and a statement of the work or bid item which will be done by each subcontractor.

Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )

BIDDER'S BOND

KNOW ALL MEN BY THESE PRESENTS,

That we _____

_____

_____, as PRINCIPAL,

and _____

_____as SURETY,

are held and firmly bound unto the Casitas Municipal Water District, hereinafter called the District, in the penal sum of TEN PERCENT (10%) OF THE TOTAL AMOUNT OF THE BID of the Principal above named, submitted by said Principal to the Casitas Municipal Water District, for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

In no case shall the liability of the surety hereunder exceed the sum of $_____

_____

THE CONDITIONS OF THIS OBLIGATION ARE SUCH,

That whereas the Principal has submitted the above-mentioned bid to the Casitas Municipal Water District, for certain construction specifically described as **MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT, Specification No. 24-471** which bids are to be opened at the office of Casitas Municipal Water District on **Wednesday, February 26, 2025, at 2:00 p.m.**

NOW, THEREFORE, if the aforesaid Principal is awarded the contract and, within the time and manner required under the heading Instructions to Bidders, after the prescribed forms are presented to them for signature, enters into a written contract, in the form set forth in said specifications, in accordance with the bid, and files the two bonds with the District, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by Instructions to Bidders and Certificate of Insurance for Workmen's Compensation and Contractor's liability insurance, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.

Bidder's Bond (Continued)

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

WHEREOF, we have hereunto set our hands and seals this _____ day of _____ _____, 2025.

_____

Principal

_____

Surety

By _____

(SEAL)

Signatures of those executing for the surety must be properly acknowledged.

NONCOLLUSION DECLARATION

(MUST BE SUBMITTED WITH BID)

The undersigned declares:

I am the _____ of _____,
(Title) (Company)
the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted their or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on_____, 2025.
(Date)

at _____, _____.
(City) (State)

_____

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AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____ in the year 2025 by and between Casitas Municipal Water District, hereinafter designated as the District, and_____hereinafter designated as the Contractor.

WITNESSETH: That the parties hereto do mutually agree as follows with respect to the project known as **MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT, Specification No. 24-471**.

ARTICLE I. For and in consideration of the payment of _____ _____Dollars ($_____) in conformance with the specifications hereinafter mentioned, the Contractor agrees with the District to construct the aforementioned project and to perform and complete in a good and workmanlike manner all the work pertaining thereto shown on the Drawings and described in the Specifications therefor, to furnish at its own cost and expense all tools, equipment, labor, and materials necessary therefor, except such materials as in the said specifications are stipulated to be furnished by the District, and to do everything required by this Agreement and the said Specifications and Drawings.

ARTICLE II. For the same consideration set forth in Article I above, Contractor agrees to furnish all said materials and labor, furnishing and removing all plants, temporary work or structures, tools and equipment, and doing all the work contemplated and embraced in this Agreement, also to be responsible at its own expense for all loss and damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen difficulties which may arise or be encountered in the prosecution of the work until its acceptance by the District, and for all risks of every description connected with the works, and also for all expenses incurred by or in consequence of the suspension or discontinuance of works, except such as in the said Specifications are expressly stipulated to be borne by the District, and for well and faithfully completing the work and the whole thereof, in the manner shown and described in the said Drawings and Specifications and in accordance with the requirements of the Engineer under them, the District will pay and the Contractor shall receive in full compensation thereof the prices for the several items named in the Bidding Sheet of the Proposal.

ARTICLE III. The District hereby promises and agrees with the said Contractor to employ, and does hereby employ the said Contractor to provide the materials and to do the work according to the terms and conditions herein contained and referred to for the price aforesaid, and hereby contracts to pay the same at the time, in the manner and upon the conditions set forth in the Specifications; and the said

parties for themselves, their heirs, executors, administrators, successors and assignees do hereby agree to the full performance of the covenants herein contained.

ARTICLE IV. The Notice Inviting Bids, the Instructions to Bidders, the Proposal, the Specifications and the Drawings mentioned therein, and all addenda issued by the District with respect to the foregoing prior to the opening of bids, are hereby incorporated in and made part of this Agreement.

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

CASITAS MUNICIPAL WATER DISTRICT

By:_____
President

ATTEST:

_____

Secretary

Approved as to form:

_____

Attorney

Dated:_____

CONTRACTOR

By _____

Title _____

BOND FOR FAITHFUL PERFORMANCE

KNOW ALL MEN BY THESE PRESENTS,

We _____

_____

hereinafter referred to as Contractor, as principal, and _____

_____, as surety,

are held and firmly bound unto the Casitas Municipal Water District, OAK VIEW, California, in

the sum ONE HUNDRED PERCENT (100%) OF THE TOTAL AMOUNT OF THE BID of the Principal above named, submitted by said Principal to the Casitas Municipal Water District, for the work described below, for the payment of which sum in lawful money of the United States, 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 presents.

The condition of the foregoing obligation is such:

whereas, said Contractor has been awarded and is about to enter into a contract with the Casitas Municipal Water District, for construction of the project known as **MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT, Specification No. 24-471**, and is required by said District to give this bond in connection with the execution of the contract. The total bond shall be equal to the funds budgeted for the total of this contract work.

NOW, THEREFORE, if the said Contractor shall well and truly do and perform all the covenants and obligations of said contract on their part to be done and performed at the times and in the manner specified herein, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect;

PROVIDED, any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of said contract shall not in any way release the Contractor or the surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such alterations or extensions of the contract is hereby waived by the surety.

WITNESS our hands this _____ day of _____, 2025.

_____

Contractor

By:_____

_____

Surety

By:_____

Approved as to form and execution:

_____

Attorney

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That we _____

as principal, and _____,

as surety, are held and firmly bound unto the Casitas Municipal Water District, Oak View, California, in the

sum of _____

_____Dollars ($_____)

lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the above obligation is such that:

Whereas, said principal has been awarded and is about to enter into a contract with the Casitas Municipal Water District, for construction of the project known as **MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT, Specification No. 24-471** and is required by said District to give this bond in connection with the execution of the contract.

NOW, THEREFORE, if said principal as Contractor in said contract, or subcontractors, fails to pay for any 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 any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, said surety will pay for the same, in an amount not exceeding the sum specified above, and also, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the court. This bond shall insure to the benefit of any and all persons entitled to file claims under Section 11929 of the Code of Civil Procedure of the State of California.

PROVIDED, that any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of said contract shall not in any way release either the Contractor or the surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such alterations or extensions of the contract is hereby waived by the surety.

WITNESS our hands this _____ day of_____, 2025.

_____

Contractor

By _____

_____

Surety

By _____

Approved as to form and execution:

_____

Attorney

SUMMARY OF INSURANCE, BOND & PAYMENT REQUIREMENTS

FOR VARIOUS CONSTRUCTION CONTRACTS

	Informal Under $35,000	Formal $35,000 &Over
Certificates of Insurance (CG 2010 Endorsement required)		
1. Workmen's Compensation	Yes	Yes
2. Commercial, General & Auto Liability	Yes	Yes
a. For one person per accident	$1,000,000	$1,000,000
b. More than one person per accident	$1,000,000	$1,000,000
3. Property damage per accident	$1,000,000	$1,000,000
4. Thirty days written notice prior to cancellation	Yes	Yes
Bonds		
Bidder's Bonds	None	10%
Payment Bonds (Material and Labor)* (Projects bid by CMWD only)	None	100%
Performance Bonds* (Projects bid by CMWD only)	None	100%
Maintenance and Guarantee Provisions	Yes	Yes
Contracts		
Period for Final payment upon acceptance	15 Days	35 Days
Amount of Retention	-0-	5%
Progress Payment (if required, retain 5%)**	None	If Required
Final Cost Statement	None	Yes
Notice of Completion	None	Yes
Labor and Material Releases	Yes	Yes

* At the option of the District and depending upon the type of construction activity, payment bonds and/or performance bonds may be placed as a requirement on the job.

** If progress payments are required for a Purchase Order Contract, provisions therefor must be added.

NOTE: The above listed are the minimum requirements for all construction contracts. Provisions are included within the Terms and Conditions for Purchase Order Contracts which will be issued for all jobs under $35.000. Provisions should be included within the Specifications for all contracts $35,000 and over. **The United States (Bureau of Reclamation), Casitas Municipal Water District, their directors, officers, employees or authorized volunteers,** shall be named as additional insured as respects to all coverages listed above when the named insured is Lessee or Licensee of the Casitas Municipal Water District or when work is performed by the named insured for the Casitas Municipal Water District, and in both instances this coverage shall be primary. Casitas, in addition to Certificates of Insurance, shall be provided with the ISO CG 2510 Endorsement or insurer's equivalent.

In accordance with the provisions of Section 1770 of the California Labor Code, the District has ascertained the general prevailing rates of wages applicable to the work to be done. If shall be mandatory upon the Contractor to whom the contract is awarded, and upon any subcontractor under them, to pay not less than the specified rates to all laborers and mechanics employed by them in the execution of the contract. The wage scale is on the internet at www.dir.ca.gov/dlsr/statistics_research.html.

CERTIFICATE OF INSURANCE

3497674

ACORD CERTIFICATE OF LIABILITY INSURANCE — Date (mm/dd/yy)

Producer

NAME OF INSURANCE BROKER
ADDRESS
TELEPHONE #

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURER A: National Union Fire Insurance Company of Pittsburgh, PA
INSURER B: SeaBright Insurance Company
INSURER C:
INSURER D:
INSURER E:

Insured

NAME OF INSURED
ADDRESS
TELEPHONE #

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE MM/DD/YY	POLICY EXPIRATION DATE MM/DD/YY	LIMITS	
A	GENERAL LIABILITY ☐ COMMERCIAL GENERAL LIAB ☐ CLAIMS MADE ☐ OCCUR GEN'L AGG LIMIT APPLIES PER ☐ POLICY ☐ PROJECT ☐ LOC				EACH OCCURRENCE	$
					FIRE DAMAGE (Any one fire)	$
					MED EXP (Any one person)	$
					PERSONAL & ADV INJURY	$
					GENERAL AGGREGATE	$
					PRODUCTS-COMP/OP AGG	$
						$
A	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS				COMBINED SINGLE LIMIT	$
					BODILY INJURY (Per person)	$
					BODILY INJURY (Per accident)	$
					PROPERTY DAMAGE (Per accident)	$
	GARAGE LIABILITY ☐ ANY AUTO				AUTO ONLY - EA ACCIDENT	$
					OTHER THAN AUTO ONLY: EA ACC	$
					AGG	$
	EXCESS LIABILITY ☐ OCCUR ☐ CLAIMS MADE ☐ DEDUCTIBLE ☐ RETENTION $				EACH OCCURRENCE	$
					AGGREGATE	$
						$
						$
						$
B	WORKERS' COMPENSATION & EMPLOYERS' LIABILITY				☐ STATUTORY LIMIT ☐ OTHER	
					EL EACH ACCIDENT	$
					EL DISEASE - EA EMPLOYEE	$
					EL DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

Additonal Insureds: Insurance coverage is primary as respects the United States of America (USBR). Casitas Municipal Water District, its directors, officers, employees, agents and volunteers.

EXAMPLE

CERTIFICATE HOLDER

Casitas Municipal Water District

The United States of America (USBR)
1055 N Ventura Avenue
Oak View, CA 93022

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES. * 10 Days for Non-Payment of Premium

AUTHORIZED REPRESENTATIVE

ACORD 25-S (7/97) © ACORD CORPORATION 1988

PART B - GENERAL CONDITIONS

1. Definitions.

1.1 Whenever the words defined in this article occur in these Specifications, or in any other contract document, they shall have the meaning here defined:

1.2 The word "specifications" shall include these General Conditions, the Special Conditions and the applicable portions of the Standard Specifications. The form of these Specifications is intended to provide for all of the work performed for Casitas Municipal Water District.

1.3 The word "District" shall mean the Casitas Municipal Water District.

1.4 The word "Board" shall mean the Board of Directors of the Casitas Municipal Water District.

1.5 The words "General Manager" shall mean the person holding the position or acting in the capacity of General Manager of the Casitas Municipal Water District.

1.6 The word "Engineer" shall mean the General Manager, or their duly authorized representative.

1.7 The word "Contractor" shall mean the Contractor in the agreement for the construction of the work and/or the furnishing of materials and/or equipment herein specified, the legal representative, or the agent of said party.

1.8 The word "Subcontractor" shall mean one who, as a subcontractor, performs at the site of the work some part of the Contractor's obligation, the legal representative, or the agent therefor.

1.9 The words "Standard Specifications" shall mean the provisions of the latest edition of the Standard Specifications for Public Works Construction (SSPWC) with all supplements, prepared and promulgated by the Southern California Chapters of the American Public Works Associated and Associated General Contractors of America. Part one of the SSPWC is hereby deleted.

1.10 The term “R & R” shall mean remove and replace.

2. Contract Documents.

2.1 The Notice Inviting Bids, Instructions to Bidders, Proposal Bonds, General Conditions, Special Conditions, Measurement and Payment Technical Specifications and Drawings, with the Agreement, supplemental notices, Notice to Proceed, permits and change orders shall be considered as incorporated in the contract. The contract documents are complementary, and what is called for in one shall be as binding as if called for by all. The intent of the contract documents is to provide for the execution and completion of a finished piece of work. The Contractor shall provide all labor and services and furnish all materials and equipment as necessary, except those items definitely stipulated in the Specifications or Drawings to be furnished by the District. Anything shown in the Drawings and not the Specifications, or in

the Specifications and not the Drawings, shall be performed by the Contractor as though shown in both the Drawings and the Specifications.

2.2 The Drawings and the Specifications show conditions as they exist, to the best knowledge and belief of the District. The Contractor shall not be relieved of any liability or responsibility under this contract, and the District or any of its officers shall not be liable for any loss sustained by the Contractor because of any variation between conditions as shown on the Drawings and the actual conditions revealed during the progress of the work, except as provided in Section 4215 of the Government Code.

3. Precedence of Contract Documents.

3.1 Should conflicts occur between Contract Documents, the document highest in precedence shall control. The precedence shall be:

3.1.1 Permits from other agencies as may be required by law.
3.1.2 Proposal.
3.1.3 Special Conditions and Measurement and Payment.
3.1.4 Technical Conditions.
3.1.5 General Conditions
3.1.6 Contract Drawings.
3.1.7 Standard Plans.
3.1.8 Standard Specifications.
3.1.9 Reference Specifications.

3.2 Change orders, supplemental agreements and approved revisions to plans and specifications will take precedence over documents listed above. Detailed plans shall have precedence over general plans.

4. Indemnification of District.

Contractor shall indemnify and hold harmless and defend the United States Bureau of Reclamation, the District, their directors, employees, agents or volunteers, and each of them from and against:

4.1 Any and all claims, demands, causes of action, damages, costs, expenses, losses or liabilities, in law or in equity, of every kind and nature whatsoever for, but not limited to, injury to or death of any person including District and/or Contractor, or any directors, officers, employees, agents or volunteers of District or Contractor, and damages to or destruction of property of any person, including but not limited to, District and/or Contractor and their directors, officers, employees, agents or volunteers, arising out of or in any manner directly or indirectly connected with the work to be performed under this agreement, however caused, regardless of any negligence of District or its directors, officers, employees, agents or volunteers, except the sole negligence or willful misconduct or active negligence of District or its directors, officers, employees, agents or volunteers.

4.2 Any and all actions, proceedings, damages, costs expenses, penalties or liabilities, in law or equity, of every kind or nature whatsoever, arising out of resulting from, or on account of the violation of any governmental law or regulation, compliance with which is the responsibility of Contractor.

Contractor shall defend, at Contractor's own cost, expense and risk, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against District or District's directors, officers, employees, agents or volunteers.

Contractor shall pay and satisfy any judgment, award or decree that may be rendered against District or its directors, officers, employees, agents or volunteers, in any such suit, action or other legal proceeding.

Contractor shall reimburse District and its directors, officers, employees, agents and/or volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided.

Contractor agrees to carry insurance for this purpose as set out in the specifications.

5. Insurance.

5.1 Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:

5.1.1 Coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:

5.1.1.1 Insurance Services Office Commercial General Liability coverage (Occurrence Form CG 0001).

5.1.1.2 Insurance Services Office Form Number CA 0001 (ed. 1/87) covering Automobile Liability, Code 1 (any auto).

5.1.2 The Contractor shall maintain limits no less than the following:

5.1.2.1 General Liability. One million dollars ($1,000,000) per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2501 or insurers equivalent endorsement provided to the district) or the general aggregate limit shall be twice the required occurrence limit.

5.1.2.2 Automobile Liability. One million dollars ($1,000,000 per accident for bodily injury and property damage combine single limit.

5.1.3 The general liability and automobile liability policies are to contain, or be endorsed to contain the following provisions:

5.1.3.1 The United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the Contractors, products and completed operations of the Contractor; premises owned,

occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the United States Bureau of Reclamation, Casitas Municipal Water District, its directors, officers, employees, agents and volunteers.

5.1.3.2 For any claims related to this project, the Contractor's insurance shall be primary insurance as respects the United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers. Any insurance or self-insurance maintained by the United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

5.1.3.3 Any failure to comply with reporting or other provisions of the policies including breaches of warrantees shall not affect coverage provided to the Unites States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers.

5.1.3.4 The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

5.1.3.5 Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior to written notice by certified mail, return receipt requested, has been given to Casitas Municipal Water District.

5.1.3.6 Such liability insurance shall indemnify the Contractor and their subcontractors against loss from liability imposed by law upon, or assumed under contract by, the Contractor or their subcontractors for damages on account of such bodily injury (including death), property damage, personal injury and completed operations and products liability. Such insurance shall be provided on a policy written by underwriters through an agency satisfactory to the District (see Section 4-08.05), which includes a cross-liability clause, and covers bodily injury and property damage liability, owned and non-owned vehicles and equipment, blanket contractual liability and completed operations liability. Such liability insurance shall include explosion, collapse, underground excavation and removal of lateral support. The United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers shall be named as additional primary insured on any such policies. An additional insured endorsement (ISO CG 2010 or equivalent) (modified to include provisions 2-5 above) and a certificate of insurance (Accord Form 25-S or equivalent), shall be provided to the District.

5.1.4 Any deductible or self-insured retention 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

retentions as respects the United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

5.1.5 Insurance is to be placed with insurers having a current A.M. Best's rating of no less than A:VII or equivalent.

5.1.6 The Contractor shall not commence work under this contract, nor allow any subcontractor to commence work on this subcontract, until they have secured all insurance required under the section and has filed with the District, certificates of insurance in the amounts specified. Such certificates shall contain a provision that they may not be called without at least thirty (30) days' written notice to the District.

5.2 **Worker's Compensation Insurance**.

5.2.1 By their signature hereunder, Contractor certifies that they are aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and they will comply with such provisions before commencing the performance of the work of this contract.

5.2.2 The Contractor shall maintain, and shall cause all subcontractors they may employ to maintain adequate workers compensation insurance under the laws of the State of California for all labor employed by them, directly or indirectly, in the execution of the work. The Contractor and all subcontractors shall file with the District certification of such workers compensation insurance prior to beginning construction.

5.3 **Evidences and Cancellation of Insurance**.

5.3.1 Prior to execution of the contract, the Contractor shall file with the District evidence of insurance from an insurer or insurers certifying to the coverage of all insurance required herein. Such evidence shall include the ISO CG 2010 (or insurer's equivalent) signed by the insurer's representative and certificate of insurance (Accord Form 25-S or equivalent). All evidence of insurance shall be certified by a properly authorized officer, agent or qualified representative of the insurer and shall certify the names of the insured, any additional primary insurers, where appropriate, the type and amount of the insurance, the location and operations to which the insurance applies, the expiration date, and that the insurer will give by certified mail, written notice to the District at least thirty (30) days prior to the effective date of any cancellation, lapse or material change in the policy.

5.3.2 The Contractor shall, upon demand of the District, deliver to the District all such policy or policies of insurance and the receipts for payment or premiums thereon; and should the Contractor neglect to obtain and maintain in force any such insurance or deliver such policy or policies and receipts to the District, then shall be lawful for the District to obtain and maintain such insurance, and the Contractor hereby appoints the District their true and lawful attorney-in-fact to do all things necessary for this purpose. All money paid by the District for insurance premiums under the provisions of this article shall be charged to the Contractor.

6. Bonds.

6.1 Payment Bond. The successful bidder shall file with the District a surety bond to be approved by the District in a sum of not less than one hundred percent (100%) of the total amount payable by the terms of the contract, conditional as provided by Section 3247 of the Civil Code.

6.2 Performance Bond.

6.2.1 The successful bidder shall also file with the District a surety bond, to be approved by the District in a sum of not less than one hundred percent (100%) of the total amount payable by the terms and conditions of the Contract. Pursuant to Public Contract Code Section 22300, at the request and expense of the Contractor, securities equivalent to the amounts withheld by the District to ensure performance under this contract, shall be deposited with the District. The District shall pay such monies to the Contractor upon satisfactory completion of the contract. Securities eligible for investment under this section shall include those listed in Government Code Section 16430, or bank or savings and loan certificates of deposit. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. If the securities to be deposited by the Contractor pursuant to this provision are in registered form, the registration shall be transferred to the District.

6.2.2 Maintenance and Guarantee. The Contractor hereby guarantees that the entire work constructed by them under the Contract will meet fully all requirements thereof as to quality of workmanship and of materials furnished by them. The Contractor hereby agrees to make, at their own expense, any repairs or replacement made necessary by defects in material or workmanship supplied by them that becomes evident within one year after the date of final payment, and to restore to full compliance with the requirements of these Specifications, any part of the work which, during said one year period, is found to be deficient with respect to any provision of the Specifications. The Contractor shall make all repairs and replacement promptly upon receipt of written orders from the Engineer to do so. If the Contractor fails to make the repairs and replacements promptly, the District may do the work and the Contractor and their Surety shall be liable to the District for the cost thereof.

6.3 Each of said bonds shall be executed by the Contractor and a corporate surety licensed in the State of California. If the amount payable under terms of the Contract exceeds the original bid because of additional quantities and/or the issuance or change orders, said surety shall be required to cover the additional amount.

7. Additional Surety.

If, during the continuance of the Contract, any of the sureties upon the faithful performance bond, in the opinion of the Engineer, are or become insufficient, they may require additional sufficient sureties, which

the Contractor shall furnish to the satisfaction of the Engineer within 15 days after notice, and in default thereof, the contract may be suspended and the work completed as provided in Section 21 hereof.

8. Assignment Forbidden.

The Contractor shall not assign, transfer, convey or otherwise dispose of this Contract, nor of their right, title or interest in any part thereof, nor any of the monies to become due and payable under the Contract, in any manner without the previous consent in writing of the Engineer. If the Contractor shall, without such written consent, assign, transfer, convey or otherwise dispose of any part of this Contract, or of any of the monies to become due and payable under the Contract, the District may, at its option, terminate the Contract according to Section 21 of these General Conditions. The District shall thereupon be relieved from all liability to the Contractor, and to their assignee or transferee.

9. Time and Order of Work.

The Contractor shall at all times employ such personnel, and provide such services, materials and equipment as will be sufficient, in the opinion of the Engineer, to complete the work or any separable portions thereof according to a progress schedule, and within the time limit fixed by the Contract. If the Contractor should fail to maintain adequate progress, they may be required to employ additional personnel, and provide additional services, materials and equipment, and to modify their plans and procedure in such manner as to ensure completion of the work within the time limit fixed by the Contract. This provision shall not be the exclusive remedy of the District.

10. Protests.

If the Contractor considers any of the work demanded of them to be outside the requirements of the Contract, or if they considers any order or ruling of the Engineer or any duly authorized representative to be unfair, they shall immediately ask for written instructions or divisions, whereupon they shall proceed without delay to perform the work or conform to the order or ruling; but unless the Contractor finds such instructions or divisions satisfactory, they shall, within ten (10) days after receipt of same, file a written protest with the Engineer, stating clearly and in detail their objections and the reasons therefor. Except for such grounds for protest 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 order, rulings, instructions, or decisions of the Engineer, and hereby agrees that as to all matters not included in such protest, the order, instructions and decisions of the Engineer shall be final and conclusive.

11. Authority of the Engineer.

The work shall be observed by the Engineer to determine that the work is being completed according to the plan, specifications and design and planning concepts. The Contractor shall be responsible for the supervision of construction processes, site condition, operation, equipment, personnel and the maintenance of a safe place to work or any safety in, on or about the work site until such time as the District files a Notice of Completion. The Engineer, however, reserves the right to determine the adequacy of the Contractor's method, plant, and appurtenance to determine in all cases the amount, quality, acceptability and fitness of the work and material to be provided under the Contract, to determine all questions in relation to said work and construction thereof, and to decide in all cases any question which may arise concerning the

fulfillment of this Contract by the Contractor. Should any discrepancy appear or any misunderstanding arising as the import of anything contained in the Specifications or Drawings, the matter shall be referred to the Engineer and their decision shall be binding on the Contractor. Any differences or conflicts which may arise between the Contractor and other contractors performing work for the District shall be adjusted to the satisfaction of the Engineer.

12. Right of Way and Encroachment.

12.1 Except as otherwise stated in the Special Conditions, the right of way for the work to be constructed under these Specifications will be provided by the District. This shall not be interpreted as giving the Contractor exclusive occupancy of the right of way provided. When the work to be performed is located within State Highway, County or Southern Pacific Railroad rights of way, or within a water course which is under the jurisdiction of the Ventura County Watershed Protection District, the Contractor will be required to obtain construction permits from those agencies in their own name.

12.2 Right of way to be furnished by the District for construction operations and other purposes will be specifically shown on the Drawings or provided for in the Detailed Specifications. Should the Contractor find it necessary to use any additional lands during the construction of the work, they shall provide for the use of such lands at their own expense.

13. Errors or Discrepancies Noted by Contractor.

13.1 If the Contractor, either before commencing work or during the work, finds any discrepancy between these Specifications and Drawings, or between either of them and the physical conditions at the site of the work, or finds any error or omission in any of the Drawings or in any survey, they shall promptly notify the Engineer in writing of such discrepancy, error, or omission. If the Contractor observes that any drawings or specifications are at variance with any applicable law, ordinance, regulations, order or degree, they shall promptly notify the Engineer, in writing, of such conflict.

13.2 The Engineer, upon receipt of any such notice, shall promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work done by the Contractor, either directly or indirectly after their discovery of such error, discrepancy or conflict, will be at their own risk and they shall bear all costs arising therefrom.

14. Extra Work.

14.1 If, during the performance of the Contract, it shall, in the opinion of the Engineer, become necessary or desirable, for the proper completion of the contract, to order work done or materials or equipment furnished which, in the opinion of the Engineer, are not susceptible of classification under the bid items, the Contractor shall do and perform such work and furnish such materials and equipment as extra work, as hereinafter provided. All extra work shall be ordered in writing before it is started. No extra work shall be paid for unless ordered in writing.

14.2 Extra work will ordinarily be paid for at a lump sum or unit price agreed upon in writing by the Engineer and the Contractor before the extra work shall be ordered.

14.3 When the price of the extra work cannot be agreed upon, the District will pay for the extra work based on the accumulation of costs as provided in sections 4.4 through 4.11. The failure of the Contractor to comply with the requirements of this section shall deem the Engineer to establish costs as the Engineer deems reasonable.

14.4 At the close of each working day, the Contractor shall submit a daily report to the Engineer, on forms approved by the District, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and for other services and expenditures when authorized. An attempt shall be made to reconcile the report daily, and it shall be signed by the Engineer and the Contractor. In case of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by subcontractors or others shall be submitted through the prime contractor. Said reports shall contain the following information:

14.4.1 The names of workers, classification and hours worked;

14.4.2 A description and the amount of materials used;

14.4.3 The type of equipment, size, identification number and hours of operation, including loading and transportation if available;

14.4.4 Other services and expenditures shall be described in such detail as the District may require.

14.5 The costs of labor will be the actual cost for wages prevailing locally for each craft or type of worker at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessment or benefits required by lawful collective bargaining agreements. The use of a labor classification which would increase the extra work costs will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

14.6 The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available and delivered to the job site in the entities involved, plus sales tax, freight and delivery. The District reserves the right to approve material sources of supply, or to supply materials to the Contractor if necessary for the progress of the work. No markup shall be applied to any material provided by the District.

14.7 No payment will be made for the use of tools which have a replacement value of $100 or less. Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors, at the time the work is performed. If local rental costs are unavailable, the Contractor shall submit their costs to operate the equipment compiled and signed by a Certified Public Accountant. The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals. Necessary loading and transportation costs for

equipment used on the extra work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the District than holding it at the work site, it shall be returned, unless the Contractor elects to keep it at the work site at no expense to the District. All equipment shall be acceptable to the Engineer, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and manufacturer's approved modifications shall be used to classify equipment, and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer. The reported rental time of the equipment already at the job site shall be the duration of its use on the extra work, plus the time required to move it from its previous site and back or to a closer site.

14.8 The District may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature form those required for the work specified in the Contract which are of a type not ordinarily available from the Contractor or any of the subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.

14.9 Vendors' invoices for material, equipment rental, and other expenditures, shall be submitted with the request for payment. If the request for payment is not substantiated by invoices or other documentation, the District may establish the cost of the item involved at the lowest price which was current at the time of the report.

14.10 The following percentage shall be added to the Contractor's costs and shall constitute the markup for all overhead and profits:

Labor	10%
Materials	10%
Equipment Rental	10%
Other Items and Expenditures	10%

To the sum of the costs and markups provided for in this subsection, one percent (1%) shall be added as compensation for bond and liability insurance.

14.11 When all or any part of the extra work is performed by any of the Contractor's subcontractors, the markups established in Subsection 14.10 shall be applied to the subcontractor's actual cost of such work, to which a markup of five percent (5%) on the subcontracted portion of the extra work may be added by the prime contractor.

14.11.1 Any extra work performed hereunder shall be subject to all of the provisions of the Contract and the Contractor's sureties shall be bound with reference thereto as under the original Contract.

15. Changed Conditions.

15.1 The Contractor shall notify the Engineer in writing of the following work site conditions, hereinafter called changed conditions, promptly upon their discovery and before they are disturbed:

15.1.1 Subsurface or latent physical conditions differing materially from those represented in the Contract; and

15.1.2 Unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the character of the work being performed.

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

15.2 The Engineer will promptly investigate conditions when notified of any conditions which appear to be changed conditions. If the Engineer determines the conditions are changed conditions and they will materially increase or decrease the costs of any portion of the work, a change order will be issued adjusting the compensation for such portion of the work. If the Engineer determines conditions of which they have been notified by the Contractor do not justify an adjustment in compensation, the Contractor will be so advised in writing. Should the Contractor disagree with such determination, they may submit a protest to the Engineer, as provided in Section 10 of these General Conditions.

15.3 If the Engineer determines the conditions are changed conditions and they will materially affect the performance time, the Contractor, upon submitting a written request, may be granted an extension of time subject to the provisions of Section 22.

15.4 The Contractor's failure to give notice of changed conditions promptly upon their discovery and before they are distributed shall constitute a waiver of all claims in connection therewith.

16. Disputed Work.

16.1 If unable to reach agreement under any of the foregoing procedures, the District may direct the Contractor to proceed with the work. Payment shall be as later determined by arbitration, if District and Contractor agree thereto, or as fixed in a court of law.

16.2 Although not to be construed as proceeding under extra work provisions, the Contractor shall keep and furnish records of disputed work according to Section 14.

17. Legal Action by Contractor.

17.1 No legal action shall be commenced against the District concerning the Contract until any dispute or decision of the Engineer has been appealed and denied by the District's Board of Directors. The Board's refusal to consider or failure to consider a written appeal within thirty (30) calendar days after receipt shall be deemed denial of such appeal.

17.2 Prior to submitting any appeal to the Board, the Contractor shall exhaust their administrative remedies by attempting to resolve their dispute with the District's staff in the following sequence:

- Construction Inspector

- District Engineer
- General Manager
- Board of Directors

17.3 Should any of the listed persons fail to consider a request by the Contractor for reconsideration of a decision within three (3) working days after receiving written request to do so, the Contractor may proceed directly to the next person in the list. At the option of the District, the person to whom the request for reconsideration is directed may elect to take such request to a higher level and the Contractor's request shall be deemed to be properly submitted to such higher level.

17.4 Nothing in this subsection shall be considered as relieving the Contractor from their duties required by the Contract documents.

18. Changes.

18.1 If either the Engineer or the Contractor, because of conditions which develop during the progress of the work, finds it impracticable to comply strictly with these Specifications, the Engineer may prescribe a modification of requirements or methods of work. For such proposes, the Engineer may, any time during the life of the Contract, by written order, make such changes, as they shall find necessary, in the design, engineer, grade, form, location, dimensions, plan, or material of any part of the work or equipment to be furnished. If such changes increase or diminish the quantity of work to be done, they shall not constitute the basis for a claim for damages or anticipated profits in the work that may be dispensed with; provided that if such changes or alterations render useless any work already done or materials already furnished or used in the work, the Engineer shall make reasonable allowance therefore, which action shall be binding upon both parties.

18.2 In case of increasing or decreasing of work, the total amount of work actually done or materials or equipment furnished shall be paid for according to the unit price established for such work under the contract, wherever such unit price has been established. In the event no prices are named in the Contract but cover such changes or alterations, the cost of such changes shall be determined as provided in Section 14.

19. Discovery of an Unknown Utility.

19.1 The Contractor's attention is directed to Section 4215 of the Government Code which provides that the District assumes the responsibility for the removal, relocation or protection of the existing utilities located on the site of any construction project if such utilities are not identified by the District in the plans and specifications made a part hereof.

19.2 If the Contractor, while performing the Contract, discovers utility facilities not identified by the District in the Contract plans and specifications, the Contractor shall immediately notify the District. The Contractor shall not be assessed liquidated damages for delay in completion of the project, which such delay is caused by the failure of the District or the owner of the utility to provide for removal or relocation of the exiting utility facilities.

19.3 In the event the discovery of said utility facilities may cause extra work, the Contractor is required to obtain written authorization to change or modify the work according to Sections 14 and 18 of these General Conditions, entitled "Extra Work" and "Changes," respectively.

19.4 The Contractor's failure to give said notice promptly upon discovery of an unknown utility or the Contractor's failure to obtain written approval for any work concerning the relocation, protection and/or removal of the said unknown utility or for any work relative to the modification of any portion of the work prior to the beginning of any of said work, shall constitute a waiver of any rights to any claim in connection therewith.

20. Termination of Contract.

20.1 General.

If, at any time before completion of work under the contract, it shall be found by the District that reasons beyond the control of the parties hereto render it impossible, or against the best interest of the District, to complete the work contracted to be done; or if the work shall have been prevented or suspended by injunction issued by a court of competent jurisdiction nor by any other order of constituted authority for a period in excess of 30 consecutive days; the District, by written thirty (30) day notice to the Contractor, may discontinue the work and terminate the contract; or, in the event the entire work shall have been suspended by the District, through no fault of the Contractor, in writing, the Contract shall be discontinued. Upon the service of notice of termination, the Contractor shall discontinue the work in such manner, sequence, and at such times as the Engineer may direct, continuing and doing, after said notice, only such work and only until such time or times as the Engineer may direct. Such work shall be paid for as extra work according to Section 14 of these General Conditions. The Contractor shall have no claim for damages for such discontinuance or termination of the Contract, nor shall the Contractor have any claim for anticipated profits on the work thus dispensed with, nor any other claim; except: (1) for the work actually performed between the date of the notice of termination and the time of complete discontinuance; and (2) for any liquidated damages accruing up to the date of said notice of termination according to the provisions of the Special Conditions.

20.2 Consumable Supplies.

In the event of discontinuance and termination of the contract, the District may, and at the request of the Contractor shall, purchase from the Contractor all consumable supplies of the Contractor on hand, or in transit, or on definite commitment which, in the opinion of the Engineer, are suitable and required, except for such discontinuance and termination, to complete the work, and the District shall pay the Contractor for such consumable supplies the prices paid therefor by the Contractor.

20.3 Completion of Contract.

In the event that the work shall be discontinued and the Contract terminated, the satisfactory completion of such work, as the Engineer may thereafter direct, and satisfactory compliance with the terms of said order shall be deemed the completion of the work specified in the Contract; and the final estimate

shall be the amount of work completed to the time of such discontinuance and termination, with such other sums as may be due the Contractor according to the provisions of this section.

21. Suspension of Contract.

21.1 If the work to be done under the Contract shall be abandoned by the Contractor, or if the Contractor shall make a general assignment for the benefit of their creditors or be adjudicated as bankrupt, or if a receiver of their property or business be appointed by a court of competent jurisdiction, or if this Contract shall be assigned by them otherwise than hereinbefore specified, or if at any time the Engineer shall be of the opinion that the performance of the contract is unnecessarily or unreasonably delayed, or that the Contractor is willfully violating any of the conditions of the Contract, or is executing the same in bad faith or not according to the terms thereof, or if the work be not fully completed within the time named in the Contract for its completion or within the time to which the completion of the Contract may have been extended as hereinafter provided, the Board may, by written notice, instruct the Contractor to discontinue all work, or any part thereof, under this Contract.

21.2 When such written notice is served upon the Contractor, they shall immediately discontinue the work or such part thereof as covered by the notice and shall not resume the same by written notice from the Board, in which case work shall be resumed in ten (10) days. In any such case, the District may take charge of the work and complete it by a new contract or by force account and charge the expense of completion by either method to the Contractor. In so doing, the District may take possession of and use any of the materials, plans, tools, equipment, supplies and property of every kind provided by the Contractor for the purpose of their work. Any such charges shall be deducted from such monies as may be due or may at any time hereafter become due the Contractor under this contract or at any part thereof. In case such expense shall exceed the amount which would have been due the contractor under the Contract if the same had been completed by them, they shall pay the amount of such excess to the District; and in case such expense shall be less than the amount which would have been payable under this contract if the same had been completed by the Contractor, they shall have no claim to the difference except to such extent as may be necessary, in the opinion of the Engineer, to reimburse the Contractor or the Contractor's sureties for any expense properly incurred for plans, equipment, materials, supplies and labor devoted to the prosecution of the work, of which the District shall have received the benefit which shall not have been otherwise paid for by the District. In computing such expense, the salvage value of such plans and equipment, at completion of the work, shall be deducted from the depreciated value thereof at the time taken over by the District and the difference shall be considered the expense. All necessary estimates and appraisals shall be made by the Engineer.

21.3 When any particular part of the work is being carried on by the District, by Contract or otherwise, under the provisions of this section, the Contractor shall continue the remainder of the work in conformity with the terms of the Contract, and in such a manner as to nowise hinder or interfere with the persons or workers employed, as provided above, by the District, to do any part of the work, or to complete the same under the provisions of this section.

22. Extension of Time of Completion.

22.1 If the work shall be delayed in consequence of suspension by the District except as provided in Section 21 or of failure by the District to provide right of way, or of any other act or omission of the District, or by strikes, acts of God, delay of delivery or properly ordered materials for which a delivery time has not been stated in the Proposal, or other unforeseeable causes beyond the control and without the fault or negligence of the Contractor or their subcontractors, the Contractor shall be entitled to so much additional time wherein to perform and complete the contract on their part as the Engineer shall certify in writing to be just.

22.2 Application for extension of time must be made to the Engineer, in writing, stating cause, within the ten (10) days immediately following the end of such delay.

22.3 Permitting the Contractor to continue and finish the work, or any part of it, after the date to which the time fixed for its completion may have been extended, shall in no way operate as a waiver on the part of the District of any of its rights under this Contract.

22.4 The Contractor shall receive no compensation on account of any suspension of the work either in whole or in part or for any delay or hindrance herein mentioned except as provided in the Special Conditions.

22.5 No extension of time shall be made for ordinary delays and accidents and the occurrence of such shall not relieve the Contractor from the necessity of maintaining the required progress. In the case of an extension of time by the Engineer for completion of the contract as provided for in these Specifications, a revised schedule of progress may be prescribed according to such extension of time.

23. Failure to Complete on Time.

23.1 The Contractor shall pay for each and every calendar day that they shall be in default in completing the whole work to be done under this contract, the sum named in these conditions, which sum is by the execution of this agreement mutually agreed upon as liquidated damages which the District shall suffer by reason of such default. The District shall have the right to deduct the amount of such damages from any monies due or to become due the Contractor under this Contract.

23.2 The Contractor shall not be assessed liquidated damages for failure to complete the work on time due to any of the causes stated in Section 22.1.

24. Liquidated Damages.

24.1 Pursuant to Section 23 of these General Conditions, failure of the Contractor to complete the work within the time allowed will result in damages being sustained by the District. Such damages are, and will continue to be, impractical and extremely difficult to determine. For each consecutive calendar day in excess of the time specified for completion of the work (as adjusted by change order), the Contractor shall pay the District, or have withheld from monies due it, the amount(s) shown in the Instructions to Bidders.

24.2 Execution of the Contract under these Specifications shall constitute agreement by the District and Contractor that the amount(s) shown in the Instructions to Bidders the minimum value of the

costs and actual damage caused by failure of the Contractor to complete the work within the allotted time, that such sum is liquidated damages and shall not be construed as a penalty, and that such sum may be deducted from payments due the Contractor if such delay occurs.

25. Contractor's Responsibility.

25.1 The Contractor shall be responsible for safe and efficient execution of the work to secure the safety of the workers, the quality of the work and the stipulated rate of progress.

25.2 The Contractor shall bear all losses resulting to them no account of the amount or character of the work, or from any unforeseen obstruction or difficulties which may be encountered, or because of weather, floods, or other causes, except as follows:

25.2.1 The Contractor shall not be responsible for the cost of repairing or restoring damage to the work which damage was caused by an act of God, as defined in Public Contract Code Section 7105, and shall be the basis for determining the extent of the District's liability, if any.

25.2.2 It shall be the responsibility of the Contractor to take all reasonable and adequate measures to protect the work from damage and/or to minimize any damage to the work.

25.2.3 The District reserves the right to make changes in the plans and Specifications applicable to the portion of the work to be restored. The District reserves the right to terminate the Contract and relieve the Contractor of further obligations to perform the work. In the event that the damaged work is to be repaired or restored either, in kind or changed by the Engineer, a contract change order will be provided according to Sections 14 and 18 of the General Conditions of this Specification. The change order may provide for the Contractor to perform any work deemed by the Engineer as necessary to put the project in satisfactory condition for the termination of all work.

25.2.4 The District may require the Contractor to submit as a separate bid item the insurance premium covering the cost of work destroyed in whole or in part by an "Act of God," as defined in Public Contract Code 7105 and provide such insurance to indemnify the District for any damage to the work caused by an "Act of God," and to rebuild said work with the proceeds of said insurance. If the District elects to do so, said insurance shall be in lieu of the provision of the Public Contract Code 7105.

25.3 The Contractor shall be responsible for all material, except defective material, furnished by the District, and for the care of all work until its completion and final acceptance, and they shall at their own expense replace damaged, lost or stolen material and repair damaged parts of the work, or the same may be done at their expense by the District.

25.4 During the progress of the work, the Contractor shall keep the premises occupied by them in a neat and clean condition. When the work is completed, they will be required to remove all debris caused

by them in their operations, repair all damage to existing improvements done by them or their employees and leave the site of the work in a neat condition. In the event of their failure to do so, the same may be done at their expense by the District.

25.5 The Contractor shall be responsible for all damage or injury which may be caused on any property by trespass of the Contractor's employees during their employment, whether the said trespass was committed with or without the consent or knowledge of the Contractor.

25.6 The Contractor shall provide at their own expense, all necessary water, telephone, and power required for their operations under the Contract, except as provided for in the Special Conditions.

25.7 The Contractor shall so conduct their operations as not to close or obstruct any portion of any highway, road, or street, or prevent in any way free access to fire hydrants until permission to do so has been obtained from the proper authorities.

25.8 The Contractor shall be responsible for determining the nature and extent of any simultaneous, collateral, and essential work by others. The Contractor shall coordinate their operation and cooperate with others to minimize interferences, conflicts, and/or any other related conduct during the construction of the work.

26. Shop Drawings.

26.1 Drawings and prints of articles, machinery, or fabricated materials entering into permanent construction which are required to be furnished by the Contractor and for which detailed drawings are not furnished by the District, the Contractor shall submit five (5) copies for approval, three (3) of which will be returned to the Contractor for their distribution, the two (2) other copies shall become the property of the District. The District shall approve such drawings or return them to the Contractor with requirements for approval within ten (10) days after the date of submission.

26.2 Approval by the District on items called for under these Specifications does not relieve the Contractor from the responsibility for errors, omissions or deviations from the Contract documents unless such deviations were specifically called to the attention of the Engineer in the letter of transmittal submitted with the material for approval.

26.3 If the Contractor objects to any conditions imposed by the District in granting said approvals, they shall immediately give the District written notification.

27. Trench Shoring Plans.

27.1 In compliance with Section 6705 of the Labor Code, the Contractor, at their sole expense, shall be required to submit detailed shoring plans for review by the District's Engineer for all construction projects and/or any related modifications, revision or changes thereto, which are in excess of $25,000, for the excavation of any trench, trenches, or other excavation five (5) feet or more in depth.

27.2 Shoring plans shall show the details of the shoring, bracing, sloping and all other provisions to be made for the workers' protection from the hazard of caving ground during the excavation of any trench, trenches, or other excavation.

27.3 Such shoring plans shall be prepared by a qualified Civil or Structural Engineer registered in the State of California in the event that such plans vary or deviate, in any manner, from the shoring system standards as outlined in the State Construction Safety Orders issued by the Division of Industrial Safety, State of California.

27.4 The Contractor shall submit the shoring plans to the Division of Industrial Safety, State of California, for its approval.

27.5 The Contractor shall be required to submit the shoring plans within fifteen (15) days after notification of an award of a contract has been sent.

28. Safety Permit.

28.1 In compliance with Section 6424 of the Labor Code, the Contractor, at their sole expense, shall be required to obtain a permit from the Division of Industrial Safety for the excavation of any trench, trenches, or other excavation five (5) feet or more in depth, prior to beginning any excavation work that is not covered by Section 6422 of the Labor Code.

28.2 A copy of all permits issued and the related construction safety orders approved by the Division of Industrial Safety shall be filed with the District within fifteen (15) days after notification of the award of a contract, or within three (3) days after issuance of the permit, and prior to the beginning of the excavation of any trench, trenches, or other excavation five (5) feet or more in depth.

28.3 Additional permits may be required for each modification, revision or change in the work.

28.4 Safety permits required by Section 6424 of the Labor Code shall be in addition to all other permits required.

29. Personal Attention.

The Contractor shall give their personal attention constantly to the faithful prosecution of the work, and shall be present, either in person or by a duly authorized and competent representative, on the site of the work continually during its progress, to receive directions or instructions from the Engineer. Whenever the Contractor is not present on any part of the work where it may be desired to give directions, orders may be given by the Engineer and shall be received and obeyed by the superintendent or foreman who may have charge of the particular part of the work in reference to which orders are given.

30. Laws, Regulations and Permits.

30.1 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 the work furnished by the contractor. If the Contractor observes that the drawings or specifications are at variance with any law or ordinance, rule or regulation, they shall promptly

notify the Engineer in writing and any necessary changes shall be made by written 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 notice to the Engineer, the Contractor shall bear all costs arising therefrom.

30.2 The Contractor shall submit a certification that they are in compliance with the Civil Rights Act of 1964 as amended by the Equal Employment Opportunity Act of 1972, the California Fair Employment Practice Act of 1959, as amended, California Labor Code Section 1777.5 and Section 1735 and any other applicable Federal and State laws and regulations hereinafter enacted. Certification of Compliance with Executive Order 11246, as amended, will be required when applicable. Such certification shall be on forms satisfactory to the District.

30.3 The following are exempted from the above provisions in relation to affirmative action efforts:

30.3.1 Contractors, subcontractors and suppliers who have a paid work force of less than fifteen (15) persons.

30.3.2 Contracts and subcontracts which do not exceed $10,000.00.

30.3.3 Contracts and subcontracts which are deemed by the Board to be an "Emergency" nature or an apparent "Sole Source" purchase.

30.3.4 Exemptions may be denied by the Board pursuant to a finding by the District that the exemption is having an adverse effect on the purpose of these Specifications. Additional exemptions may be granted by the Board for reasons of a similar finding.

30.4 The Contractor shall only use equipment that complies with California air quality regulations and the Ventura County Air Pollution Control District regulations.

31. Sales and/or Use Taxes.

Except as may be otherwise specifically provided herein, all sales and/or use taxes assessed by Federal, State, or local authorities on materials used or furnished by the Contractor in performing the work hereunder shall be paid by the Contractor.

32. Construction Schedule.

Prior to commencing the work, the Contractor shall submit a detailed construction schedule. At the beginning of each month as may be required by the Engineer, the Contractor shall submit an updated construction schedule. Said construction schedule shall show the order in which the Contractor proposes to complete the work, the dates when the various parts of the work are to begin and the estimated dates of completion. The detailed schedule shall be a modified bar type and shall show each principal item of work or activity.

33. Inspection.

33.1 All materials furnished and all work done under these Specifications shall be subject to rigid inspection. The Contractor shall furnish the Engineer every reasonable facility for ascertaining whether the work is in accordance with the requirements and intent of these Specifications.

33.2 Work done in the absence of prescribed inspection may be required to be removed and replaced under the proper inspection. 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 removed, shall be borne by the Contractor, irrespective of whether the work removed is found to be defective.

33.3 Work covered up without the authority of the Engineer shall, upon order of the Engineer, be uncovered to the extent required, and the Contractor shall bear the entire cost of performing all the work and furnishing all the materials necessary for the removal of the covering and its subsequent replacement, as directed and approved by the Engineer.

33.4 Nothing in these Specifications shall be construed to mean that the District will provide continuous inspection. The Contractor shall cooperate and coordinate their activities in order that the work can be inspected to the satisfaction of the Engineer.

33.5 The Contractor shall keep the Engineer informed, a reasonable time in advance, of the times and places at which they intend to do work, so that the inspection and the necessary measurements may be made with a minimum of inconvenience to the Engineer, or delay to the Contractor.

34. Construction Staking.

34.1 The Engineer may provide minimal construction staking, the extent of which, if any, will be described in the Special Conditions herein. The Contractor shall be required to provide all other additional staking and/or measurements necessary for the proper execution of the work.

34.2 The Contractor shall notify the Engineer in writing at least five (5) working days before the time the Contractor will require the construction staking.

34.3 The Contractor shall be required to preserve all benchmarks, monuments, survey marks and construction stakes, and in case of their removal or destruction caused by the Contractor's activities, the Contractor shall be liable of the cost of their replacement.

35. Construction Interferences.

35.1 Insofar as practicable during the progress of the work, the Contractor shall not disturb, but shall support and protect against injury, and maintain in good operating condition at their own expense, all subsurface, surface and overhead utilities, structures and other facilities as are encountered in the prosecution of the work.

35.2 In the event that subsurface, surface, or overhead utilities, structures or other facilities are required to be disturbed or removed out permit the construction of the work, the Contractor shall not do any work that would affect such utilities, structures or facilities, or enter upon the right of way or other lands

appurtenant thereto until notified by the Engineer that authority has been obtained to do so. The Engineer will make all necessary arrangements with the owner or other utilities for their relocation and reconnection, without cost to the Contractor, including the reconnection of services and the resurfacing of trenches required for said location; provided such arrangements shall not relieve the Contractor of their responsibilities as outlined in Section 2(b) of these General Conditions, nor the responsibility of proper care and protection of any utilities, structures or facilities encountered because of such varying conditions. The Contractor shall coordinate their operations with those of the owner or owners concerned with the disturbance or removal of facilities to minimize the inconvenience imposed on all affected parties.

35.3 Except as provided in Section 4215 of the Government Code and in the event the Contractor disturbs, disconnects or damages any subsurface, surface, or overhead utility, structure or other facility prior to the making of necessary arrangements by the Engineer with the owner thereof, they shall immediately give to the owner notice of said disturbance, disconnection, or damage, and the Contractor shall assume all responsibility connected therewith, event in the even such damage occurs after backfilling or is not discovered until after completion of backfilling, and the provisions of this subsection shall continue in force until the termination of the guarantee period provided.

35.4 All facilities removed shall be reconstructed as promptly as is possible in its original or other authorized location, and in a condition at least as good as when removed and subject to the inspection of the owner or of the governing body having jurisdiction.

35.5 During the performance of the work under these Specifications, the owners or agencies in control of any of the facilities affected by the work shall have the right to enter, when necessary, upon the project right of way, or upon any street or other public way affected by the Contractor's operations, or any portion thereof, for the purpose of maintaining service and of making changes in or repairs to said facilities.

35.6 The District reserves the right during the progress of the work and upon determination of the actual position of the existing utilities, structures, and other facilities, to make changes in the grade or alignment, or both, of the District's facilities wherever by so doing the necessity for relocation as provided herein of such utility, structures, or other facility will be avoided; provided that such changes shall not entitle the Contractor to additional compensation other than according to the prices named in the Bidding Sheet for the respective contract items.

35.7 In the event the Contractor discovers a substructure as defined in Section 4215 of the Government Code and not identified by the District on the contract plans and Specifications, the Contractor shall be required to notify the District in writing. In the event that such discovery may cause extra work, the Contractor shall be required to obtain written authorization to change or modify the work according to Sections 14 and 18 of these General Conditions of the Specifications.

35.8 Whether the Contractor is entitled to any additional compensation for any work hereinbefore described in Section 36 of these General Conditions shall be governed by the applicable portions of Section 4215 of the Government Code or amendments thereto.

35.9 The Contractor shall make every effort to protect and preserve all trees encountered in the work. Any trees which unreasonably interfere with the work shall, with the approval of the Engineer, be removed by the Contractor. The cost of the removal shall be borne by the Contractor.

36. Materials, Workmanship, and Tests.

The Contractor shall submit samples, specimens, or test pieces of such materials to be furnished or used in the work as the Engineer shall require. All materials must be new and must be of the specified quality and equal to approved samples. The Contractor shall furnish, without cost to the District, such quantities of construction materials as may be required for test purposes and shall place at the Engineer's disposal all available facilities for and cooperate with them in the sampling and testing of all materials and workmanship. All work shall be done and completed in a thorough workmanlike manner, notwithstanding any omission from these Specifications or the Drawings.

37. Certification of Materials and Equipment

37.1 All materials and equipment furnished by the Contractor shall be according to these Specifications. Any time when requested by the Engineer, the Contractor shall furnish written certification from the manufacturer of the various materials and equipment that such materials and equipment do meet all of the requirements of these Specifications. When requested by the Engineer, such certification shall be furnished to the District before payment to the Contractor, for the material and/or equipment in question, will be made.

37.2 Where reference is made in these Specifications to a specification or test designation of the American Water Works Association, the American Society for Testing and Materials, the American Association of State Highway Officials, Federal Specifications, or any other recognized national organization, and the number or other identification accompanying the test designation representing the year of adoption of latest revision of the test is omitted, it shall mean the test method in effect on the date of the Notice Inviting Bids for the work.

38. Defective Work or Materials.

38.1 The inspection of the work shall not relieve the Contractor of any of their obligations to fulfill the contract as herein prescribed, and defective work shall be made good, and unsuitable materials may be rejected, notwithstanding that such work and materials have been previously inspected by the Engineer and accepted or estimated for payment. If the work, or any part thereof, shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good such defect without compensation in a manner satisfactory to the Engineer and shall be charged for any excess material furnished by the District.

38.2 If any materials furnished and brought upon the ground by the Contractor for use in the work, or selected for the same by them, shall be condemned by the Engineer as unsuitable or not in conformity with the Specifications, the Contractor shall forthwith discard such materials and remove them to a satisfactory distance from the vicinity of the work.

38.3 If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove condemned materials from the work within ten (10) days after the service by the Engineer of an order to do so, the Engineer acting on behalf of the District may make the ordered repairs or remove the condemned materials and deduct the cost thereof from any monies due the Contractor.

39. Use of "Or Equal."

39.1 Any material or article of equipment designated by manufacturer's name, trade name, catalog reference or brand and qualified by "or equal" shall be understood to be a standard of quality and performance. Articles of other make will be acceptable provided they are, in the opinion of the Engineer, of equal quality and/or capable of equal performance. Names, brands and characteristics of proposed substitute materials shall be submitted to the Engineer for approval and no such substitute materials shall be purchased or delivered to the project until the Engineer's approval, in writing, has been obtained.

39.2 The Contractor may be required to obtain certification from a qualified testing laboratory approved by the Engineer that such proposed substitute materials meet the minimum requirements in the Specifications, and/or that such proposed substitute materials are of equal quality and performance of the material or article designated in the Specifications. Such certification shall be required prior to obtaining the Engineer's approval, and shall be at the sole expense of the Contractor.

40. Property Rights in Materials.

40.1 Nothing in this contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or the soil, or after payment has been made for the value of unused material delivered to the site of the work as provided for in Sections 45, 58 through 65 inclusive hereof. All such materials attached or affixed or unused shall become the property of the District.

40.2 The District reserves the right to use any or all of the completed facilities either after said facilities are connected to the existing facilities or otherwise completed by the Contractor as set forth in Section 45 hereof and prior to acceptance of the work by the Board.

41. Title to Materials Found on the Work.

Except as may otherwise be provided in these Specifications, the right to the use of all soil, stone, gravel, sand and all other materials and equipment developed or obtained in the excavation or other operations by the Contractor or any subcontractor or any of their employees, and the right to use and/or dispose of the same, are hereby expressly reserved by the District and neither the Contractor nor any subcontractor, nor any of their employees shall have any right, title or interest in or to any part thereof nor shall they, nor any of them, assert or make any claim thereto. The Contractor shall be permitted to use in the work without charge any such materials which meet the requirements of these Specifications.

42. Patents and Copyrights.

The Contractor shall hold and save the District, its officers, agents and employees, harmless from liability of any nature and kind, including costs and expense, for or because of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliances,

manufactured, furnished, or used by them in the performance of this contract, including their use by the District, unless otherwise specifically stipulated in this contract.

43. Responsibility for Safe Storage.

The Contractor shall be responsible for the safe storage of the material furnished by or to them and accepted by them and intended for the work until it has been incorporated in the completed project. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign matter at all times.

44. Completion.

When in the opinion of the Contractor, the work under this contract has been fully completed according to the plans and Specifications, they shall notify the Engineer. Upon such notification, the Engineer shall, within a reasonable time, make a field inspection of the work and shall satisfy themself by examination and such tests as may be necessary that the work has been fully and properly completed according to the plans and Specifications. If any deficiencies are found, the Engineer shall notify the Contractor of the measures to be taken to correct them. When all deficiencies, if any, are corrected to the satisfaction of the Engineer, the work shall be deemed completed and the date of such completion shall be used in computing the Liquidated Damages, if any, as set forth in Section 24.

45. Final Cleanup.

Upon completion of the work and before the final inspection and estimate is prepared, the Contractor shall, at their own expense, dispose of and remove from the vicinity of the work, all rubbish, unused materials and other items used under their direction during construction and perform cleanup to the satisfaction of the Engineer.

46. Responsibility for a Safe Place to Work.

46.1 The Contractor's attention is directed to Section 4 of these General Conditions entitled, "Indemnification of District."

46.2 The Contractor shall be responsible for the maintenance of a safe place to work and any safety in or about the work site. The Contractor shall be required to conform to all of the applicable Construction Safety Orders issued by the Division of Industrial Safety of the State of California.

46.3 The Contractor shall execute and maintain their work so as to avoid injury or damage to any person or property. The contractor shall comply with the requirement s of the specifications relating to safety measures applicable in particular operations or kinds of work.

46.4 In carrying out their work, the Contractor shall at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all federal, state and local statutory and regulatory requirements including State of California, Division of Industrial Safety (Cal/OSHA) regulations. Safety precautions as applicable shall include, but not be limited to, adequate life protection, and life-saving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees such as machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space procedures, trenching and shoring, and other safety devices, equipment and wearing apparel as are

necessary or lawfully required to prevent accidents or injuries; and adequate facilities for the proper inspection and maintenance of all safety measures.

46.5 The names and telephone numbers of at least two medical facilities in the vicinity and the telephone number of the local emergency response services shall be prominently displayed at the project site.

47. Public Convenience and Safety.

47.1 The Contractor shall provide for the protection of the traveling public. The Contractor shall be required to furnish and maintain safety devices and other measures required for the public safety, which devices and measures shall conform to the requirements of Section 21406 of the Vehicle Code, any sign manual and current standard specifications of the Division of Highways. The Contractor shall conduct their operation to avoid unnecessary interference with the flow of traffic along highways, streets, roads, etc., used for vehicular traffic. Where any highway, street, road, etc., used for vehicular traffic is required to be kept open, the Contractor shall be required to furnish and maintain warning signs, lights, barricades, flagmen and other safety devices and measures necessary to provide adequate protection of the traveling public. Such protection shall be at the sole expense of the Contractor. Any highway, street maintenance or repair work required by local authorities concerning necessary operation under this contract shall be performed by the Contractor at their sole expense.

47.2 Vehicular access to any driveway shall be maintained to the property line unless necessary construction precludes such access for reasonable periods of time.

47.3 Vehicular and pedestrian access to any fire hydrant shall be maintained at all times during the construction of the work.

48. Safety, Sanitary and Medical Requirements.

48.1 The Contractor, their employees and the subcontractors, if any, and their employees shall promptly and fully carry out the existing safety, sanitary and medical requirements as may from time to time be prescribed by the District to the end that proper work shall be conserved and safeguarded. In case such regulations and orders are not observed by the Contractor, they may be enforced by the Engineer at the Contractor's expense.

48.2 Contractor shall notify District in writing within twenty-four (24) hours should an employee, officer or agent of Contractor or subcontractor incur personal injury while present on District properties or employed by District. District shall be furnished copies of all medical reports or accident reports filed or required by any local state or federal agency or regulatory body.

49. Character of Workers.

49.1 None but skilled workers shall be employed on work requiring special qualifications. All equipment operators, pipelayers and jointers shall be well qualified and experienced in their work. All welding, however minor, shall be done by competent, certified welders, who have been qualified under Section IX of the ASME Boiler and Pressure Vessel Code, API Publication 1104 or such other standard as may be satisfactory to the Engineer. The Engineer shall have the right at any time to call for and witness the

making of test specimens by any welding operator according to these standards, and the expense of such tests shall be borne by the Contractor.

49.2 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.

49.3 Enforcement of Order. The Contractor shall be responsible for maintaining good order at the site where work is performed under this contract and to that end shall employ such watchmen or other persons as may be required. Unauthorized persons shall be excluded from the site of the work. The Contractor shall not sell, nor shall they permit or suffer the introduction or use of, intoxicating liquors or narcotics upon the work embraced in these Specifications or upon any of the grounds occupied or controlled by them in connection with such works.

50. Subcontracts.

50.1 Subcontracts will be permitted subject to the following provisions. No subcontract will be permitted which has the effect of avoiding the residence or wage requirements or any other provisions of the main contract. Individual subcontractors or members of contracting or subcontracting organizations personally engaged upon the work shall be subject to all the requirements of these specifications applicable to employees working for wages, including but not limited to, wages, hours of work, character of workers and certified payrolls.

50.2 Reference is hereby made to the provisions of the Subletting and Subcontracting Fair Practices Act, Public Contract Code Section 4100, commencing with Section 4100, also known as the "Subletting and Subcontracting Fair Practices Act," which is incorporated herein and made a part hereof by reference, and the Contractor is bound thereby and shall be subject to the consequences named in Sections 4110 and 4111 of said Act in event of their violation thereof. Each bidder shall, in their bid or offer, set forth: (1) The name and the location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the Contractor's total bid or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the prime contractor's total bid; and (2) The portion of the work which will be done by each such subcontractor under said Act. The Contractor shall list only one subcontractor for each such portion as defined by the Contractor in their bid. If the Contractor fails to specify a subcontractor or if the Contractor specifies more than one subcontractor for the same one-half of one percent of the Contractor's total bid, the Contractor agrees they are fully qualified to perform that portion themselves, and that they shall perform that portion themselves.

51. Access to the Site and Haul Routes.

51.1 The Contractor shall make their own investigation of the condition of available public or private roads or other access, and of clearances, restrictions, bridge load limits, bond requirements, and other limitations that affect or may affect transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of work. It shall be the Contractor's own responsibility to construct and maintain, at their own expense and at their own risk, any haul roads, access roads, bridges, or drainage structures required for construction operations.

51.2 The use of existing roads (public or private) shall be at the Contractor's own expense and risk. It shall be the Contractor's responsibility to anticipate and meet all conditions properly imposed upon the use of existing roads by those having jurisdiction thereover, including (without limitation of the generality of the foregoing) seasonal or other limitations or restrictions, the payment of excess size and weight fees, and the posting of bonds conditioned upon repair of road damage caused by contract-generated traffic.

51.3 The hauling of sand, gravel, asphalt or other intra job hauling, over public highways, roads or bridges, shall be in compliance with the applicable regulations and shall be such as to minimize interference with or congestion of local traffic.

51.4 The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of work.

52. Irregular Hours.

52.1 When any work is to be performed at a time other than regular working hours, the Engineer shall be given advance notice. Irregular working hours shall be defined as follows, except for certain specialized jobs and circumstances:

52.1.1 Before 8:00 a.m. Monday through Friday.

52.1.2 After 4:30 p.m. Monday through Friday.

52.1.3 Saturdays, Sundays, and District's Holidays.

52.2 The Contractor will be exempt from this provision only for such work as required by the Specifications to be completed at other than working hours.

53. Eight-hour Law.

In accordance with the provisions of Articles 1 and 3 of Chapter 1, Part 7, Division 2 of the Labor Code of the State of California eight (8) hours constitute a legal day's work. The Contractor shall forfeit, as a penalty to the District, $25.00 for each worker employed in the execution of the contract by the Contractor or any subcontractor under them: for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Sections 1810 to 1815 thereof, inclusive,

except that work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay as provided in said Section 1815. The Contractor and each subcontractor shall keep accurate records showing the name of and schedule of hours worked by each worker employed by them concerning the contract. The records shall be kept open at all reasonable hours to inspection by the District and the Division of Labor Law Enforcement.

54. Payment of Wages.

The issuance as payment for wages of any evidence of indebtedness is prohibited unless the same is negotiable and payable on demand without discount. Wages must be paid at least semi-monthly on regular pay days established in advance, and shall include all amounts for labor or services performed by employees of every description as required under the provisions of the California Labor Code.

55. Prevailing Rate of Per Diem Wages.

Pursuant to the provisions of Articles 1 and 2 of Chapter 1, Part 7, Division 2 of the Labor Code of the State of California, not less than the general prevailing rate of per diem wages and not less than the general prevailing rate of per diem wages for legal holiday and overtime work for each craft or type of worker needed to execute the work contemplated under this contract, as determined by the District and as set forth in the schedule of such wages currently on file in the District office, shall be paid to all workers employed on such work by the Contractor or by any subcontractor doing or contracting to do any part of said work. The Contractor shall comply with Labor Code Section 1775. According to said Section 1775, the Contractor shall forfeit, as a penalty to the District, $25 for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed for any work done under the contract by them or by any subcontractor under them in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor. The Contractor and each subcontractor shall keep accurate records showing the name of and schedule of hours worked by each worker employed by them in connection with the contract. The records shall be kept open at all reasonable hours to inspection of the District and the Division of Labor Law Enforcement.

56. Unpaid Claims.

If, upon or before the completion of the work herein agreed to be performed or at any time prior to the expiration of the period within which claims may be filed as prescribed by Section 3184 of the Civil Code, any person or persons shall bring against the District or against any agent or agents thereof any action to enforce such claim, the District shall, until the discharge thereof, withhold from the moneys under its control so much of said moneys due or to become due the Contractor under this contract as shall be sufficient to satisfy and discharge the amount in such notice or under such action claimed to be due, together with the costs thereof; provided, that if the District shall in its discretion permit the Contractor to file such additional bond as is authorized by Section 3196 of the Civil Code, in a penal sum equal to one and one-fourth times the amount of said claim, said moneys shall not thereafter be withheld due to such claim.

57. Monthly Cost Estimates - Progress and Final Progress Payment.

57.1 The Contractor shall submit, by the third calendar day of each month on a form acceptable to the District, the estimate of the amount and value of all acceptable work and any extra work or changes approved by the District, up to the last day of the preceding calendar month, for the District's approval; and the Contractor will request a progress payment for the work completed thereof.

57.2 A deduction of five (5) percent shall be made from the total thus computed, and from the remainder there shall be further deducted any amounts due the District from the Contractor for supplies or materials furnished or services rendered and any other amounts that may be due the District under the terms of the contract. From the balance thus determined shall be deducted the amount of all previous payments and the remainder shall constitute the progress payment for that month. Such progress estimates shall not be required to be made by strict measurement, but they may be made by measurement or by estimation, or partly by one method and partly by the other, and it shall be sufficient if they are approximate only.

57.3 Pursuant to Public Contract Code Section 22300, at the request and expense of the Contractor, securities equivalent to the amounts, if any, withheld by the District to ensure performance under this contract shall be deposited with the District. The District shall pay such moneys to the Contractor upon satisfactory completion of the contract. Securities eligible for investment under this section shall include those listed in Government Code Section 16430 or bank or savings and loan certificates of deposit. The Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon.

If the securities to be deposited by the Contractor pursuant to this provision are in registered form, the registration shall be transferred to the District.

57.4 The Engineer shall approve the amount and value of all acceptable work and any extra work or changes approved by the District. Upon mutual agreement thereto, the Engineer will forward the approved estimate to the Chief Financial Officer for payment of the progress or final progress payment within ten (10) days thereafter.

57.5 In the event the Contractor and the District cannot mutually agree as to the amount and value of any item of work in the progress payment, the District will authorize payment of that portion of the progress and final progress payment to which the Contractor and the District have mutually agreed.

57.6 The Contractor shall file with the District, within five (5) calendar days after the Engineer has issued written notice of the disputed items to the Contractor, a written statement setting forth in complete detail the basis for their disagreement, including, but not limited to, any amount or value in disagreement or dispute.

57.7 Upon receipt of the Contractor's written statement, the General Manager shall investigate and consider the items of disagreement or dispute and render a decision thereon within a reasonable time, which decision shall be conclusive.

57.8 In the event the Contractor disagrees with the General Manager's decision, the Contractor's cost to the Contract for the delay in receiving the disputed balance of any progress or final progress payment, may be an item for arbitration according to Section 65 of the General Conditions.

57.9 In the event the contract or any part thereof shall be suspended as provided in Section 21, the retained percentage as provided in Section 58(b) shall become the sole and absolute property of the District to the extent necessary to repay the District any excess in the cost of the work above the contract price. After issuance of notice to discontinue work, no payment upon progress estimates or otherwise shall thereafter be made to the Contractor for the work covered by said notice until completion of work and final settlement.

57.10 The making of an estimate and payment in accordance therewith shall not preclude the District from demanding and recovering from the Contractor such damages as it may be entitled to under the contract because of their failure to comply with the Specifications.

58. Final Cost Statement.

58.1 Final Cost Statement is a document which summarizes all of the Contractor's earnings under this contract and any amounts due the District from the Contractor, and from which the final payment is made.

58.2 Upon completion of all of the work to be performed under this contract as set forth in Section 45, the Contractor shall submit for approval by the District in a form satisfactory to the District the amount and value of all acceptable work, and all extra work or changes approved by the District.

58.3 The Engineer shall approve the amount and value of all acceptable work and any extra work or changes approved by the District. Upon mutual agreement thereof, this District will prepare the Final Cost Statement document which shall be submitted to the Contractor for their acceptance and signature.

58.4 Upon endorsement by the Contractor of the Final Cost Statement, the District shall accept the work and authorize the final payment according to Sections 61 and 62 hereof.

59. Disputed Final Payment.

59.1 In the event the Contractor and the District cannot mutually agree as to the amount and value of the work, as set forth in this Final Cost Statement, the District will prepare the Final Cost Statement based upon the Engineer's determination of the amount and value of the work to which this Contractor may be entitled. Upon receipt of this Final Cost Statement, the Contractor shall file with the District within five (5) calendar days thereafter, a written statement setting forth in complete detail the basis for their disagreement, including, but not limited to, any amount or value in disagreement or dispute.

59.2 The Board reserves the right to accept the work and file the necessary Notice of Completion.

59.3 The Board shall investigate and consider the items of disagreement or dispute and render its decision thereon as to the amount due the Contractor within a reasonable time.

59.4 The District will authorize payment of that portion of the Final Cost Statement to which the Contractor and the District have mutually agreed according to Section 58 hereof. Reference is made to Section 64 of these General Conditions.

60. Acceptance.

Upon endorsement by the Contractor of the final cost statement, the Engineer shall prepare a memorandum of completion to advise the Board that the work has been satisfactorily completed and is ready for acceptance. At its next succeeding meeting, the Board shall consider acceptance of the work, and upon acceptance, shall authorize payment to the Contractor.

61. Final Payment.

61.1 At the end of thirty-five (35) days after filing the Notice of Completion, as set forth above, the total balance due the Contractor, or in case of a dispute, any portion of the total balance which has been mutually agreed is not in dispute, if unencumbered, or any part thereof unencumbered, shall be paid provided that a guarantee bond shall have been filed with the District.

61.2 For the purposes of this section, unencumbered balance means that portion over and above the face amount of all the stop notices on file with the District plus 25 percent of the face amount for potential interest and the cost of litigation as provided for in the Civil Code Section 3186-7.

62. Final Payment Terminates Liability.

62.1 The acceptance by the Contractor of the final payment aforesaid shall be a release to the District and its agents from all claim liability to the Contractor for anything done related to the work or for any act or neglect of the District related to the work, except the claim against the District for the remainder, if any, of the amounts kept or retained as hereinbefore provided.

62.2 No agent of the District shall be personally responsible for any liability arising under the contract. No claim shall be made or filed, and neither the District nor any of its agents shall be liable for, or held to pay any money, except as specifically provided in the contract.

63. Releases.

63.1 Prior to payment of the final progress payment, the District may require the Contractor to obtain releases from each of the subs, material suppliers, equipment rental firms and employees, whether or not any have filed a preliminary notice with District, who have performed any work for the Contractor under this contract for which any payment may be warranted.

63.2 Releases shall be submitted in a form approved by the District. Conditional releases may be unacceptable and acceptance thereof will be at the discretion of the District.

64. Disputes Settled by Arbitration.

In the event there is a dispute between the parties as to any of the terms and conditions of this agreement, including but not limited to the accounting rendered by the District, and said dispute cannot be resolved according to Section 59 of these General Conditions, the dispute shall be submitted to arbitration before a single arbitrator agreed to by the parties or failing such agreement appointed by the American

Arbitration Association and resolved according to Article 1.5 of the Public Contract Code. Regardless of the manner of appointment of said arbitrator, the arbitration shall be conducted according to the then prevailing rules of the American Arbitration Association for commercial arbitration, except that each party shall bear their own costs and attorney's fees which they incur.

64.1 As required under Section 20104, et seq., of the California Public Contract Code (Stats. of 1990), any 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 District shall be processed in accordance with the provisions of said Section 20104, et seq., related to informal conferences, non-binding judicially-supervised mediation, and judicial arbitration.

64.2 A single written claim shall be filed under this Article prior to the date of final payment for all demands resulting out of the Contract.

64.3 Within thirty (30) days of the receipt of the claim, District may request additional documentation supporting the claim or relating to defenses or claims 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.

64.4 Unless further documentation is requested, 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, District shall respond within the same amount of time taken by Contractor to respond, or fifteen (15) days, whichever is greater, after receipt of the 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 requested by District, District shall respond within the same amount of time taken by the Contractor to respond or thirty (30) days, whichever is greater.

64.5 If the Contractor disputes District's response, or 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 District within fifteen (15) days after the deadline of District to respond or within fifteen (15) days of District's response, whichever occurs first. District shall schedule the meet and confer conference within thirty (30) days of the request.

64.6 If following the meet and confer conference the claim or any portion remains in dispute, the claimant may pursue the remedies authorized by law. For purposes of these provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits their or her written claim until the time the claim is denied, including any period of time utilized by the meet and confer conference.

END OF PART B

PART C - SPECIAL CONDITIONS

1. Requirements.

The work to be performed under this contract shall consist of furnishing all plans, tools, materials (other than Owner-Furnished, Contractor-Installed items), supplies and manufactured articles and for furnishing all transportation, services, including fuel, power and water, and essential communications and the performance of all labor, work or other operations required for the fulfillment of the contract in strict accordance with the specifications, schedules and drawings, all of which are made a part hereof, and including such detail sketches as may be furnished by the Engineer from time to time during the construction in explanation of said drawings. The work shall be complete, and work, materials and services not expressly called for in the Specifications or not shown on the Drawings which may be necessary for complete and proper construction to carry out the contract in good faith shall be performed, furnished and installed by the Contractor at no increase in cost to the District.

2. General Description.

The Casitas Municipal Water District (District) is soliciting formal bids for a contract to Construct/Replace an Emergency Generator and Automatic Transfer Switch (ATS) at Marion R. Walker Pressure Filtration Plant (MWPFP). The work location is contained within the Casitas Municipal Water District service area in Ventura County, CA as shown in the Contract Documents. Work includes, but is not limited to:

- Relocate existing 350 kilowatt (kW) generator to be used as a temporary generator and demolish existing bollards.
- Install a new 450 kW, 480/277 Volt (V), 3-phase diesel generator skid with accessories (Owner-furnished), as an emergency power supply to the treatment plant.
- Install a new 480V, 800A, 3-pole,Automatic transfer Switch (ATS), also Owner-furnished. New ATS controller will automatically switch between generator and main service "MSA" for MCC-2 loads.

3. General Sequence of the Work.

3.1. Contractor shall notify the District of planned start date and general plan or order of work to be completed. A pre-construction meeting shall be held by the District for contract work. A field visit shall be conducted with District staff to field-verify the scope of contract work including removal, relocation, installation, and abandonment.

3.2. A shutdown plan shall be provided by the Contractor and approved by the District in order to minimize customer outages. The Contractor shall notify the District at least 10 days prior to any shutdown.

3.3. District Inspector will verify all work is completed in a manner consistent with the governing agency standards and will verify measurement of work.

3.4. Contractor submits a monthly progress payment request.

4. Contract Drawings

When deemed necessary by the District Engineer, additional detailed drawings will be furnished during the progress of work. The Drawings included in the contract are provided as Appendix A.

5. Beginning and Completion of the Work.

The Contractor shall execute the work in a timely fashion and shall complete all related work within the timeframe(s) established in the Instructions to Bidders, Time for Completion and Forfeiture Due to Delay. Work shall be performed Mondays through Fridays unless otherwise approved by the District. All work shall be performed between the hours of 8:00 a.m. and 4:30 p.m. No work shall occur on District observed holidays. The Contractor shall notify the District Inspector of work dates seven days in advance of work start. Time extensions for the project shall be granted with written permission from the District Engineer based on unreasonable weather conditions. Extension of work will be granted only for unfavorable weather conditions or natural disasters.

6. Access to the Site and Haul Routes.

6.1. The Contractor shall make their own investigation of the condition of the available public or private roads or other access, and of clearances, restrictions, bridge load limits, bond requirements and other limitation that affect or may affect transportation and ingress and egress at the job sites. The unavailability of transportation facilities or limitation thereon shall not become a basis for claims for damages or extension of time for completion of work. It shall be the Contractor's responsibility to construct and maintain, at their own expense and at their own risk, any haul roads, access roads, bridges or drainage structures required by construction operations.

6.2. Existing Public or Private Roads. The use of existing roads shall be at the Contractor's own expense and risk. It shall be the Contractor's responsibility to anticipate and meet all conditions properly imposed upon the use of existing roads by those having jurisdiction thereover, including (without limitation of the generality of the foregoing) seasonal or other limitations or restrictions, the payment of excess size and weight fees, and the posting of bonds conditioned upon repair of road damage caused by Contractor-generated traffic. It shall be the Contractor's responsibility to satisfy all lawful demands for repair of damage to existing roads caused by contract-generated traffic and barricade public access to project sites.

6.3. Haul Routes. The hauling of sand, gravel, earth materials or other intra-job hauling over public highways, roads or bridges shall be in compliance with the applicable local regulations and shall be such as to minimize interference with or congestion of local traffic. Temporary haul routes may be constructed through the basin. Access to the basin shall be from the designated area or as allowed by the permits and approved by the Engineer. Said temporary routes shall be removed and side slopes restored upon completion of hauling material. Routes shall be presented to the Engineer, in plan, prior to their creation, and modified as directed by the Engineer.

6.4. Cost. The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of work.

7. Explosives and Blasting.

The use of explosives for the work is not permitted.

8. Water and Power.

The Contractor is required to make their own arrangements for water and power they may require during construction of the project. If water is obtained from existing District facilities, the water will be furnished free of charge, but the Contractor shall be required to use the water through temporary metering facilities. Contractor shall obtain a temporary Construction Water Meter per Paragraph 6.1.3 of the Standard Specifications. The Contractor shall provide a suitable backflow prevention device to prevent contamination to the potable water system.

9. Safety.

9.1. The Contractor shall execute and maintain Contractor's work so as to avoid injury or damage to any person or property. The Contractor shall comply with the requirements of the specifications relating to safety measures applicable in particular operations or kinds of work.

9.2. In carrying out the Contractor's work, the Contractor shall at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all federal, state and local statutory and regulatory requirements including State of California, Division of Industrial Safety (Cal/OSHA) regulations. Safety precautions as applicable shall include, but not be limited to, adequate life protection, and lifesaving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees; such machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space procedures, trenching and shoring, and other safety devises, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; traffic control per County of Ventura requirements; and adequate facilities for the proper inspection and maintenance of all safety measures.

9.3. The name and telephone number of at least one medical provider in the vicinity and the telephone number of the local emergency facility shall be prominently displayed adjacent to the work area.

10. Access.

Contractor shall prioritize the vehicular ingress/egress of residents and visitors to maintain effective traffic control. Traffic control and equipment must be staged in a manner that will minimize impacts to the flow of traffic. Contractor shall maintain vehicle and pedestrian access for all access roads at all times.

11. Trench Backfill.

Contractor shall assume trench backfill to be sand bedding and native compacted backfill, per CMWD Standard Plan SD-1 and Section 5.6 of the Standard Details and Specifications or as shown on the Drawings.

12. Order of Work and Shutdowns

The anticipated order of work is shown below. Contractor shall provide a more detailed schedule showing tasks, duration, and dependencies.

12.1. The work for installing the new generator is expected to be as follows:

- Existing generator will be relocated as shown to be used as a temporary generator.
- Cables from existing generator to be disconnected from existing ATS.

- Temporary generator to be connected to existing ATS and tested for proper operation.
- Foundations for new generator and ATS, and the underground conduit, will be installed with ground loop and ground well.
- Install the generator and new ATS.
- Install cables from new generator to new ATS and then to inside the process room right above the MCC2, ready for swapping with existing cables from existing ATS. Also, the wiring from generator needs to be run all the way to Main service entrance, ready to be connected.
- Low voltage wiring to generator panel installed.
- Generator and ATS wiring tested for proper operation.
- Disconnect the wiring from existing ATS to new ATS.
- Main service lock out and tag out.
- Wiring from service entrance disconnected from existing ATS, at the same time, the wiring from MCC-2 to existing ATS will be disconnected. The temporary generator must be disconnected from existing ATS.
- New generator wiring connected to main service and MCC-2 will also be fed from new ATS.
- Existing ATS to be removed after completion of generator installation.
- Relocate existing generator to site shown on Drawings.

12.2. Compliance with the following items shall be required for any shutdowns:

- All power shutdowns by the Contractor shall be approved in advance by the District.
- It is expected there will be a shutdown of power at the time of disconnecting the existing generator from existing ATS and connecting the temporary generator to the ATS.
- The next expected power shut down would be after installation of new generator and ATS for transitioning from the temporary generator to the new generator.
- The District shall be given not less than one week's notice for any power shut down.

13. Owner Furnished Equipment and Materials

The District will furnish a new Generator and ATS. Cut sheets for the generator and ATS are included in Appendix B. The generator and ATS are expected to be delivered to the MWPFP site in mid-April 2025.

14. Contractor Furnished Equipment and Materials

The Contractor shall take steps to procure materials in a timely fashion so they are available for construction. Contractor shall not be entitled to additional compensation for price increases in materials or equipment. Materials and equipment purchased by the Contractor may be stored on location, in advance of construction. At the site location itself, any laydown or work activities must always ensure that chemical deliveries are maintained at all times. Contractor shall coordinate delivery of material with the District. Materials shall be stored in accordance with manufacturer recommendations to protect them from degradation and damage. Contractor takes complete responsibility for protection of materials stored at the site and shall not be entitled to compensation for damages or loss.

END OF PART C

PART D - MEASUREMENT AND PAYMENT

1. General.

This section defines rate schedule item prices and the manner in which they will be used to determine measurement and payment for all items included in the bid sheet.

2. Unbalanced Prices.

Proposed rate schedule item prices which are so unbalanced as to be detrimental to the District's interests may be rejected or cause rejection of the Bidder's entire bid at the discretion of the District.

3. Costs Included.

Each proposed bid schedule item price shall cover all costs and charges, including, without limitation, the costs of materials, fabrication, delivery, installation or application, supervision, bond and insurance charges, overhead, profit and taxes. Lump sum prices shall be the exact amount to be applied for the work actually provided for the purpose of establishing the payment due the Contractor.

4. Term of Prices.

Bid schedule item prices accepted by the District shall be held good and in effect until the work is completed and accepted by the District unless modified by change order.

5. Measurement and Payment.

This section defines the manner and method of measurement and payment for all items included in the Proposal and as amended by change order.

Compensation for all plant, equipment, tools, materials, labor, service, safety, permits, and all other items required to complete the work in conformity with the contract documents will be included in the payment provided in this section unless specifically excluded. No other compensation will be made except for the items listed on the bid sheet. Work for which no separate payment has been provided will be considered as a subsidiary obligation of the Contractor and the cost therefor shall be included in the applicable contract price for the item to which the work applies. All measurements of the work done will be made by the Engineer.

5.1. Bid Schedule Item No. 1 – Mobilization/Demobilization

This bid item shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of all offices, portable restrooms, and other facilities necessary for work on the project; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site.

Full compensation for Mobilization, including all labor, materials, tools, equipment and incidentals and for conforming to all applicable provisions of the Standard Specifications, these Special Provisions, and the requirements of the District shall be considered as included in the lump sum price paid for Bid Item 1, Mobilization, Demobilization complete and in-place, and no additional compensation will be allowed

therefor. This item will be paid at 60% upon start of the work, and 40% when the project is complete, and all materials and equipment have been mobilized off the project site.

5.2. Bid Schedule Item No. 2 – Site Clearing, Demolition, and Relocation

The work under this item shall include the cost of, but is not limited to, demolition of bollards, clearing the site and any other related activities.

5.3. Bid Schedule Item No. 3 – Environmental Controls.

The work under this item shall include the cost of but not limited to the Environmental controls that include complying with federal, state, and local regulations pertaining to water, air, solid waste, and noise pollution (including preparation of Environmental Protection Plan).

5.4. Bid Schedule Item No. 4 – Removing and Salvaging the existing Diesel Generator

The work under this item shall include the cost of, but is not limited to, disassembly of the existing diesel-generator and its platform, and relocation of the diesel-generator and platform pieces to the location specified by owner within designated area. Also provide the penetration for cables in the wall and ATS (E) for temporary Generator, as shown on the Drawings.

5.5. Bid Schedule Item No. 5 – Generator and ATS Foundation Earthwork

The work under this item shall include the cost of, but is not limited to, Generator and ATS Foundation Earthwork, cut the existing conduits to generator and cap it off, remove the excavation material, prepare for foundation as shown on the Drawings.

5.6. Bid Schedule Item No. 6 – Diesel Generator and ATS Foundation.

The lump sum price shall include the cost of, but is not limited to, running underground conduits from the generator to the ATS and installing the ground rod and grounding wiring and pouring Generator and ATS Foundations as shown on the Drawings.

5.7. Bid Schedule Item No.7 – Concrete and AC Pavement.

The work under this item shall include the cost of, but is not limited to Concrete, Asphalt Concrete Pavement, and Miscellaneous work around the Diesel-Generator and ATS foundation as shown on the Drawings.

5.8. Bid Schedule Item No. 8 – Furnish and Install Bollards.

The work under this item shall include the cost of, but not limited to, Furnish and Installation of Protection Posts (Bollards) as shown on the Drawings.

5.9. Bid Schedule Item No. 9 – Installation of Diesel Generator.

The work under this item shall include the cost of, but is not limited to, Install Diesel Generator include leveling of Diesel Generator, adjustment with conduit penetrations as shown on the Drawings.

5.10. Bid Schedule Item No. 10 – Installation of Automatic Transfer Switch (ATS).

The work under this item shall include the cost of, but is not limited to, installing new ATS and running above ground conduits:

- From main service entrance to ATS
- From new ATS to MCC2
- From generator to Load center
- From Generator and new ATS to PLC

As shown on the Drawings.

5.11. Bid Schedule Item No. 11 – Furnish and Install Wiring.

The work under this item shall include the cost of, but is not limited to, installing wiring, Conduit, Grounding, and Misc. Electrical as shown on the Drawings.

After installation and wiring of the new ATS, dispose of the existing ATS as shown on the Drawings.

5.12. Bid Schedule Item No. 12 – Facility Start-Up, Commissioning.

The work under this item shall include the cost of, but is not limited to, Facility Start-Up, Commissioning, Closeout Documents, Record Drawings, and Training.

END OF PART D

PART E – TECHNICAL SPECIFICATIONS

CASITAS MUNICIPAL WATER DISTRICT
MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

TECHNICAL SPECIFICATIONS
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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 31 20 00 "Earth Moving"

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

C. Design Mix: Prepared by a qualified professional engineer.

D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Casitas to provide concrete testing services. Contractor to provide samples as requested.

1.5 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1.

1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete”.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
3. ACI 318, “Building Code Requirements for Structural Concrete”.

2.2 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C 150, Type II, or Type V.
2. Fly Ash: ASTM C 618, Class F.
3. Slag Cement: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33 graded.

1. Maximum Coarse-Aggregate Size: **1 inch** nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C 260.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494, Type A.
2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

E. Water: ASTM C 94 **and potable**.

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, non-dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.7 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned based on laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use **water-reducing, high-range water-reducing**, **or**, **plasticizing** admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Normal-Weight Concrete:

1. Normal-Weight Concrete: Properties as indicated on Structural Notes Sheet of Contract Documents.

2.9 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 **and ASTM C 1116**, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.5 CONCRETE PLACEMENT

A. Place concrete in accordance with ACI 301.

B. Place concrete such that outdoor equipment pads are to be sloped for proper drainage away from the equipment.

C. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
2. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces **not exposed to public view**.

3.7 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces **to receive trowel finish.**

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Owner. Remove and replace concrete that cannot be repaired and patched to Ownert's approval.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a **special inspector** to perform field tests and inspections and prepare test reports.

END OF SECTION 03 30 00

SECTION 26 05 00

ELECTRICAL BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work Included:
1. Provide all required labor, project equipment and materials, tools, construction equipment, safety equipment, transportation, and test equipment, and satisfactorily complete all electrical work shown on the Drawings, included in these Specifications, or required for a complete and fully operating facility. In addition, provide wiring for the equipment that will be provided under other Divisions of these Specifications.
2. Provide all Instrumentation and Control wire that is specified in Division 26.
3. Auxiliary Devices: Provide conduit and wire for power and control for all auxiliary devices such as solenoid valves, pressure switches, and instruments that are included as part of a manufacturer's packaged system (i.e., all systems specified in Divisions 25 through 40)
4. Contractor shall be responsible for conduit and wire to these auxiliary devices even if not specifically shown on the Drawings or specified herein.

B. Work Specified in Other Divisions:
1. Division 26: Providing instruments and other equipment specified in Division 26.

C. Safety: Conduct operations in accordance with NFPA 70E, Standard for Electrical Safety Requirements for Employee Workspaces.

1.2 SUBMITTALS

A. Shop Drawings:
1. General: Submit Product Review or Product information shop drawings for materials and equipment as required under each Specification section.
2. For Product Review submittals, submit a single, complete submittal package for all items specified in a particular Specification section. Submittal packages shall be organized by equipment type. Include separators and tabs or other means of identifying each Specification paragraph (e.g., 2.01, 2.02, etc.) of the submittal.

B. As-Built Shop Drawings: Revise manufacturer's shop drawings to show any construction changes. Prior to final acceptance, deliver one complete set to the Owner for his favorable review. After such review, provide copies of all CAD produced drawings on magnetic media satisfactory to the Owner in AutoCAD DWG format.

C. Manuals:
1. Furnish manuals for equipment where Manuals are specified in the equipment Specifications. Submit manuals in accordance with the requirements of Division 1.
2. In each manual, include equipment descriptions, record shop drawings, operation and maintenance instructions, parts ordering data and ratings for the equipment furnished for this project.

D. Spare Parts: For each piece of equipment, submit a list of recommended spare parts. Include part numbers and the name, address, and telephone number of the supplier.

1.3 QUALITY ASSURANCE

A. Codes: All electrical equipment and materials, including installation and testing, shall conform to the following applicable codes:
   1. National Electrical Code (NEC), 2023 edition;
   2. National Electrical Safety Code (NESC), 2023 edition;
   3. Occupational Safety and Health Act (OSHA) standards;
   4. Rules For Overhead Electric Line Construction, General Order No. 95, Public Utilities Commission of the State of California, (G.O.95), latest edition;
   5. Rules For Construction of Underground Electric Supply and Communication Systems, General Order No. 128, Public Utilities Commission of the State of California, (G.O.128), latest edition; and
   6. Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, International Electrical Testing Association (NETA), latest edition.

B. Variances: In instances where two or more codes are at variance, the most restrictive requirements shall apply

C. Standards: Equipment shall conform to applicable standards of American National Standards Institute (ANSI), Electronics Industries Association (EIA), Institute of Electrical and Electronics Engineers (IEEE), and National Electrical Manufacturers Association (NEMA). The revisions of these standards in effect on the date of issuance of the Contract Documents shall apply.

D. Underwriters Laboratories (UL) listing is required for all equipment and materials where such listing is offered by the Underwriters Laboratories. Safety labeling and listing by other organizations, such as ETL Testing Laboratories, may be substituted for UL labeling and listing if acceptable to the authority having code enforcement jurisdiction. Provide service entrance labels for all equipment required by the NEC to have such labels.

E. Series short circuit ratings for protective devices are not allowed.

1.4 DRAWINGS

A. Drawings: The Electrical Drawings are diagrammatic; exact locations of electrical products shall be verified in the field with the Owner. Except where special details are used to illustrate the method of installation of a particular piece or type of equipment or material, the requirements or descriptions in this Specification shall take precedence in the event of conflict.
   1. Locations of equipment, inserts, anchors, motors, panels, pull boxes, manholes, conduits, stub-ups, fittings, lighting fixtures, power and convenience outlets, exterior lighting units and ground wells are approximate unless dimensioned; verify locations with the Owner prior to installation. Field verify scaled dimensions on Drawings.
   2. Review the Drawings and Specification Divisions of other trades and perform the electrical work that will be required for the installations.
   3. Should there be a need to deviate from the Electrical Drawings and Specifications, submit written details and reasons for all changes to the Owner for favorable review.
   4. Resolution of conflicting interpretations of the Contract Documents shall conform to Division 1, General Conditions.

B. As-Built Drawings:
   1. Maintain a complete and accurate record set of Drawings for the electrical construction work.
   2. Record all work that is installed differently than shown on the Drawings.

3. Upon completion of the work, transfer all marked changes to a clean set of full size Drawings with red ink. Mark the Drawings "AS-BUILT DRAWINGS" and submit them to the Owner when the electrical work is completed.

1.5 COORDINATION

A. Coordinate the electrical work with the other trades, code authorities, utilities, and CMWD.

B. Where connections must be made to existing installations, properly schedule all the required work, including the power shutdown periods. Schedule and carry out shutdowns so as to cause the least disruption to operation of the plant and privately owned facilities.

C. When two trades join together in an area, make certain that no electrical work is omitted.

1.6 JOB CONDITIONS

A. Operations:
1. Keep all power shutdown periods to a minimum.
2. Carry out shutdowns only after the schedule has been favorably reviewed by the Owner.

B. Construction Power:
1. Make all arrangements for the required construction power.
2. When required, provide all equipment, materials and wiring in accordance with the applicable codes and regulations.
3. Upon completion of the project, remove all temporary construction power equipment, material and wiring from the site as the property of the Contractor. Owner to remove temporary generator.

C. Storage: Provide adequate storage for all equipment and materials which will become part of the completed facility so that it is protected from weather, dust, water, or construction operations.

1.7 ELECTRICAL SERVICES

A. Provide all the equipment and materials for electrical services at the locations shown on the Drawings and described hereinafter. All work shall meet the requirements of the serving utility companies.

1.8 DAMAGED PRODUCTS

A. Notify the Owner in writing in the event that any equipment or material is damaged.

B. Obtain prior favorable review by the Owner before making repairs to damaged products.

1.9 OPTIONAL EQUIPMENT

A. For optional or substituted equipment, refer to Division 1, General Conditions.

1.10 LOCATIONS

A. General: Use equipment, materials and wiring methods suitable for the types of locations in which they are located, as defined in Paragraph B. herein.

B. Definitions of Types of Locations:
1. Dry Locations: All those indoor areas which do not fall within the definitions below for Wet, Damp, Hazardous, or Corrosive Locations and which are not otherwise designated on the Drawings.
2. Wet Locations: All locations exposed to the weather, whether under a roof or not, unless otherwise designated on the Drawings.

PART 2 - PRODUCTS

2.1 STANDARD OF QUALITY

A. Products that are specified by manufacturer, trade name or catalog number establish a standard of quality and do not prohibit the use of equal products of other manufacturers provided they are favorably reviewed by the Owner prior to installation.

B. It is the intent of these Specifications and Drawings to secure high quality in all materials and equipment in order to facilitate operation and maintenance of the facility. All equipment and materials shall be new and the products of reputable suppliers having adequate experience in the manufacture of these particular items. For uniformity, only one manufacturer will be accepted for each type of product. All equipment shall be designed for the service intended and shall be of rugged construction, of ample strength for all stresses, which may occur during fabrication, transportation, erection, and continuous or intermittent operation. All equipment shall be adequately stayed, braced and anchored and shall be installed in a neat and workmanlike manner. Appearance and safety, as well as utility, shall be given consideration in the design of details.

C. All components and devices installed shall be standard items of industrial grade, unless otherwise noted, and shall be of sturdy and durable construction suitable for long, trouble-free service. Light-duty, fragile and competitive grade devices of doubtful durability shall not be used.

2.2 FASTENERS

A. Fasteners for securing equipment to walls, floors and the like shall be either hot-dip galvanized after fabrication or stainless steel. Provide stainless steel fasteners in Corrosive Locations. When fastening to existing walls, floors, and the like, provide capsule anchors, not expansion shields. Size capsule anchors to meet load requirements. Minimum size capsule anchor bolt is 3/8-inch.

2.3 PAINTING

A. Equipment: Refer to each electrical equipment section of these Specifications for painting requirements of equipment enclosures. Repair any final paint finish, which has been damaged or is otherwise unsatisfactory, to the satisfaction of the Owner.

B. Wiring System: Paint all exposed conduits, boxes and fittings to match the color of the surface to which they are affixed. Paint finishes shall include proper surface preparation, prime coat and a final finish coat.

2.4 ENCLOSURES

A. Unless otherwise noted, provide enclosures as follows:
   1. Dry Locations: NEMA Type 1
   2. Wet Locations: NEMA Type 4
   3. Damp Locations: NEMA Type 12
   4. Hazardous Locations (gases): NEMA Type 7
   5. Hazardous Locations (dusts): NEMA Type 9
   6. Corrosive Locations: NEMA Type 4X
   7. See additional requirements below in Paragraph 3.8, Metal Panels.

PART 3 - EXECUTION

3.1 REQUIREMENTS

A. All electrical installations shall conform to the codes and standards outlined in this Section.

3.2 WORKMANSHIP

A. Assign a qualified representative who shall supervise the electrical construction work from beginning to completion and final acceptance.

B. Perform all labor using qualified craftsmen, who have had experience on similar projects. Provide first-class workmanship for all installations.

C. Ensure that all equipment and materials fit properly in their installations.

D. Perform any required work to correct improperly fit installations at no additional expense to Owner.

3.3 EXCAVATION AND BACKFILL

A. Provide the excavations for electrical equipment foundations and trenches for conduits as shown on the Drawings.

B. Exercise caution during all excavation work and avoid damage to existing underground pipes. Exercise extreme caution when working near existing electrical conduits and facilities. Field verify the location of all electrical facilities before proceeding with any nearby work.

C. Refer to Division 31 Earthwork, of these Specifications for all excavation and backfilling work.

3.4 CONCRETE

A. Where shown on the Drawings or specified, provide the required concrete installations for conduit encasement and equipment foundations.

B. Refer to relevant Technical Specifications for all concrete work.

3.5 CONDUCTOR IDENTIFICATION

A. Identify all wires and cables in conformance with the requirements of Sections 26 05 19 Low-voltage Electrical Power Conductors and Cables. This requirement applies to all equipment provided under this contract, regardless of Division, as well as to all conductors provided or worked on during this contract.

3.6 INSTALLING EQUIPMENT

A. Provide the required inserts, bolts and anchors, and securely attach all equipment and materials to their supports.

3.7 CUTTING, DRILLING, AND WELDING

A. Provide any cutting, drilling, and welding that is required for the electrical construction work.

B. Structural members shall not be cut or drilled, except when favorably reviewed by the Owner. Use a core drill wherever it is necessary to drill through concrete or masonry.

C. Provide the required welding for equipment supports. Conduits and fittings shall not be welded to structural steel.

D. Perform patch work with the same materials as the surrounding area and finish to match, as specified in Division 1 of these Specifications.

3.8 METAL PANELS

A. Mount all metal panels which are mounted on or abutting concrete walls in damp locations or any outside walls 1/4-inch from the wall, and paint the back sides of the panels with a high build epoxy primer. Film thickness shall be 10 mils minimum.

3.9 FIELD TESTS

A. Perform tests in accordance with applicable procedures as described in NETA Acceptance Testing Specifications.

B. Give one week notice to the Owner prior to any test to permit witnessing the test.

C. Provide the services of a recognized independent testing laboratory and pay all costs of performing the inspections and tests as specified herein, and SPEC 26 08 00 Commissioning of electrical system.

D. The testing laboratory shall provide all materials, equipment, labor and technical supervision to perform such tests and inspections. It is the intent of these tests to ensure that all electrical equipment is operational within industry and manufacturer's tolerances and is installed in accordance with the Contract Documents and manufacturer's instructions. The tests and inspections shall determine the suitability for energization.

E. The testing laboratory shall meet federal OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907. Membership in the International Electrical Testing Association (NETA) constitutes proof of meeting such criteria. The testing laboratory shall submit proof of these qualifications to the Owner for review. Testing laboratory shall be Electrical Testing and Controls, Electro-Test, Power Systems, or equal.

F. The testing laboratory shall have a calibration program, which maintains all applicable test instrumentation within, rated accuracy. The accuracy shall be traceable to the National Bureau of Standards in an unbroken chain. Instruments shall be calibrated in accordance with the following frequency schedule:
   1. Field instruments: 6 months maximum
   2. Laboratory instruments: 12 months
   3. Leased specialty equipment: 12 months Date calibration labels shall be visible on all test equipment.

G. Where testing pursuant to NETA requirements is required in these specifications, submit a test report which includes the following:
   1. Name of project, name of person performing test, and date of test
   2. Description of equipment tested
   3. Description of test
   4. List of test equipment used and calibration date
   5. Test results
   6. Conclusions and recommendations
   7. Appendix, including appropriate test forms, the test report shall be bound and its contents certified. Submit the completed report directly to the Owner no later than thirty (30) days after completion of the test unless directed otherwise. Number of reports to be submitted for review shall be the same as the number required for shop drawing submittals.

H. Safety practices shall include, but are not limited to, the following requirements:
   1. Occupational Safety and Health Act of 1970, OSHA
   2. Accident Prevention Manual for Industrial Operations, Seventh Edition, National Safety Council, Chapter 4.
   3. Applicable state and local safety operating procedures.

I. All field tests shall be performed with apparatus de-energized except where otherwise specifically required by Section 7 of the latest Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems published by NETA. The testing laboratory shall have a designated safety representative who shall be present on the project and supervise operations with respect to safety. Circuits operating in excess of 600 volts between conductors shall have conductors shorted to ground by a hot-line grounded device approved for the purpose. In all cases, work shall not proceed until the safety representative has determined that it is safe to do so. The testing laboratory shall have available sufficient protective barriers and warning signs to conduct specified test safely.

J. Electrical equipment and materials furnished and installed by the Contractor, and the testing equipment listed below shall be tested in accordance with the "Inspection and Test Procedures" and "System Function Tests" (Section 7) of the latest Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems published by NETA. Tests shall not

include any tests listed as optional in the aforementioned NETA Specifications unless specifically noted in respective equipment specifications for this project.

K. Retesting will be required for all unsatisfactory tests after the equipment or system has been repaired. Retest all related equipment and systems if required by the Owner. Repair and retest equipment and systems, which have been satisfactorily tested but later, fail, until satisfactory performance is obtained.

L. Putting Equipment and Cables into Service: Submittal and favorable review of the specified factory and field tests shall occur before the Contractor is permitted to place the respective equipment or cable into service.

M. Miscellaneous Tests
1. Insulation Resistance, Continuity, Rotation: Perform routine insulation resistance, continuity and rotation tests for all distribution and utilization equipment including all motors 1/2 horsepower and larger prior and in addition to tests performed by the testing laboratory specified herein. Supply a suitable and stable source of test power to the test laboratory at each test site. The testing laboratory shall specify requirements. Notify the testing laboratory when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling. All testing shall be performed in the presence of the Owner. The testing laboratory shall be responsible for implementing all final settings and adjustments on protective devices and tap changes. Any system material or workmanship that is found defective on the basis of acceptance tests shall be reported directly to the Owner. The testing laboratory shall maintain a written record of all tests and upon completion of project, assemble and certify a final test report.
2. Motor Current: Measure and record current in each phase for each new motor. Include measurement of the motor terminal voltages and motor currents when the motor is being operated at normal operating loads. For motors that are part of variable frequency drive systems, use true-RMS-reading instruments in making the measurements
3. Operational Tests: Operationally test all circuits to demonstrate that the circuits and equipment have been properly installed, adjusted and are ready for fulltime service. Demonstrate the proper functioning of circuits in all modes of operation.

3.10 EQUIPMENT PROTECTION

A. Exercise care at all times after installation of equipment, motor control centers, etc., to keep out foreign matter, dust, dirt, debris, or moisture. Use protective sheet metal covers, canvas, heat lamps, etc., as needed to ensure equipment protection.

3.11 CLEANING EQUIPMENT

A. Thoroughly clean all soiled surfaces of installed equipment and materials.

B. Clean out and vacuum all construction debris from the bottom of all equipment.

C. Provide and touch-up to original condition any factory painting that has been marred or scratched during shipment or installation, using paint furnished by the equipment manufacturer.

3.12 CLEANUP

A. Upon completion of the electrical work, remove all surplus materials, rubbish, and debris that accumulated during the construction work. Leave the entire area neat, clean, and acceptable to the Owner.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes covers all labor, material, tools, equipment and services required to install building wire and cable, service entrance cable, control cables, wiring connectors and connections.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. ASTM B 8 - Specifications for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

B. NECA - Standard of Installation.

C. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. NFPA 70 - National Electrical Code (NEC). Latest approved edition.

E. UL 83 - Thermoplastic-Insulated Wires and Cables.

1.3 DESCRIPTION OF WORK

A. The requirements of this section apply to cable and wires specified on the Drawings and in these specifications. The extent of electrical wire and cable work is indicated on Drawings and schedules and by the requirements of this section. The applications for cable, wire and connectors required, but not limited to, are as follows:
   1. Power distribution circuitry.
   2. Wiring from the generator to ATS and MCC.
   3. Line voltage wiring as required by other Divisions
   4. Control wiring from Generator to TS and PLC.

1.4 PROJECT CONDITIONS

A. Conductor sizes are based on copper.

B. Wire and cable routing shown on Drawings is diagrammatic unless dimensioned.

C. Route wire and cable as required to complement project conditions.

D. The Contractor shall be responsible for any and all raceways and raceway/cable supports in accordance with other sections of these specifications.

1.5 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by Underwriters Laboratories, Inc. (UL), Electrical Testing Laboratories, Inc. (ETL), or other recognized, acceptable testing and listing agencies as suitable for the purpose specified and shown.

1.6 CONTRACTOR SUBMITTALS

A. In accordance with Division 1 requirements.

B. Product Data: Submit manufacturer's catalog cuts and technical data for building wire and cables.

C. Test Report: Measure overall insulation resistance to ground. Provide certified test report for Engineer's Review.

1.7 CLOSEOUT SUBMITTALS

A. In accordance with Division 1 requirements.

B. Provide project record documents showing actual locations of components and circuits.

1.8 QUALIFICATIONS

A. Manufacturer shall be a Company specializing in manufacturing products specified in this section with a minimum of five years' experience.

1.9 FIELD MEASUREMENTS

A. Verify field measurements as indicated on Drawings.

1.10 COORDINATION

A. In accordance with Division 1 requirements.

B. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

C. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 feet of length shown.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE

A. Wire and cable shall be UL83 compliant, insulated, single conductor, copper, stranded, rated for 600-volts AC. The insulation shall be thermoplastic material rated for 90 degrees Celsius

dry locations, 75 or 90 degrees Celsius wet locations, THWN-2 or XHHW-2, per ANSI/NFPA 70.

2.2 INSTRUMENTATION AND CONTROL CABLES

A. Instrumentation cables to field mounted equipment and devices shall be minimum two (2) conductor No. 16 AWG, tin-coated copper, stranded, shielded twisted pair, 80 degree Celsius, PVC insulation foil shield with overall heavy duty polyethylene jacketing, rated for 600-volt AC.

B. Control cables to field mounted equipment and devices shall be a single conductor, insulated, No. 14 AWG minimum, copper, solid or stranded, rated for 600-volts AC. The insulation shall be thermoplastic material rated for 90 degrees Celsius dry locations, 75 degrees Celsius wet locations, THW or XHHW-2, per ANSI/NFPA 70.

C. Multi-conductor control cables to field mounted equipment and devices shall consist of several single conductor, insulated No. 14 AWG minimum, copper, solid or stranded, rated for 600-volts AC with an overall protective PVC jacket. The insulation shall be thermoplastic material rated for 90 degrees Celsius dry locations, 75 degrees Celsius wet locations, PVC, THW or XHHW-2, per ANSI/NFPA 70. Circuit identification shall consist of Method 1 - color coding in accordance with ICEA S-66-524, Appendix K Table K-2.

D. Instrumentation and control cable connected to equipment or devices within control panels shall be sized per requirements of equipment manufacturer (minimum #16 AWG control wire and instrumentation cable).

2.3 WIRING CONNECTORS

A. Solderless Pressure Connectors:
   1. FCI Burndy Corp.
   2. Ideal Industries Co.
   3. Thomas & Betts Co.
   4. 3-M Co.

B. Spring Wire Connectors:
   1. Ideal Industries Co.
   2. 3-M Co.

C. Compression Connectors:
   1. FCI Burndy Corp.
   2. Thomas & Betts Co.
   3. 3-M Co.

2.4 WIRE COLOR CODE

A. Color-code all conductors:
   1. Wire sizes 10 AWG and smaller shall have integral color-coded insulation.
   2. Wire sizes 8 AWG and larger may have black insulation but shall be identified by color-coded electrical tape at all junction, splice, pull, or termination points.
   3. Color tape shall be applied to at least 3 inches of the conductor at the termination ends and in junction or pull boxes or where readily accessible.
   4. Conductors for all systems shall not change color at splice points.

5. Where there are two or more neutrals in one conduit, each shall be individually identified with the proper circuit.
6. For 4 AWG and larger ground conductors, identify with green tape at both ends and all visible points, included in all junction boxes.
7. Each phase shall be uniquely color-coded.
8. Color-code wires as indicated below:

	Standard Single Phase 120, 208 or 240-Volts	**Standard Three Phase 208 or 240-Volts**	**Standard Three phase Industrial Equipment: 480 V**
Phase:	L1 – black	L1 - black	L1 - brown
	L2 - red	L2 - red	L2 - orange
	N - white	L3 - blue	L3 - yellow
	G - green	N - white	N - white or natural gray
		G – green	G- Grean or bare wire

See Appendix C for CMVD Electrical Wiring Color standard

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

C. Verify that raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly clean and swab raceway before installing wire.

3.3 INSTALLATION

A. General:
   1. Install wire and cable in accordance with manufacturer's instructions and NECA “Standard of Installation”.
   2. Route wire and cable as required to meet project conditions.
   3. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.
   4. Protect exposed cable from damage.
   5. Pull all conductors into raceway at same time.
   6. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
   7. Support cables above accessible ceiling using standard support methods to support cables from structure. Do not rest cable on ceiling panels.
   8. Neatly train and lace wiring inside boxes, equipment, and panelboards

B. Cable and Wire Size:
   1. Conductor sizes are based on copper unless indicated as aluminum or “AL”.
   2. Use 10 AWG conductors for 20 ampere, 120-volt branch circuits longer than 75 feet.
   3. Use 10 AWG conductors for 20 ampere, 277-volt branch circuits longer than 200 feet.

4. Use stranded conductor for all feeders, branch and control circuits.

C. Special Techniques - Wiring Connections:
1. Clean conductor surfaces before installing lugs and connectors. Where an anti-oxidation lubricant is used, apply liberally, coating all exposed conductor surfaces.
2. Use suitable cable fittings and connectors.
3. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
4. Tape un-insulated conductors and connector with two layers of half-lapped rubber insulating compound tape and two layers of half-lapped, 7-mil electrical tape, Scotch 33+, or equal.
5. Use split bolt connectors for copper conductor splices and taps, 8 AWG and larger.
6. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
7. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
8. Stranded conductors for control circuits shall have fork or ring terminals crimped on for all device terminations. Bare stranded conductors shall not be placed directly under the screws.

3.4 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection:
1. Inspect wire and cable for physical damage and proper connection.
2. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
3. Verify continuity of each branch circuit conductor.
4. Inspect compression-applied connectors for correct cable match and indentation.

B. Electrical Testing and Verification:
1. All 600 volt conductors 8 AWG and larger, shall be verified by use of a 500-volt meg-ohm-meter.
2. Perform continuity test to insure correct cable connection.
3. Correct malfunctions and/or deficiencies immediately as detected at no additional cost to the Owner, including additional verification testing.
4. Compile test report results and submit to Engineer for approval.
5. Subsequent to final wire and cable terminations, energize all circuitry and demonstrate functional adequacy in accordance with system requirements.

C. Test Values
1. Compare bolted connection resistance to values of similar connections.
2. Bolt-torque levels should be in accordance with NETA ATS Table 10.12 unless otherwise specified by the manufacturer.
3. Minimum insulation-resistance values should not be less than 50 meg-ohms.
4. Investigate deviations between adjacent phases.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes: Grounding and bonding for electrical systems.

B. Section includes: Grounding systems and equipment, plus the following special applications:

1. Underground distribution grounding.

2. Ground bonding common with lightning protection system.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Test wells.

2. Ground rods.

3. Ground rings.

4. Grounding arrangements and connections for separately derived systems.

B. Qualification Data: For qualified testing agency and testing agency's field supervisor.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition also include instructions for periodic testing and inspection of grounding features at test wells and ground rings based on NFPA 70B.

1. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.

2. Include recommended testing intervals.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.

2. Stranded Conductors: ASTM B 8.

3. Tinned Conductors: ASTM B 33.

4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.

5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at

least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad, round type; 3/4 inch by 10 feet (19 mm by 3 m) in diameter.

PART 3 EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0AWG minimum.

1. Bury at least 24 inches below grade.

2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.

3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Welded connectors.

D. Comply with IEEE C2 grounding requirements.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.

2. Lighting circuits.

3. Receptacle circuits.

4. Three-phase motor and appliance branch circuits.

5. Armored and metal-clad cable runs.

6. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

C. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

1. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Boxes and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.

2. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column extending around the perimeter of building

1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.

2. Bury ground ring not less than 24 inches from building's foundation.

E. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No.4 AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.

2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

F. Labeling

1. Comply with requirements in Division 26 05 54 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal at ground test wells. Make tests at ground rods before any conductors are connected.

4. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

5. Perform tests by fall-of-potential method according to IEEE 81.

6. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 25 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Owner promptly and include recommendations to reduce ground resistance.

-END OF SECTION-

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provisions: Applicable provisions of Section 26 05 00 Electrical Basic Requirements become a part of this Section as if repeated herein.

B. Work specified in other Divisions:
1. Division 3 Concrete
2. Division 31 Earthwork

1.2 REFERENCE STANDARDS

A. American National Standards Institute (ANSI) Publications:
1. C80.1 Specification for Zinc Coated Rigid Steel Conduit

B. Federal Specifications (FS):
1. FS W-C-1094 W-C-1094A Conduit and Conduit Fittings, Plastic, Rigid
2. FS WW-C-540 WW-C-540A Conduit, Metal, Rigid, (Electrical, Aluminum) WW-C-540C Conduit, Metal, Rigid & Coupling, Elbow & Nipple, Electrical Conduit, Aluminum
3. FS WW-C-566 WW-C-566C Flexible Metal Conduit

C. National Electrical Manufacturers Association (NEMA) Publications:
1. RN 1 Polyvinyl Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing
2. TC 6 PVC and ABS Plastic Utilities Duct for Underground Installation

D. Underwriters Laboratories (UL) Standards:
1. 6 Rigid Metal Electrical Conduit
2. 360 Liquid-Tight Flexible Steel Electrical Conduit
3. 651 Electrical Rigid Nonmetallic Conduit
4. 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

1.3 SUBMITTALS

A. Submit material or equipment data in accordance with the Product Information category of the General Conditions.

1.4 LOCATIONS

A. Refer to Section 26 05 00 Electrical Basic Requirements for definitions of types of locations.

PART 2 - PRODUCTS

2.1 CONDUIT, RACEWAYS

A. General:
1. Rigid steel conduit shall be used in all conduit systems, except where otherwise shown on the Drawings, where flexible conduit is required, or where these Specifications require, or allow the use of flexible nonmetallic tubing (ENMT), polyvinyl chloride (PVC) conduit.
2. The minimum size raceway shall be 3/4-inch unless indicated otherwise on the Drawings.

B. Galvanized Rigid Steel Conduit (RGS) shall be hot-dip galvanized after fabrication, conforming to ANSI C80.1 and UL 6. Couplings shall be threaded type. Where PVC coated rigid steel conduit is called for, it shall be hot-dip galvanized, conforming to NEMA RN 1, with factory-applied PVC coating 40 mils thick.

C. Flexible Conduit:
1. Flexible metal conduit shall be liquid-tight, shall have a moisture- and oil-proof PVC jacket extruded over a galvanized, flexible steel conduit, and shall conform to UL 360.
2. Flexible conduit for hazardous locations shall be UL listed for the applicable Class, Division, and Group.

D. Rigid Nonmetallic Conduit: Rigid nonmetallic conduit shall be PVC Schedule 40 (PVC-40) conduit approved for underground use and for use with 90°C wires and shall conform to UL 651.

2.2 CONDUIT SUPPORTS

A. Supports for individual conduits shall be galvanized malleable iron one-hole type with conduit back spacer.

B. Supports for multiple conduits shall be hot-dip galvanized Unistrut or Superstrut channels, or equal. All associated hardware shall be hot-dip galvanized.

C. All channels, strut, threaded rods, nuts and clamps in corrosive areas shall be of epoxy resin reinforced fiberglass material. Provide Robroy, Superstrut, or equal.

2.3 FITTINGS

A. Fittings for use with Rigid Galvanized Conduit (RGC) or Intermediate Metallic Conduit (IMC) shall be hot dipped galvanized steel or galvanized cast ferrous metal; access fittings shall have gasketed cast covers and be Crouse-Hinds Condulets, Appleton Unilets, or equal. Provide threaded-type couplings and connectors; set-screw type and compression-type are not acceptable.

B. Fittings for use with either rigid nonmetallic conduit or duct shall be PVC and have solvent-weld-type conduit connections. If such are not available, then the Specification for PVC coated galvanized rigid steel fittings shall apply.

C. Fittings for flexible conduit shall be Appleton Type ST, O-Z Gedney Series 4Q, or equal.

D. Union couplings for conduits shall be the Erickson type and shall be Appleton Type EC, O-Z Gedney 3-piece Series 4, or equal. Threadless couplings shall not be used.

E. Bushings:
   1. Bushings shall be the insulated type.
   2. Bushings for rigid steel or IMC shall be hot dip galvanized insulated grounding type, 0-Z Gedney Type HBLG, Appleton Type GIB, or equal.

F. Conduit seals shall have zinc electroplate and shall be Crouse-Hinds Type EYS or EZS; Appleton Type EYS, ESU, or EY series; or equal.

G. Fittings for EMT shall be compression type. Connectors shall be insulated throat type. Drive-on, crimp, spring or set screw fittings are not acceptable.

H. Fittings for ENMT shall be snap on-snap in types specially fabricated for ENMT.

2.4 WIREWAYS AND AUXILIARY GUTTERS

A. General: Wireways shall consist of a prefabricated channel-shaped trough with hinged or removable covers, associated fittings, and supports. Straight sections shall not be longer than 5 feet. Cross-sectional dimensions shall be as indicated on the Drawings. Fittings shall consist of elbows, tees, crosses, and closing plates as required.

B. Interior Locations: All components shall be constructed from sheet steel not less than 16 gauge and coated with a corrosion-resistant gray paint. Covers shall be held closed with screws.

C. Exterior Locations: Wireway and associated fittings shall meet NEMA 3R/12 classifications, with gasketed closing end plates and gasketed hinged covers.

2.5 SURFACE RACEWAYS

A. Surface metal raceways shall conform to the requirements of ANSI/NFPA 70 (the NEC) Article 352. Minimum cross-sectional area shall equal or exceed that of 1/2-inch conduit.

2.6 WARNING TAPE

A. Provide electrical warning tape in duct bank as shown on the Drawings. The tape shall be 6 inches wide, red with black lettering stating "CAUTION BURIED ELECTRIC LINE." The tape shall be made of 6-mil polymer with 36,000 psi tensile strength.

PART 3 - EXECUTION

3.1 CONDUIT, RACEWAY AND FITTING INSTALLATION

A. From pull point to pull point, the sum of the angles of all of the bends and offsets shall not exceed 270 degrees.

B. For power, control and signal circuits, provide conduit per Conduit Use Tables below, unless specifically indicated otherwise on the Drawings:

C. At all boxes and equipment, provide insulated type metallic grounding bushings for metallic conduits. Bond together all conduits to provide continuity of the equipment grounding system. Size bonding conductor per code.

D. Provide flexible conduit in lengths of not more than 18 inches at connections to motors, valves and any equipment subject to vibration or relative movement.

E. Conduits embedded in concrete floors on grade shall be installed between grids of reinforcing steel, or shall be encased below the floors, provided the concrete is thickened in a manner satisfactory to the Engineer. Installation of conduit below the bottom of this slab is not acceptable; embedding or encasing is required.

F. Provide galvanized rigid steel factory ells for both RGS and IMC raceways. Provide RGS for offsets in both RGS and IMC raceways.

G. Underground Raceways: Slope all underground raceways to provide drainage; for example, slope conduit from equipment located inside a building to the handhole located outside the building. For additional requirements see Section 26 05 33 Raceways and Boxes for Electrical Systems.

H. Conduit Supports: Properly support all conduits as required by the NEC. Run all conduits exposed except where the Drawings indicate that they are to be embedded in the floor slab, walls, or ceiling, or to be installed underground.
   1. Exposed Conduits:
      a. Support exposed conduits within 1 foot of any outlet and at intervals not exceeding NEC requirements; wherever possible, group conduits together and support on common supports. Support exposed conduits fastened to the surface of the concrete structure by one-hole clamps, or with channels. Use conduit spacers with one-hole clamps. Coordinate conduit locations with piping, equipment, fixtures, and with structural and architectural elements. Conduits attached to walls or columns shall be as unobtrusive as possible and shall avoid windows. Run all exposed conduits parallel to building lines.
      b. Group together exposed conduits in horizontal runs located away from walls and support on trapeze hangers. Arrange such conduits uniformly and neatly. Trapeze hangers shall consist of channels of adequate size, suspended by means of rods or other suitable means from the ceiling or from pipe hangers. Install such runs so as not to interfere with the operation of valves or any other equipment, and keep at least 6 inches clear of any pipe which may operate at more than 100°F. Treat cut surfaces or damaged ends with corrosion-resistant coatings such as "Devcon Z", prepared by Subox Coatings; "Galvanox Type I", prepared by Pedley-Knowles; or equal. Application shall follow manufacturer's recommendation.
   2. Conduits Embedded in Concrete: Provide concrete cover at least equal to that of the reinforcing steel, space at 3 conduit diameters apart except where they cross at angles greater than 45 degrees, and install so as not to reduce the structural integrity of the concrete element.

I. When expansion joints are crossed, whether conduit is embedded or exposed, provide watertight expansion fittings and bonding jumpers. In hazardous locations, provide Crouse-Hinds UNF/UNV, Appleton, or equal. In unclassified locations, provide Crouse-Hinds XD, Appleton, or equal.

J. Spare Raceways: After completing a conduit run between manholes, handholes, or pullboxes, prove the integrity of the conduit run. Use an air compressor to blow in a pull-line, then use the pull-line to pull a mandrel through the entire conduit run. Install a new 3/16-inch nylon, 800

pound test pull-line which has tape measure marking every foot to indicate length. Plug the ends of the conduit, with conduit cap plugs.

K. All penetrations through walls into or out of corrosive locations, as defined in Section 26 05 00 Electrical Basic Requirements shall be made gas-tight. In concrete walls, pour concrete after the conduit is in place, if possible. If not, core drill concrete or CMU walls, install conduit and caulk around it with non-shrink grout. Install conduit seal in each conduit near the penetration.

L. All conduit penetrations through interior walls and floors shall be sealed with silicon sealant.

M. Conduit Identification: Conduits in manholes, handholes, building entrance pull boxes, junction boxes, and equipment shall be provided with identification tags. Identification tags shall be 19 gage [1 mm thick] stainless steel, with 1/2 inch [13 mm] stamped letters and numbers as indicated on the drawings. Identification tags shall be attached to conduits with nylon tie wraps and shall be positioned to be readily visible.

N. Conduit Seals:
1. Moisture Seals: Provide in accordance with NEC Paragraph 300-5(g).
2. Gas Seals: Provide in accordance with NEC Paragraph 501-5.

O. Conduit in finished areas shall be installed concealed.

P. Rigid PVC conduit shall be stored on a flat surface and shielded from the sun.

Q. ENMT shall not be installed in hazardous areas, in concrete, or direct earth buried

Conduit Use Table 1

Circuit Type	Inside Buildings						
	Exposed			Concealed			
	Standard	Corrosive	Hazardous	Above Suspended Ceilings	In Stud Walls	Embedded In Concrete	Slab On Grade
Power & 120 VAC Control	RGS	PVC-40*	PVC Coated RGS**	EMT	EMT	RGS	RGS
Signal	RGS	PVC Coated GRS	PVC Coated RGS**	IMC	IMC	RGS	RGS

Conduit Use Table 2

Outside Building				Transition
Circuit Type	Exposed	Buried In Soil	Duct Bank Encased In Concrete	Within 5 Feet of Building

Power & 120 VAC Control	RGS	PVC-40*	PVC Type EB*	PVC Coated RGS
Signal	RGS	PVC Coated RGS	PVC type EB*	PVC Coated RGS

* Provide ground wire sized per NEC requirements for all circuits.
** PVC coated RGS in wet wells, etc., that are both hazardous and corrosive, otherwise, RGS.

Notes:

1. Generally, the Conduit Use Tables apply.
2. Signal circuits are those subject to RF interference or induced current. MSPs, TSPs, telephone cable, coaxial cable, and manufacturer's cables specially designed for low level signals are all presumed to be part of signal circuits.
3. Provide fiberglass conduit where indicated on the Drawings.

3.2 WIREWAY INSTALLATION

A. Straight sections and fittings shall be solidly bolted together to be mechanically rigid and electrically continuous. Dead ends shall be closed. Unused conduit openings shall be plugged.

B. Wireways shall be supported every 5 feet.

C. Wireways and auxiliary gutters shall not contain wiring or control devices and shall not extend over 30 feet in length.

END OF SECTION

SECTION 26 05 54

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.2 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.3 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:
   1. Black letters on an orange field.
   2. Legend: Indicate voltage and system or service type.
   3. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

F. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Colors for Raceways Carrying Circuits at 600 V and Less:
   1. Black letters on an orange field.
   2. Legend: Indicate voltage and system or service type.
   3. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

D. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.4 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

F. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.5 UNDERGROUND-LINE WARNING TAPE

A. Tape:
1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:
1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: Electric Line, High Voltage.
3. Inscriptions for Orange-Colored Tapes: Telephone cable, CATV cable, communications cable, optical fiber cable.

2.6 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and OSHA.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:
1. Preprinted aluminum signs punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

G. Metal-Backed, Butyrate Warning Signs:
1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches

D. Warning label and sign shall include, but are not limited to, the following legends:
4. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
5. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.7 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.8 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, according to ASTM D 638:12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F According to ASTM D 638:12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.
1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, according to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl tape applied in bands. Install labels at 30-foot maximum intervals.

B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
1. Emergency Power.
2. Power.

C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
2. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit. Refer to appendix C for Casitas Municipal Water District electrical wiring color standard.
3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

E. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.

F. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

G. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    a. Power transfer switches.
    b. Controls with external control power connections.

I. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer

J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
    1. Labeling Instructions:
        a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
        b. Outdoor Equipment: Engraved, laminated acrylic or melamine label
        c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
        d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION

SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 WORK INCLUDED

A. Testing, commissioning and startup of electrical system wiring, equipment and grounding.

B. In general inspection, testing and startup is described in the relevant sections of the specifications.

C. Field tests of low voltage conductors and cables are described in Section 26 05 19.

D. Field tests of grounding and bonding for electrical systems are described in Section 26 05 26.

1.2 RELATED WORK

A. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables

B. Section 26 05 26: Grounding and Bonding for Electrical Systems

1.3 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen trained and experienced in necessary trades and crafts and completely familiar with specified requirements and methods for proper performance of Work of this section.

B. Testing of installed equipment shall result in acceptable test results. Equipment for which acceptable test data has not been submitted, or has been submitted but rejected, shall be deemed as not meeting Contract Requirements.

C. Repair or replace items not passing tests.

1.4 REFERENCES

A. NETA ATS 1995 Acceptance Testing Specifications for Electric Power Distribution Equipment and Systems

B. NFPA 70 National Electric Code (NEC)

1.5 SUBMITTALS

A. Furnish the following submittals.

SUBMITTAL	DESCRIPTION
Pre-Test Submittals	Submit at least 7 days before testing

SUBMITTAL	DESCRIPTION
	Submit test personnel qualifications (resumes)
	Submit equipment testing schedule
	Equipment Manufacturer's instructions for testing manufactured products
	Submit test data forms
Post-Test Submittals	Submit summary of testing for Work including date and time of all tests
	Submit description of equipment tested
	Submit description of tests and test procedures
	Submit test results
	Submit conclusions and recommendations
	Submit completed test forms in appendix, including witness's signatures.
	Submit list of test equipment in appendix including calibration documents
	Submit tabulated data for each piece of equipment tested, including circuit number, equipment or motor name and tag number (where applicable), nameplate full-ampere rating, motor service factor, motor ambient temperature rating, overload relay rating, measured full load current, and measured discharge pressures (where applicable)
	Note or indicate wiring deviations from Contract Documents on Project Record Documents.
Deviations from Contract Documents	

1.6 UNIT PRICES

A. Payment for Work in this section shall be included as part of lump-sum or unit-price bid amount for which such Work is appurtenant.

PART 2 PRODUCTS

2.1 ACCEPTABLE TESTING FIRMS

A. Retain qualified engineering appraisal and testing firm to perform inspections, tests, and evaluation to determine equipment designated herein is installed and adjusted for successful energization and operation.

B. Testing firm shall meet Federal OSHA criteria for accrediting testing laboratories, Title 29, Part 1910.7, and have a work history and qualifications acceptable to COUNTY.

C. Testing firm shall have at least 2 years experience in testing equipment of nature to be tested.

D. Testing technicians shall be trained and experienced in type of testing to be performed.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify Owner Representative at least 3 days before tests to allow Owner to witness testing.

B. Examine areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of Work.

3.2 TESTING

A. The following testing standards shall be followed:
1. NETA (National Electrical Testing Association) standards
2. Manufacturer's installation and warranty requirements
3. Applicable OSHA and Cal OSHA regulations
4. NFPA 70 National Electric Code (NEC)
5. Other applicable ANSI, ASTM, and NEMA standards.

B. Refer variances between above documents and Contract Documents to Owner.

C. Perform tests to assure electrical equipment will safely operate within industry and Manufacturer's published tolerances and warranty requirements.

D. Record test result data to be used as baseline for future tests.

E. Report any items failing to pass tests promptly to Owner.

F. Coordinate work to expedite project schedule.

3.3 FIELD QUALITY CONTROL

A. Field testing shall include the following, in addition to any other requirements specified in other sections of the specification:

ITEM	TEST FOR	TEST STANDARD (ASTM OR OTHER TEST STANDARD)	FREQUENCY	FIRST TEST PAID FOR BY	RETESTS PAID FOR BY
Electrical Work	Installation Examination	Verify Work is free from improper grounds, short circuits and overloads.	1 inspection	Contractor	Contractor
		Verify correctness of wiring by visual comparison of conductor connections with connection diagrams.		Contractor	Contractor
		Make individual circuit con-		Contractor	Contractor

		tinuity checks using electrical circuit testers.			
	3-Point Fall-of-Potential Ground Test	Use accepted test equipment and test per Manufacturer's instructions	1 test each ground	Contractor	Contractor
	Circuit Insulation Resistance	Insulation resistance between conductors and between each conductor and ground shall be at least 25 megohms.	1 test each circuit before energizing	Contractor	Contractor
	Project Equipment Testing	Test the following electrical equipment items • MCC. • Molded Case Circuit Breakers. • Motors. • VFDs • Grounding Electrode Systems and Equipment Grounding System • 3-Phase Power Transformers.	1 test each piece of project electrical equipment, including 600 volt electrical distribution equipment, motor control centers, and grounding	Contractor	Contractor
	Field Performance	Demonstrate compliance to Contract Documents and Manufacturers' printed Literature	1 test	Contractor	Contractor

-END OF SECTION-

SECTION 312000

EARTH WORK

PART 1 - GENERAL

1.1 DEFINITIONS

A. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Owner. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner. Unauthorized excavation, as well as remedial work directed by Owner, shall be without additional compensation.

B. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

C. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

D. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.2 FIELD CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 SUBGRADE INSPECTION

A. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Owner, without additional compensation.

3.6 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of trees.

3.7 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform inspections:

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Structural Engineer.

D. When special inspector reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required. Recompact and reTest until specified compaction is obtained. Additional testing shall be at Contractor's expense.

E. Test until specified compaction is obtained. Additional testing shall be at Contractor's expense.

3.8 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

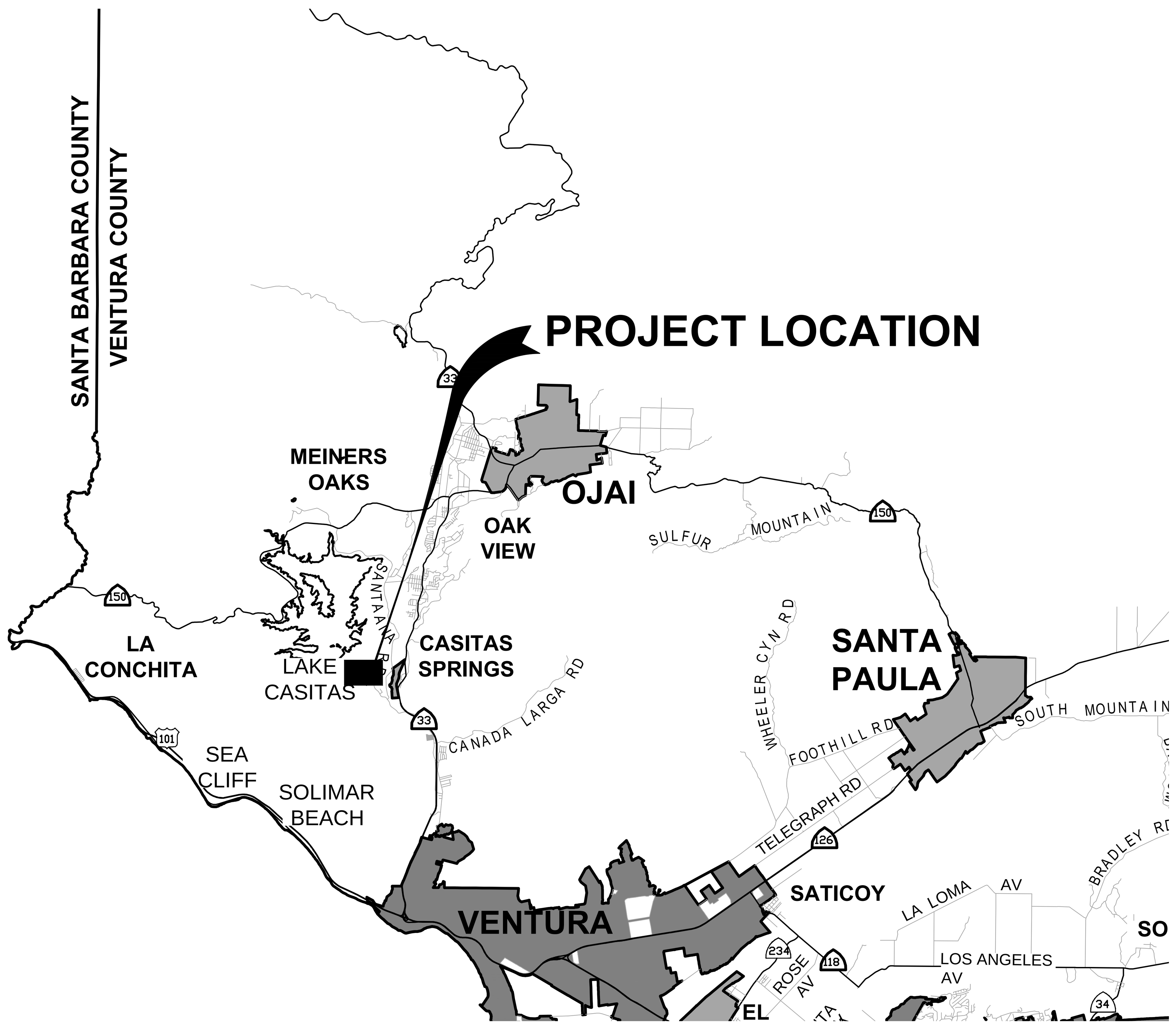
END OF SECTION 31 20 00

Appendix A

Drawings

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

SPECIFICATION NO. 24-471
JANUARY 2025



VICINITY MAP
NOT TO SCALE

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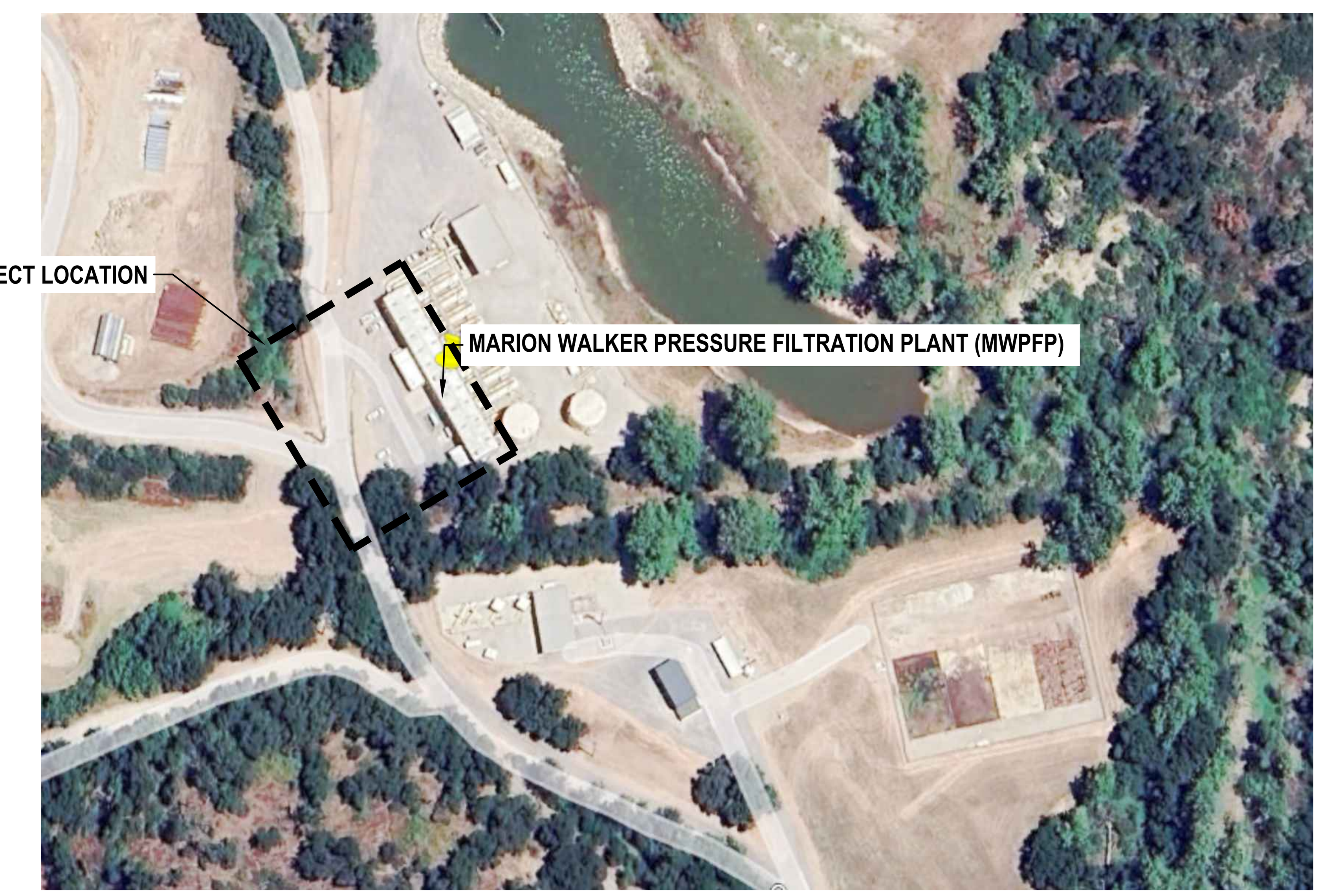
SHEET INDEX		
SHEET #	SHEET NAME	SHEET DESCRIPTION
1	G-01	TITLE SHEET, LOCATION MAP, AND SHEET INDEX
2	G-02	GENERAL NOTES
3	G-03	GENERAL SYMBOLS AND CIVIL NOTES
4	D-01	DEMOLITION AND TEMPORARY GENERATOR INSTALLATION
5	C-01	SITE CIVIL IMPROVEMENTS
6	C-02	CIVIL DETAILS
7	S-01	STRUCTURAL NOTES
8	S-02	FOUNDATION STRUCTURAL DETAILS AND SECTIONS
9	E-01	ELECTRICAL SYMBOLS, ABBREVIATIONS, AND NOTES
10	E-02	ELECTRICAL SITE PLAN NEW GENERATOR AND ATS INSTALLATION
11	E-03	SINGLE LINE DIAGRAM TEMPORARY GENERATOR INSTALLATION
12	E-04	SINGLE LINE DIAGRAM NEW GENERATOR AND ATS INSTALLATION
13	E-05	ELECTRICAL DETAILS

SHEET INDEX
NO SCALE



LOCATION MAP
1"=100'

Know what's below. Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER MEHDI MARDI No. E20033 ELECTRICAL STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

DESIGNED: TM
DRAWN: TM
CHECKED: MM
QA/QC: MM
CONSTRUCTABILITY:

NAME
TITLE
R.C.E. XXXXX EXP. XX - XX - XXXX

XX/XX/XXXX
DATE

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THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
AS SHOWN

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

TITLE SHEET, LOCATION MAP, AND SHEET INDEX

PROJECT NUMBER
12650565

DRAWING NUMBER
G-01

SHEET NUMBER
1 OF 13

GENERAL NOTES

1. PROJECT REQUIRES A CLASS 'A' OR "C10" GENERAL ENGINEERING CONTRACTOR'S LICENSE IN THE STATE OF CALIFORNIA.
2. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SITE CONDITIONS PRIOR TO THE COMMENCEMENT OF WORK AND REPORT ANY DISCREPANCIES TO THE OWNER. CONTRACTOR IS RESPONSIBLE FOR VISITING THE SITE AND BECOMING FAMILIAR WITH THE SITE CONDITIONS PRIOR TO BIDDING.
3. IT IS EXPECTED THAT THE ACTUAL LOCATION OF EXISTING UTILITIES MAY VARY FROM THAT SHOWN ON THE PLANS. CONTRACTOR SHALL POTHOLE AND LOCATE ALL EXISTING UTILITIES. VARIATIONS IN LOCATION AND DEPTH SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER IMMEDIATELY SO THAT THE LOCATION OF UTILITIES MAY BE CHECKED WITH THE PROPOSED DESIGN. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT PRIOR TO WORK COMMENCING FOR ANY EXCAVATION OR POTHOLING.
4. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THAT NEW FEATURES TIE INTO EXISTING SITE DEVELOPMENT, PIPE JOINTS MATCH CORRECTLY, AND THAT GENERAL DESIGN ELEVATIONS FOR NEW CONSTRUCTION PROVIDE PROPER DRAINAGE SLOPES FROM EXISTING TIE IN POINTS. REPORT DISCREPANCIES TO OWNER PRIOR TO CONSTRUCTION.
5. THE DESIGN FEATURES INCLUDING HORIZONTAL AND VERTICAL ALIGNMENTS, TYPICAL SECTIONS, APPROACHES, AND OTHER DESIGN DETAILS SHOWN ON THESE DESIGN PLANS SHALL NOT BE ALTERED OR MODIFIED IN ANY WAY DURING CONSTRUCTION WITHOUT THE EXPRESSED, WRITTEN DIRECTION AND APPROVAL OF THE OWNER.
6. UPON COMPLETION OF THE CONSTRUCTION PROJECT, THE CONTRACTOR SHALL LEAVE THE PROJECT AREA AND THE EXISTING ACCESS FREE OF DEBRIS AND UNUSED MATERIAL. ALL DAMAGE CAUSED BY THE CONTRACTOR SHALL BE RESTORED TO AN "AS GOOD OR BETTER" CONDITION.
7. CONTRACTOR TO MAINTAIN TRAFFIC (VEHICULAR AND PEDESTRIAN) ACCESS AT ALL TIMES. CONTRACTOR TO COORDINATE ANY PROPOSED SHUT DOWNS WITH OWNER.
8. MATERIAL NOT SUITABLE FOR REUSE SHALL BE REMOVED FROM SITE AND DISPOSED OF IN A MANNER CONSISTENT WITH APPLICABLE REGULATIONS. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND EXPENSE FOR LEGAL DISPOSAL OF ALL MATERIALS TAKEN FROM SITE.
9. THE CONTRACTOR SHALL SUBMIT A PROPOSED CONSTRUCTION SCHEDULE TO THE OWNER AT THE PRE-CONSTRUCTION MEETING SHOWING THE ORDER THEY INTEND TO CONSTRUCT ALL PORTIONS OF THIS PROJECT. THE OWNER SHALL PROVIDE EITHER APPROVAL OF THE CONTRACTOR'S SCHEDULE OR A LIST OF PROPOSED CHANGES TO THE SCHEDULE PRIOR TO CONSTRUCTION, AND THE CONTRACTOR SHALL ABIDE BY THAT APPROVED SCHEDULE THROUGHOUT THE COURSE OF THE PROJECT UNLESS OTHERWISE DIRECTED BY THE OWNER.
10. CONTRACTOR SHALL NOTIFY THE OWNER TWO (2) WEEKS PRIOR TO ANY CONSTRUCTION ACTIVITIES SO THAT THE OWNER MAY COORDINATE ACTIVITIES WITH OPERATION OF OWNER UTILITIES AND ROADS.
11. CONTRACTOR SHALL PROVIDE OWNER WITH THREE WEEKS' NOTICE FOR SYSTEM SHUTDOWNS SO CUSTOMER NOTICE CAN BE PROVIDED BY OWNER. SHUTDOWNS SHALL BE LIMITED TO 12-HOURS MAXIMUM.

GRADING NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL SURVEY DATA. CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING RIGHT- OF-WAY LINES, SLOPE EASEMENTS, AND ALL HORIZONTAL AND VERTICAL CONTROL PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKING AND SHALL ARRANGE FOR STAKING WITH A LICENSED SURVEYOR. STAKING WILL BE REVIEWED BY OWNER FOR CONFIRMATION TO DESIGN PRIOR TO CONSTRUCTION.
3. ALL GRADES BETWEEN SPOT ELEVATIONS SHALL HAVE UNIFORM SLOPE UNLESS OTHERWISE INDICATED. MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING WALLS AND DOORS. PER CALIFORNIA BULIDING CODE, LATEST EDITION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF ALL CONSTRUCTION. ADEQUATE SHORING BRACING, TIES, AND SUPPORTS SHALL BE USED TO PROVIDE PROPER TEMPORARY INTEGRITY DURING ALL PHASES OF CONSTRUCTION.
5. ALL EXISTING LANDSCAPED AND UNPAVED AREAS WHICH ARE DISTURBED BY CONSTRUCTION OR EARTHWORK OPERATIONS SHALL BE HAND RAKED SMOOTH AND RETURNED TO ORIGINAL EXISTING CONDITIONS.
6. ALL DITCHES, SWALES, GUTTERS, ETC. SHOULD BE CONSIDERED ACTIVE STORM CONVEYANCES UNLESS OTHERWISE INDICATED. CONTRACTOR IS RESPONSIBLE FOR ADDRESSING STORM WATER DRAINAGE AND DEWATERING OF WORK AREAS DURING CONSTRUCTION.
7. DURING WET WEATHER PERIODS, CONTRACTOR IS RESPONSIBLE FOR SEQUENCING CONSTRUCTION IN A MANNER TO MINIMIZE IMPACT ON OPEN EARTHWORK AND COMPACTION OPERATIONS.
8. COMPLETELY COVER ANY SOIL STOCKPILES WITH 6 MIL BLACK PLASTIC AND PROVIDE RESTRAINTS TO HOLD PLASTIC IN PLACE. MONITOR PLASTIC COVER AS PART OF CONTINUOUS EROSION CONTROL PLAN. PLACE SILT FENCE COMPLETELY AROUND STOCKPILE.

FIRE PROTECTION NOTES

1. CONTRACTOR SHALL MAKE THEIR OWN PROVISIONS FOR HOT WORK PERMIT AND PROVIDE APPROPRIATE FIRE PROTECTION.

BASIS OF DESIGN AND CONSTRUCTION SEQUENCE

OVERVIEW

CASITAS MUNICIPAL WATER DISTRICT WILL BE REPLACING THE EXISTING EMERGENCY GENERATOR AND ATS AT MARION WALKER TREATMENT PLANT TO ACHIEVE THE FOLLOWING OVERALL OBJECTIVES:

1. INSTALL TEMPORARY GENERATOR, PROVIDED BY OWNER.
2. SALVAGE AND RELOCATE EXISTING 350 KW GENERATOR, DEMOLISH EXISTING BOLLARDS.
3. INSTALL A NEW 450KW, 480/277V, 3Φ, DIESEL GENERATOR SKID WITH ACCESSORIES, OWNER FURNISHED, AS AN EMERGENCY POWER SUPPLY TO THE TREATMENT PLANT.
4. INSTALL A NEW 480V, 800A, 3 POLE, ATS, OWNER FURNISHED,. NEW ATS CONTROLLER WILL AUTOMATICALLY SWITCH BETWEEN GENERATOR AND MAIN SERVICE "MSA" FOR MCC-2 LOADS.

THE FOLLOWING CHANGES TO THE EXISTING ELECTRICAL SYSTEM WILL BE REQUIRED AS PART OF THE ABOVE OVERALL OBJECTIVES:

1. INSTALL A NEW 450KW, 480/277V, 3Φ, DIESEL GENERATOR SKID.
2. INSTALL A NEW 480V, 800A, 3 POLE, ATS.
3. INSTALL NEW UNDERGROUND CONDUITS AND FEEDER CABLES FROM GENERATOR TO THE NEW ATS.
4. INTERCEPT EXISTING CONDUITS FROM MSA THAT FEEDS (E) ATS, THEN PROVIDE NEW ABOVE GROUND CONDUITS AND FEEDER CABLES ALONG THE WALL TO THE NEW ATS.
5. INSTALL ABOVE GROUND CONDUITS AND FEEDER CABLES FROM NEW ATS TO (E) MCC-2.
6. INSTALL AUXILIARY POWER TO GENERATOR'S 120V DISTRIBUTION PANEL FOR BATTERY CHARGER, LIGHTING, AND OTHER LOADS FROM EXISTING LIGHTING PANEL.

CONSTRUCTION SEQUENCE:

1. CONTRACTOR TO COORDINATE WITH CMWD OPERATION AND PROVIDE A CONSTRUCTION SEQUENCE FOR PROJECT INSTALLATION.

UTILITY NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE PLOTTED FROM INFORMATION AVAILABLE AND INTERPOLATION OF PHYSICAL EVIDENCE ON THE SITE AND ARE SUBJECT TO FIELD VERIFICATION BY THE CONTRACTOR. .
2. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION.
3. THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THEY DO NOT SHOW EVERY DIMENSION, COMPONENT PIECE, OR FITTING REQUIRED TO COMPLETE THE PROJECT. CONTRACTOR IS RESPONSIBLE FOR PROVIDING A COMPLETE AND WORKING SYSTEM.
4. CONTRACTOR SHALL COORDINATE A UTILITY LOCATE 72 HOURS PRIOR TO BEGINNING ANY UTILITY CONSTRUCTION FOR LOCATION MARK-UP OF ALL EXISTING UTILITIES. CONTRACTOR SHALL COORDINATE THE UTILITY LOCATE WITH OWNER FOR ALL UTILITY WORK. INFORM OWNER IMMEDIATELY IF LOCATE INDICATES THAT EXISTING UTILITIES ARE DIFFERENT THAN SHOWN ON DRAWINGS.
5. CONTRACTOR IS RESPONSIBLE FOR POTHOLING ALONG IN THE VICINITY OF THE IMPROVEMENTS TO IDENTIFY POTENTIAL UTILITY CONFLICTS, SOILS CONDITIONS, AND TIE-IN POINTS. CONTRACTOR RESPONSIBLE FOR MAKING ADJUSTMENTS IN CONFIGURATION TO ACCOMMODATE ACTUAL FIELD CONDITIONS.
6. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES, FEATURES, AND STRUCTURES LOCATED ON THE SITE. LOCATE, PROTECT, AND AVOID DISRUPTION OF ALL ABOVE AND BELOW GRADE UTILITIES DURING CONSTRUCTION.
7. ALL UTILITY CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA ELECTRICAL CODE (CEC) AND OWNER STANDARDS.
8. ALL BURIED LINES TO HAVE 30 INCHES MINIMUM COVER, UNLESS NOTED OTHERWISE.
9. ALL EXISTING UTILITIES AND TIE-IN POINTS SHOULD BE CONSIDERED ACTIVE UTILITIES UNLESS OTHERWISE INDICATED.
10. CONFIRM ALL UTILITY VALVE VAULTS, VALVES, METERS, BACKFLOW PREVENTION ASSEMBLIES, AND OTHER PUBLIC UTILITY APPURTENANCES IN THE RIGHT-OF-WAY WITH THE UTILITY OWNERS.
11. ALL BOLTS USED FOR UNDERGROUND CONNECTIONS SHALL BE STAINLESS STEEL. ALL CORROSION PROTECTION SHALL BE IN PLACE. ALL BOLTED JOINT ACCESSORIES SHALL BE CLEANED AND THOROUGHLY COATED WITH ASPHALT OR OTHER CORROSION-RETARDING MATERIAL AFTER INSTALLATION.

REGISTERED PROFESSIONAL ENGINEER
MEHDI MARD
No. E20033
ELECTRICAL
STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District

GHD

DESIGNED:	TM
DRAWN:	TM
CHECKED:	MM
QA/QC:	MM
CONSTRUCTABILITY:	

NAME XX/XX/XXXX
TITLE DATE
R.C.E. XXXXX EXP. XX - XX - XXXX

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SCALE:
AS SHOWN

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

GENERAL NOTES

PROJECT NUMBER
12650565
DRAWING NUMBER
G-02
SHEET NUMBER
2 OF 13

GENERAL PLAN SYMBOLS

Symbol	Description	Symbol	Description
	6" CURB & GUTTER	IRR	IRRIGATION BOX
///	EDGE OF AC PAVEMENT	GM	GAS METER
	6" VERTICAL CURB	GV	GAS VALVE
OH	OVERHEAD WIRES	WM	WATER METER
OHE	OVERHEAD ELECTRIC WIRES	WV	WATER VALVE
OHT	OVERHEAD TELEPHONE WIRES	WV	WATER VALVE
UGE	UNDERGROUND ELECTRIC LINE		FIRE HYDRANT
E	ELECTRIC LINE		FIRE DEPARTMENT CONNECTION
SL	STREET LIGHT CONDUIT		WATER TAPPING SADDLE
G	GAS LINE		SANITARY SEWER MANHOLE
SS	SANITARY SEWER LINE	S	SEWER MANHOLE
SSFM	SANITARY SEWER FORCE MAIN	SSCO	SANITARY SEWER CLEANOUT
SD	STORM DRAIN LINE	SLP	SEWER LAMP HOLE
SWS	SEAWATER SUPPLY	SV	SEWER VENT
SWR	SEAWATER RETURN	SD	STORM DRAIN MANHOLE
T	TELEPHONE LINE	CB	CATCH BASIN
TC	TELECOMMUNICATIONS		CURB INLET
L	LIGHTING CONDUIT	DI	DRAINAGE INLET
TV	TELEVISION LINE	SDCO	STORM DRAIN CLEANOUT
W	WATER LINE	RWL	RAIN WATER LEADER
FW	FIRE WATER MAIN	E	ELECTRIC VAULT COVER
IRR	IRRIGATION LINE		ELECTRIC PULLBOX
	TRENCH DRAIN	TV	TELEVISION PULLBOX
x	CHAIN LINK FENCE	T	TELEPHONE PULLBOX
>	FLOW LINE	HVE	HIGH VOLTAGE ELECTRIC
v	TOP OF BANK		UNDERGROUND ELECTRIC VAULT
89	CONTOUR ELEVATION LINE	T	TELEPHONE MANHOLE
	CENTER LINE		POWER POLE
	EXISTING PROPERTY LINE	GUY	GUY WIRE & ANCHOR
	MONUMENT LINE	(2)R	JOINT POLE WITH (2) RISERS
	EXISTING EASEMENT LINE		JOINT POLE
TC 24.52	FINISH GRADE		STREET LIGHT
2.0%	SURFACE DRAINAGE SLOPE		ELECTROLIER
x 95.94 / 95.94 G	SPOT ELEVATION		PEDESTRIAN LIGHT
	CORRUGATED METAL PIPE		PEDESTRIAN PUSH BUTTON
	PROPOSED AC PAVEMENT	SL	STREET LIGHT PULLBOX
			SIGN (AS NOTED)
			BOLLARD

GENERAL SHEET SYMBOLS

1 KEYNOTE

1 DEMOLITION NOTE

DETAIL OR SECTION NUMBER

1 / C-501 **TITLE**

SCALE

SHEET ON WHICH DETAIL OR SECTION APPEARS

DETAIL NUMBER

1 / C-501 DETAIL INDICATOR

SHEET ON WHICH DETAIL APPEARS

SECTION NUMBER

A / C-501 SECTION INDICATOR

SHEET ON WHICH SECTION APPEARS

811

Know what's **below.**
Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

GENERAL CIVIL NOTES

1. CONTRACTOR COMPLIANCE: CONTRACTOR SHALL COMPLY WITH ALL PERMITS FROM REGULATORY AGENCIES HAVING JURISDICTION.
2. MAINTAIN A STRICT RECORD OF ALL CHANGES AND SUBMIT THIS RECORD TO THE DISTRICT, COORDINATE TRANSFERRING "AS-BUILT" INFORMATION ON THE CONTRACT DRAWINGS, AND DELIVER THE CERTIFIED "AS-BUILT" PLANS TO THE DISTRICT BEFORE THE RELEASE FOR FINAL ACCEPTANCE OF THE PROJECT SHALL BE FILED.
3. EXERCISE DUE CARE TO AVOID DAMAGE TO EXISTING IMPROVEMENTS OR FACILITIES, UTILITY FACILITIES, ADJACENT PROPERTY, AND TREES AND SHRUBBERY TO REMAIN. ALL DAMAGE CAUSED TO PUBLIC STREETS, INCLUDING HAUL ROUTES, ALLEYS, SIDEWALKS, CURBS OR STREET FURNISHINGS, OR TO PRIVATE PROPERTY, SHALL BE REPAIRED AT THE SOLE EXPENSE OF THE CONTRACTOR TO THE SATISFACTION OF THE DISTRICT'S REPRESENTATIVE.
4. TYPICAL DETAILS APPLY WHETHER OR NOT THEY ARE SPECIFICALLY REFERENCED ON INDIVIDUAL PLANS, DETAILS, OR SECTIONS.
5. THE CONTRACTOR SHALL MAINTAIN A COMPLETE SET OF CONTRACT DOCUMENTS, INCLUDING PLANS AND SPECIFICATIONS, AT THE JOB SITE WHILE ANY WORK IS BEING CONDUCTED.
6. THE DISTRICT WILL HIRE AN INSPECTOR FOR TESTING SERVICES FOR COMPACTION AND CONCRETE COMPRESSIVE STRENGTH. CONTRACTOR SHALL COMPLETE THE WORK IN CONFORMANCE WITH ALL REQUIREMENTS AND SPECIFICATIONS AND SHALL PROVIDE ACCESS TO DISTRICT REPRESENTATIVES TO PERFORM TESTING. COSTS FOR ADDITIONAL TESTING DUE TO FAILURE TO COMPLY WITH CONTRACT REQUIREMENTS SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL DESIGN, CONSTRUCT, AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING AND BRACING, AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS, AND REGULATIONS

UNDERGROUND UTILITY NOTES

1. ALL UNDERGROUND UTILITIES OR STRUCTURES REPORTED BY THE OWNER OR SHOWN ON RECORDS ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. THE CONTRACTOR AGREES TO ASSUME LIABILITY AND HOLD THE DISTRICT HARMLESS FOR ANY DAMAGE RESULTING FROM UNREPORTED OR INACCURATELY RECORDED UNDERGROUND UTILITIES OR STRUCTURES. THE CONTRACTOR MUST NOTIFY UTILITY OWNERS BEFORE STARTING WORK.
2. THE CONTRACTOR SHALL CONTACT THE UTILITY OWNERS AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO BEGINNING EXCAVATION AND VERIFY IF A REPRESENTATIVE FROM EACH ENTITY WILL BE PRESENT DURING EXCAVATION.
3. OVERHEAD UTILITIES ARE NOT SHOWN IN ALL INSTANCES. THE CONTRACTOR SHALL USE CAUTION WHEN WORKING NEAR OR UNDER THESE UTILITIES AND PROTECT THEM IN PLACE.
4. THE CONTRACTOR SHALL NOT INTERRUPT THE UTILITY SERVICE FUNCTION, DISTURB THE SUPPORT BASE, OR MODIFY ANY FACILITY WITHOUT AUTHORITY FROM THE UTILITY OWNER.
5. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER IF ANY UTILITY IS DISTURBED OR DAMAGED DURING THE COURSE OF THE WORK. THE CONTRACTOR SHALL BEAR THE COSTS OF REPAIR OR REPLACEMENT OF ANY MARKED UTILITY WHERE DAMAGE WAS CAUSED BY THE CONTRACTOR'S ACTIVITIES.

PUBLIC UTILITIES WITHIN PROJECT LIMITS

ELECTRICITY:

SOUTHERN CALIFORNIA EDISON COMPANY
14005 S. BENSON AVE
CHINO, CA 91710
GILBERT ACEVES
909-548-7249

WATER:

CASITAS MUNICIPAL WATER DISTRICT
1055 VENTURA AVE
OAK VIEW, CA 93022
LINDSAY CAO
805-649-2251, EXT. 144

TELEPHONE:

COORDINATE WITH PLANT OPERATION
FOR POINT OF CONTACT WITH ATT

ABBREVIATIONS

AC	ASPHALT CONCRETE
AVE	AVENUE
ATS	AUTOMATIC TRANSFER SWITCH
CMWD	CASITAS MUNICIPAL WATER DISTRICT
CMP	CORRUGATED METAL PIPE
CNC	CONCRETE
CP	CONTROL POINT
DWY	DRIVEWAY
E	EXISTING
EG	EXISTING GRADE
FG	FINISH GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
FT	FOOT (FEET)
L	LENGTH
LF	LINEAR FEET
LOTO	LOCK OUT/TAG OUT
MAX.	MAXIMUM
MIN.	MINIMUM
NO.	NUMBER
NTS	NOT TO SCALE
OFCI	OWNER-FURNISHED CONTRACTOR INSTALLED
PP	POWER POLE
PVC	POLYVINYL CHLORIDE
RD	ROAD
SCE	SOUTHERN CALIFORNIA EDISON
SCH	SCHEDULED
ST	STREET
TOC	TOP OF CONCRETE
TYP.	TYPICAL
UG	UNDERGROUND

REGISTERED PROFESSIONAL ENGINEER
MEHDI MARDI
No. E20033
ELECTRICAL
STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District

GHD

DESIGNED:	TM
DRAWN:	TM
CHECKED:	MM
QA/QC:	MM
CONSTRUCTABILITY:	

NAME
TITLE
R.C.E. XXXXX EXP. XX - XX - XXXX

XX/XX/XXXX
DATE

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
AS SHOWN

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

GENERAL SYMBOLS AND CIVIL NOTES

PROJECT NUMBER
12650565

DRAWING NUMBER
G-03

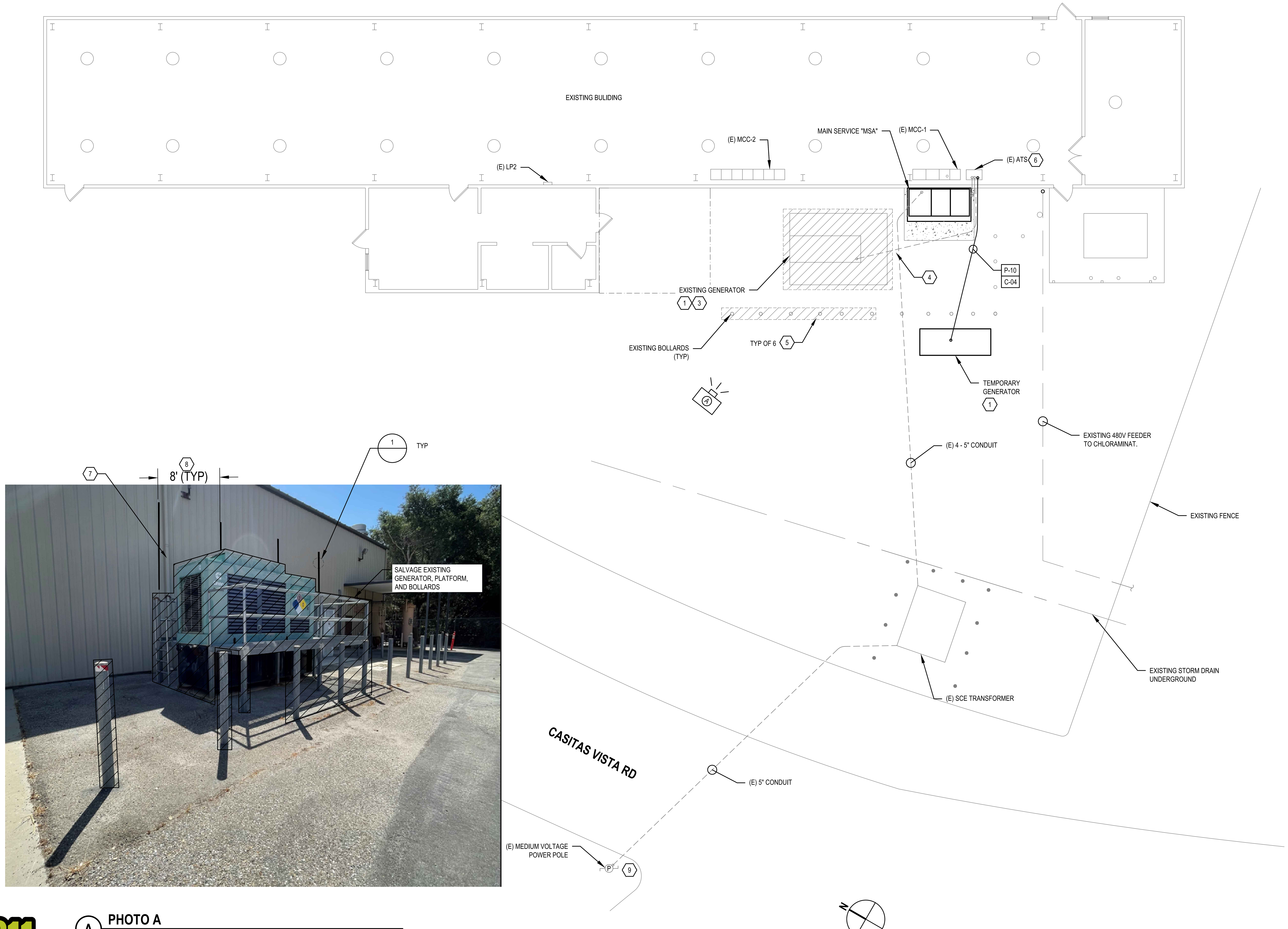
SHEET NUMBER
3 OF 13

SHEET GENERAL NOTES

1. REFER TO E-04 FOR TEMPORARY GENERATOR SINGLE LINE DIAGRAM.
2. INSTALL TEMPORARY GENERATOR PRIOR TO DEMOLITION OF EXISTING GENERATOR

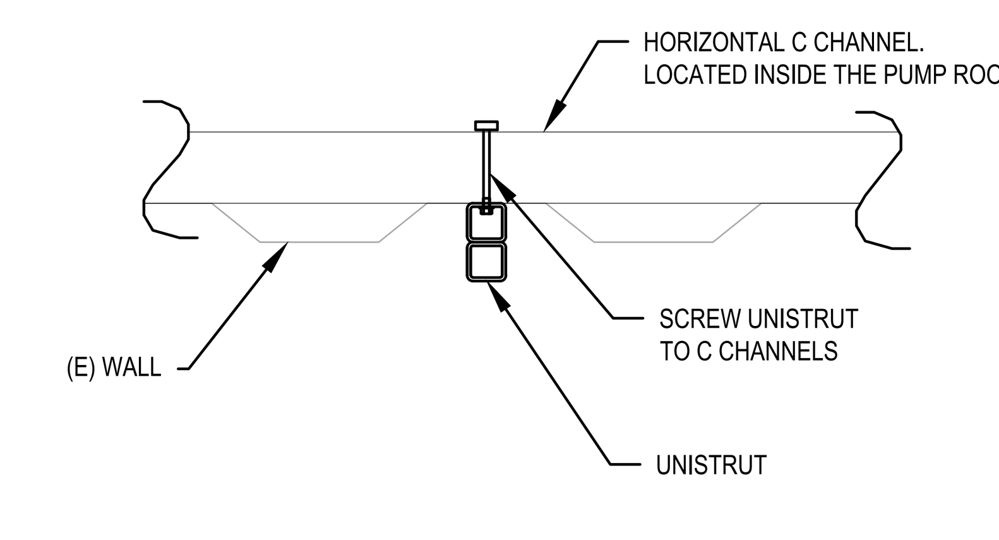
SHEET KEYNOTES

1. TEMPORARY GENERATOR INSTALLATION NOTES.
   - 1.1. USE RELOCATE EXISTING GENERATOR AS TEMPORARY DIESEL GENERATOR, 350KW, 480/277V, 3φ.
   - 1.2. LOTO 800A CB FROM MAIN SERVICE "MSA" THAT FEEDS (E) ATS.
   - 1.3. DISCONNECT (E) GENERATOR WIRING FROM (E) ATS.
   - 1.4. CONNECT TEMPORARY GENERATOR TO (E) ATS WITH TEMPORARY CABLES, P-02.
   - 1.5. SEE SHEET E-03 FOR SINGLE LINE DIAGRAM.
   - 1.6. NOT TO EXCEED 8-HR SHUTDOWN TO RELOCATE AND RECONNECT.
2. NOT USED.
3. REMOVE EXISTING POWER AND CONTROL WIRES CONNECTED TO GENERATOR.
4. CUT THE CONDUIT FROM GENERATOR TO ATS, FLUSH WITH GROUND, ON BOTH ENDS. FILL IN 12" OF EACH END OF THE CONDUIT WITH SLURRY .
5. DEMOLISH EXISTING PIPE BOLLARDS.
6. AFTER INSTALLING NEW GEN-SET AND ATS-1, DEMOLISH AND DISPOSE EXISTING ATS AND ASSOCIATED CABLES.
7. RELOCATE EXISTING DOWNSPOUT AS NEEDED.
8. INSTALL UNISTRUT WITH 8' SEPARATION.
9. COORDINATE WITH AT&T FOR ANY LIVE SERVICE UNDERGROUND PHONE LINE.



A PHOTO A
NO SCALE

SALVAGE/DEMOLITION SITE PLAN
SCALE 1/8" = 1'-0"
0 4' 8' 16'



1 DETAIL 1 TOP VIEW
NO SCALE

Know what's below. Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER MEHDI MARD No.E20033 ELECTRICAL STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District
GHD

DESIGNED:	TM
DRAWN:	TM
CHECKED:	MM
QA/QC:	MM
CONSTRUCTABILITY:	

NAME ______ XX/XX/XXXX
TITLE ______ DATE
R.C.E. XXXXX EXP. XX - XX - XXXX

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SCALE:
NO SCALE

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

SALVAGE/DEMOLITION AND TEMPORARY GENERATOR INSTALLATION

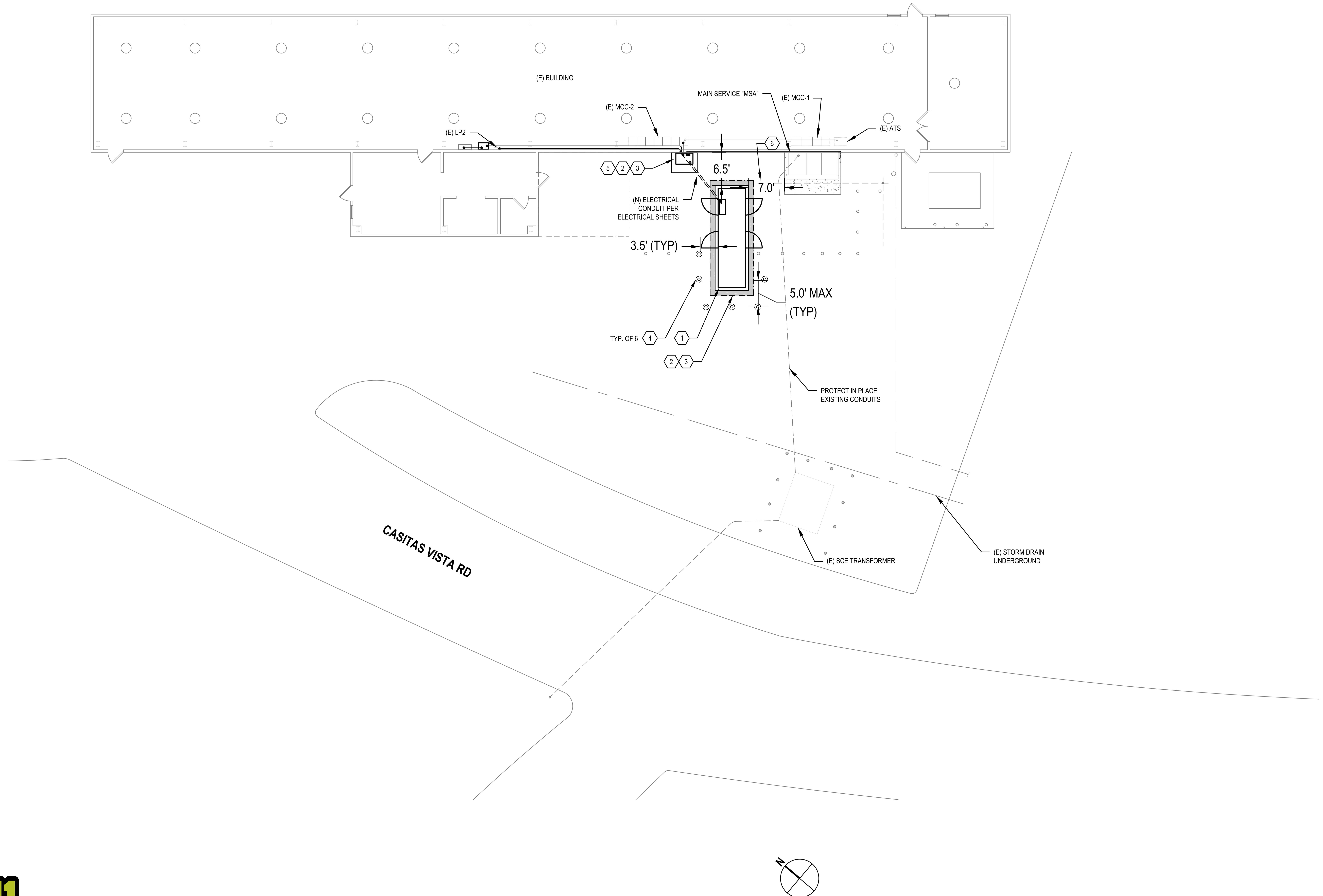
PROJECT NUMBER 12650565
DRAWING NUMBER D-01
SHEET NUMBER 4 OF 13

GENERAL NOTES

1. PROTECT REMAINDER OF EXISTING GENERATOR CONCRETE PAD.
2. REPAIR THE AC PAVEMENT, SEE SHEET C-02 DETAIL 1

SHEET KEYNOTES

1. CONSTRUCT CONCRETE PAD FOR GENERATOR, PER SHEET S-02. INSTALL GENERATOR PER SHEET E-02.
2. FINISH SURFACE WITH AC PAVING TO LIMITS SHOWN PER DETAIL 1, SHEET C-02. SAWCUT AND JOIN WITH EXISTING PAVEMENT PER DETAIL 1 SHEET C-02.
3. REPAIR AC PAVEMENT TO MATCH EXISTING GRADE PER DETAIL 1, SHEET C-02.
4. INSTALL 4" BOLLARDS PER DETAIL 2, SHEET C-02.
5. CONSTRUCT CONCRETE PAD FOR ATS, PER SHEET S-02. INSTALL ATS PER SHEET E-02.
6. THE CONTRACTOR TO KEEP MINIMUM 7' DISTANCE BETWEEN GENERATOR FOUNDATION AND SERVICE ENTRANCE PAD, VERIFY THIS DISTANCE WITH THE OWNER BEFORE CONSTRUCTION OF FOUNDATION.



SITE IMPROVEMENTS PLAN

SCALE: 1"=10'

0 10' 20'

Know what's below. Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District

GHD

DESIGNED:	TM
DRAWN:	TM
CHECKED:	MM
QA/QC:	MM
CONSTRUCTABILITY:	

NAME
TITLE
R.C.E. XXXXX EXP. XX - XX - XXXX

XX/XX/XXXX
DATE

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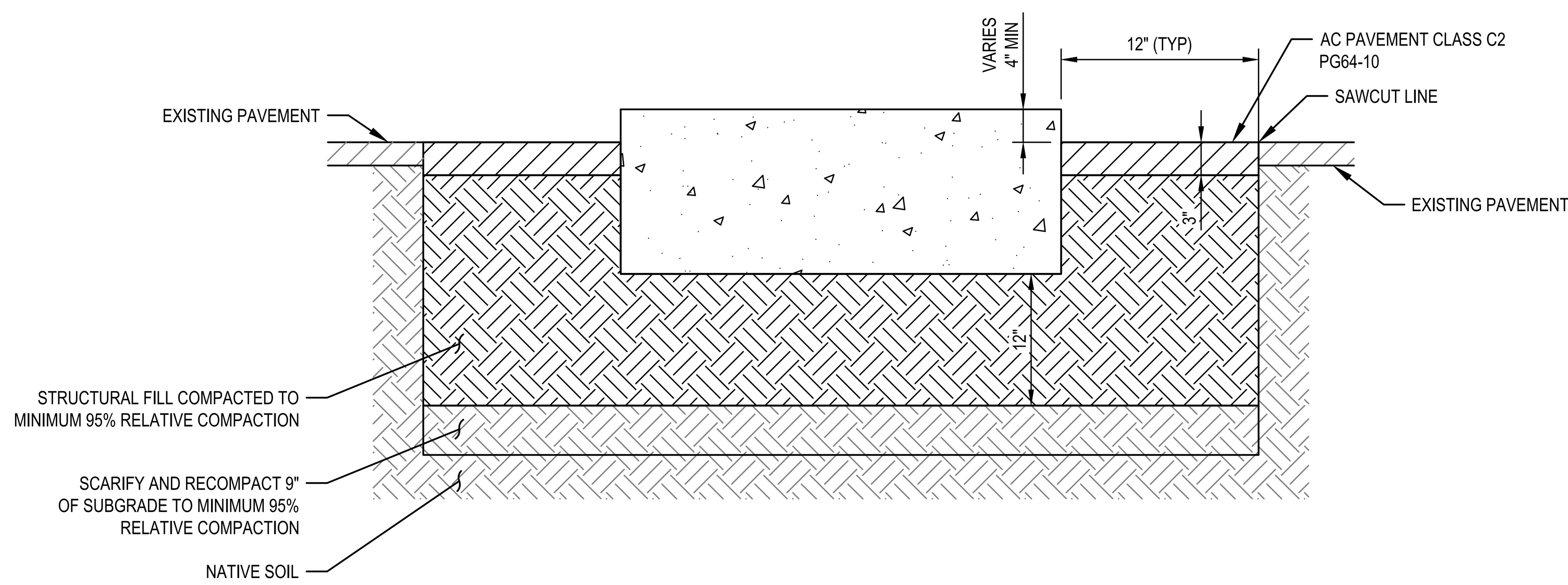
SCALE:
AS SHOWN

REGISTERED PROFESSIONAL ENGINEER PEDRO ALVAREZ No. C85867 CIVIL STATE OF CALIFORNIA

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

SITE CIVIL IMPROVEMENTS

PROJECT NUMBER 12650565
DRAWING NUMBER C-01
SHEET NUMBER 5 OF 13

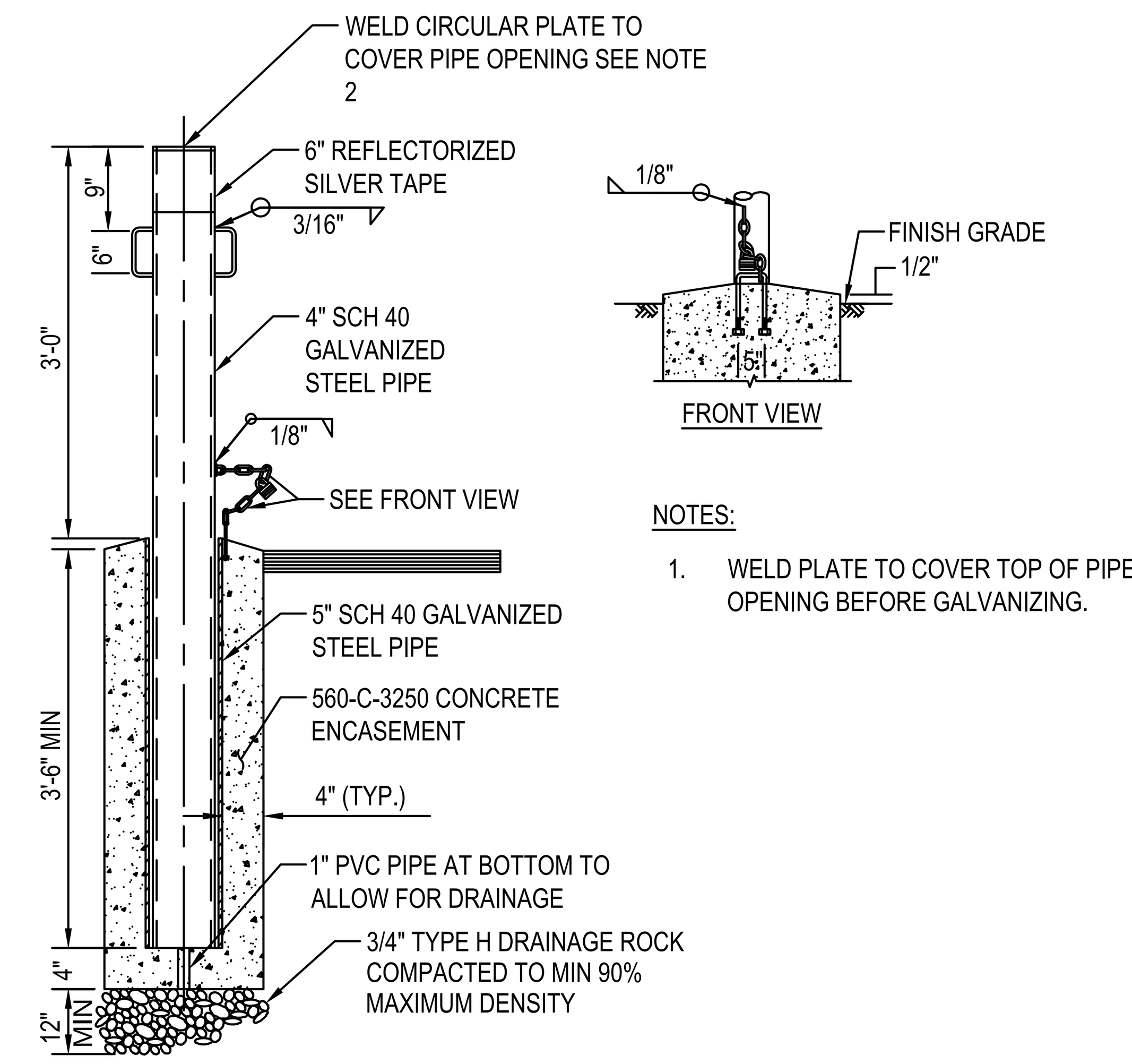


NOTES:

1. SLOPE PAVEMENT AWAY FROM GENERATOR AND ATS PADS.

PAVING AND SAWCUT DETAIL (1 / -)

NOT TO SCALE



NOTES:

1. WELD PLATE TO COVER TOP OF PIPE OPENING BEFORE GALVANIZING.

4" REMOVABLE BOLLARD DETAIL (2 / -)

NOT TO SCALE

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District

GHD

DESIGNED: TM
DRAWN: TM
CHECKED: MM
QA/QC: MM
CONSTRUCTABILITY:

NAME
TITLE
R.C.E. XXXXX EXP. XX - XX - XXXX

XX/XX/XXXX
DATE

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SCALE:
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MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

CASITAS MUNICIPAL WATER DISTRICT

CIVIL DETAILS

PROJECT NUMBER 12650565

DRAWING NUMBER C-02

SHEET NUMBER 6 OF 13

GENERAL

1. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST CALIFORNIA BUILDING CODE AND APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

2. ALL CONDITIONS SHOWN OR NOTED AS EXISTING ARE BASED ON BEST INFORMATION CURRENTLY AVAILABLE AT THE TIME OF PREPARATION OF THESE DRAWINGS. NO WARRANTY IS IMPLIED AS TO THEIR ACCURACY. CONTRACTOR IS TO FIELD VERIFY ALL CONDITIONS. SHOULD CONDITIONS BECOME APPARENT WHICH DIFFER FROM THE CONDITIONS SHOWN HEREIN THEY SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE STRUCTURAL ENGINEER. THE STRUCTURAL ENGINEER WILL THEN PREPARE ADDITIONAL DRAWINGS AS MAY BE NEEDED TO ACCOMMODATE THE NEW CONDITIONS.

3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF EXISTING CONDITIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB. SHOULD ANY DISCREPANCIES OCCUR, NOTIFY ENGINEER FOR INSTRUCTIONS BEFORE PROCEEDING.

4. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ADEQUATE SHORING, BRACING AND OTHER WORKING PROVISIONS AS REQUIRED TO SAFELY COMPLETE THE STRUCTURE AND PROTECT AGAINST BODILY INJURY AND PROPERTY DAMAGE. SAFETY MEASURES SHALL MEET THE REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL GUIDELINES.

5. TYPICAL DETAILS AND STRUCTURAL NOTES SHALL APPLY UNLESS OTHERWISE NOTED OR SHOWN. DETAILS OF CONSTRUCTION NOT FULLY SHOWN SHALL BE THE SAME NATURE AS SHOWN FOR SIMILAR CONDITION.

6. ALL BUILDING MATERIAL SHALL BE NEW MATERIAL UNLESS NOTED OTHERWISE.

7. CIVIL AND ELECTRICAL PLANS ARE CONSIDERED A PART OF THE STRUCTURAL DESIGN DRAWINGS AND ARE TO BE USED TO DEFINE DETAIL CONFIGURATIONS INCLUDING, BUT NOT LIMITED TO RELATIVE LOCATION OF MEMBERS, ELEVATION, LOCATION OF ALL OPENINGS, ETC. ANY CONFLICTS IN INFORMATION BETWEEN DRAWINGS SHALL BE BROUGHT TO THE ARCHITECT'S OR STRUCTURAL ENGINEER'S ATTENTION BEFORE PROCEEDING.

8. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE SHOWN, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY FIELD REPRESENTATIVES OF THE STRUCTURAL ENGINEER DO NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OF THE PROCEDURES FOR SUCH METHODS OF CONSTRUCTION. ANY SUPPORT SERVICES PERFORMED BY THE STRUCTURAL ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES WHICH ARE FURNISHED BY THE STRUCTURAL ENGINEER, WHETHER OF MATERIAL OR WORK, AND WHETHER PERFORMED PRIOR TO, DURING OR AFTER COMPLETION OF CONSTRUCTION, ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS; BUT THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

9. CONTRACTOR SHALL NOT SCALE DRAWINGS.

DESIGN CRITERIA

SEISMIC LOADS:
- RISK CATEGORY: III
- IMPORTANCE FACTOR: 1.25
- S_S= 2.23
- S_1 = 1
- S_{DS} = 1.57
- S_{D1} = 1.4
- SITE CLASS = D
- SEISMIC DESIGN CATEGORY = E
- SEISMIC DESIGN FORCE, Fp = 795 LBS FOR ATS AND 11028 LBS FOR GENERATOR
- STRUCTURAL ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE PROCEDURE

WIND LOADS:
- EXPOSURE: B
- ULTIMATE DESIGN WIND SPEED (3 SEC GUST): 88 MPH
- RISK CATEGORY: III
- WIND DESIGN LOAD, Fh = 18 PSF

CONCRETE NOTES

1. ALL WORK TO CONFORM TO THE REQUIREMENTS OF THE FOLLOWING PUBLICATIONS:

   1.1. ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-LATEST EDITION) AND "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" (ACI 315-LATEST EDITION).

2. READYMIX CONCRETE SHALL BE MIXED AND DELIVERED IN ACCORDANCE WITH ASTM C-94.

3. CEMENT FOR CONCRETE SHALL BE A STANDARD BRAND "PORTLAND CEMENT", MEETING THE REQUIREMENT OF ASTM C-150.

4. AGGREGATES FOR CONCRETE SHALL MEET THE REQUIREMENTS OF ASTM C-33.

5. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS:

   4000 PSI (NORMAL WEIGHT) AT FOUNDATIONS
   MAXIMUM SLUMP: 5" AS MEASURED BY THE ASTM "STANDARD METHOD OF TESTING FOR SLUMP OF PORTLAND CEMENT CONCRETE
   PRIOR TO PLACING CONCRETE, MIX DESIGNS SHALL BE SUBMITTED FOR REVIEW.

6. CONCRETE ACCESSORIES MUST BE ADEQUATE TO MAINTAIN REINFORCING ACCURATELY IN PLACE AND BE NON-CORROSIVE, NON-STAINING TYPE.

7. REFERENCE SPECIFICATIONS FOR CONCRETE CURING AND PROTECTION. BEGIN CONCRETE CURING AS SOON AS FINISHING OPERATIONS ARE COMPLETE (WITHIN TWO HOURS).

8. IN CONCRETE SLABS OTHER THAN THOSE ON STEEL DECK, INSTALL ALL ELECTRICAL CONDUITS WITH MINIMUM 1.5" COVER BEFORE TOP REINFORCING IS PLACED. CHAIR CONDUITS SO AS TO BE LOCATED IN MIDDLE THIRD OF SLAB THICKNESS. WHERE 3 OR MORE CONDUITS RUN ADJACENT TO EACH OTHER AND HAVE NO TOP REINFORCING, ADD 6X6 - W2.9 X W2.9 WELDED WIRE FABRIC X 2'-0" WIDE OVER FULL LENGTH OF CONDUIT. THE MAXIMUM CONDUIT SIZE IS TO BE 1/3 THE THICKNESS OF THE SLAB. THE MINIMUM CLEAR DIMENSION BETWEEN CONDUITS SHALL EQUAL 3 CONDUIT DIAMETERS. CONDUIT PLACEMENT IS NOT TO AFFECT DESIGN OF CONCRETE MEMBERS.

9. REFER TO ARCHITECTURAL AND MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS FOR ALL DEPRESSIONS, REVEALS, GROOVES, REGLETS, DOVETAILS, CURBS, TREAD INSERTS, SLAB INSERTS, PROJECTIONS, SILLS, PIPE SLEEVES, DUCT OPENINGS, CONDUIT OPENINGS, ETC. THAT ARE TO BE CAST WITH CONCRETE.

10. ALL PROPRIETARY ANCHORING SYSTEMS TO BE INSTALLED INTO CONCRETE ELEMENTS IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS USING THE REQUIRED SUPPLEMENTAL COMPONENTS SUCH AS SCREEN TUBES, DOWELING ADHESIVES, ETC.

11. EPOXY ANCHORS AND DOWELS

   11.1. EPOXY SHALL BE THE FOLLOWING, UNO
   HILTI HIT-HY 200-R V3 (ICC-ES REPORT ESR-3814)
   11.2. RODS EMBEDDED IN EPOXY SHALL BE CARBON STEEL THREADED RODS PER THE EPOXY MANUFACTURER'S TEST REPORT
   11.3. ANCHOR EMBEDMENT AND FIELD TEST VALUES ARE AS FOLLOWS, UNO
   11.4. TESTING SHALL OCCUR AFTER EPOXY HAS CURED, AS PER MANUFACTURER'S RECOMMENDATIONS

Know what's below.
Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

REINFORCING STEEL

1. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60. ALL REINFORCING STEEL TO BE WELDED SHALL BE ASTM A706. DEFORMATIONS SHALL BE IN ACCORDANCE WITH ASTM A305.

2. REINFORCING SHALL BE FABRICATED AND PLACED ACCORDING TO CRSI, "MANUAL OF STANDARD PRACTICE".

3. ALL REINFORCING STEEL, DOWELS, ANCHOR BOLTS AND OTHER INSERTS SHALL BE WELL SECURED IN PLACE PRIOR TO CONCRETE OR GROUT POUR. ADEQUATE SUPPORTS SHALL BE PROVIDED FOR ALL REINFORCING STEEL.

4. THE FOLLOWING MINIMUM CLEAR DISTANCES BETWEEN REINFORCING STEEL AND FACE OF CONCRETE SHALL BE MAINTAINED UNLESS OTHERWISE NOTED:

   CONCRETE BELOW GRADE, FORMED ____ 2"
   CONCRETE BELOW GRADE, UNFORMED (POURED AGAINST EARTH) ____ 3"
   CONCRETE EXPOSED TO WEATHER EXCEPT IN PRECAST ____ 2"

5. ALL BENDING OF REINFORCING STEEL SHALL CONFORM TO THE LATEST EDITION OF THE C.B.C. NO HEATING SHALL BE ALLOWED FOR BENDING OF REINFORCING STEEL UNLESS APPROVED BY STRUCTURAL ENGINEER. REINFORCEMENT SHALL NOT BE FIELD BENT UNLESS NOTED OTHERWISE.

6. NO WELDING OF REINFORCING STEEL SHALL BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER OF RECORD. WELDING OF REINFORCING STEEL SHALL CONFORM TO AWS D1.4 USING PROPER LOW HYDROGEN ELECTRODES. FIELD WELDING OF REINFORCING STEEL SHALL BE PERFORMED BY WELDERS SPECIFICALLY CERTIFIED FOR REINFORCING STEEL.

FOUNDATION NOTES

1. SOIL BEARING CAPACITY USED IN THE DESIGN OF FOUNDATIONS SHALL BE 2,000 PSF AND SHALL BE PERMITTED TO BE INCREASED BY ONE-THIRD WHERE USED WITH WIND OR EARTHQUAKE LOADS.

ABBREVIATIONS

@	AT	EF	EACH FACE	MIN	MINIMUM
℄	CENTERLINE	ELV	ELEVATION	MISC	MISCELLANEOUS
#	POUND/NUMBER	EMBED	EMBEDMENT	NTS	NOT TO SCALE
(E)	EXISTING	ENGR	ENGINEER	OC	ON CENTER
(N)	NEW	EQ	EQUAK	PSF	POUNDS PER SQUARE FOOT
(R)	REMOVED	EQUIP	EQUIPMENT	PSI	POUNDS PER SQUARE INCH
		EW	EACH WAY		
		EXT	EXTERIOR	REINF	REINFORCEMENT
ACI	AMERICAN CONCRETE INSTITUTE			REQD	REQUIRED
		FND	FOUNDATION		
ADDL	ADDITIONAL	FF	FINISHED FLOOR	SCH	SCHEDULE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	FG	FINISH GRADE	SN	STRUCTURAL NOTES
		FT	FOOT / FEET	SIM	SIMILAR
		FTG	FOOTING	SOG	SLAB ON GRADE
CBC	CALIFORNIA BUILDING CODE			SQ	SQUARE
CLR	CLEAR	GALV	GALVANIZED	STD	STANDARD
CIP	CAST-IN-PLACE				
CONC	CONCRETE	HDG	HOT DIP GALVANIZED	T&B	TOP & BOTTOM
CONT	CONTINUOUS	HORIZ	HORIZONTAL	THK	THICK
CTR	CENTER			TOC	TOP OF CONCRETE
		JNT	JOINT	TYP	TYPICAL
DIM	DIMENSION				
DTL	DETAIL	LB	POUND	UON	UNLESS OTHERWISE NOTED
DWG	DRAWING				
		MAX	MAXIMUM	VERT	VERTICAL
EA	EACH	MFR	MANUFACTURER		
				W/	WITH

REGISTERED PROFESSIONAL ENGINEER
RICHARD RAMOSO
No. C66286
CIVIL
STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District

GHD

DESIGNED:	WKP
DRAWN:	WKP
CHECKED:	MM
QA/QC:	RR
CONSTRUCTABILITY:	

NAME
TITLE
R.C.E. XXXXX EXP. XX - XX - XXXX

XX/XX/XXXX
DATE

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
NO SCALE

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

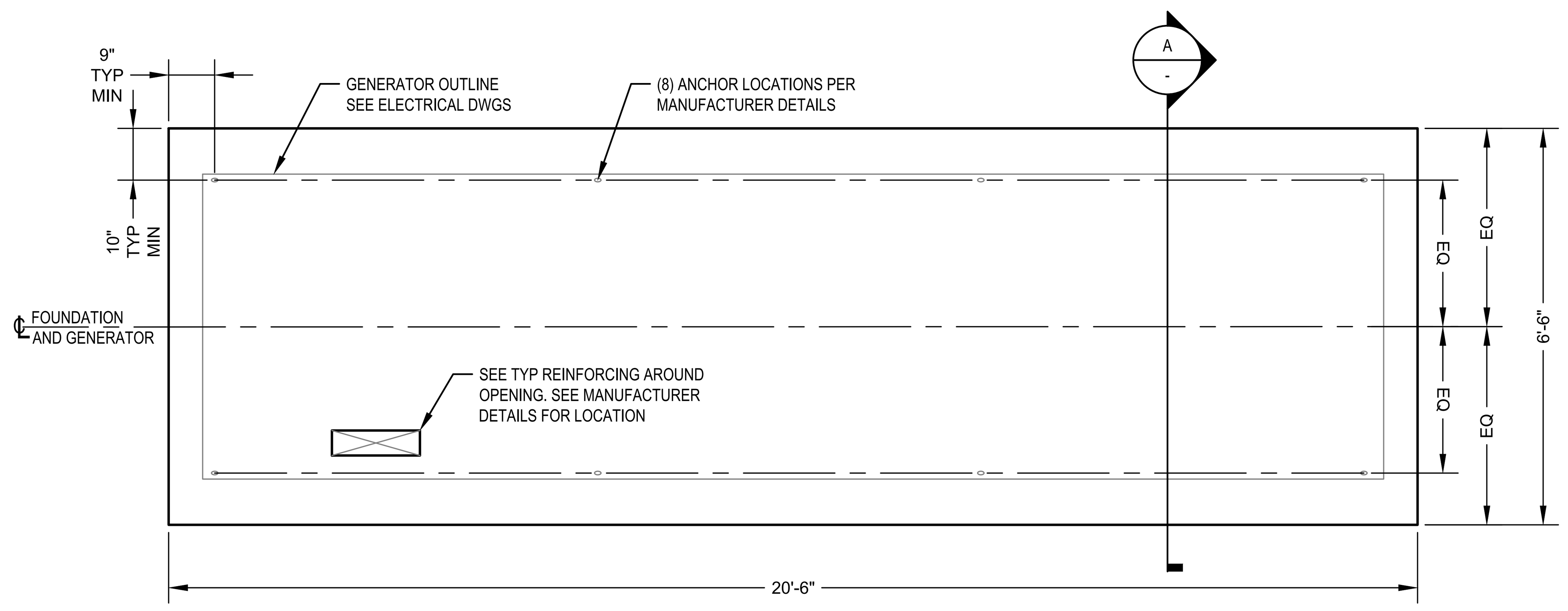
STRUCTURAL NOTES

PROJECT NUMBER
12650565

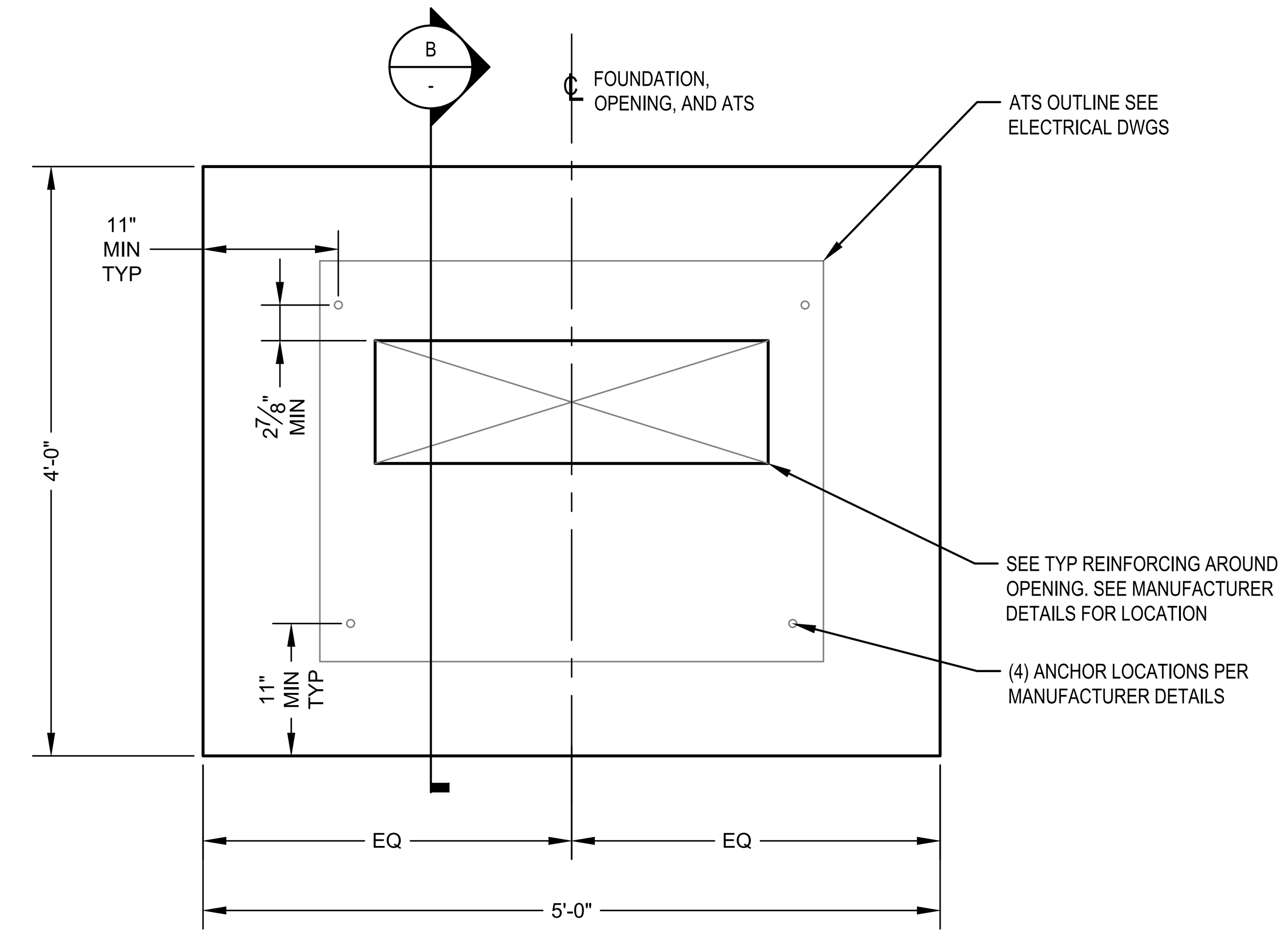
DRAWING NUMBER
S-01

SHEET GENERAL NOTES

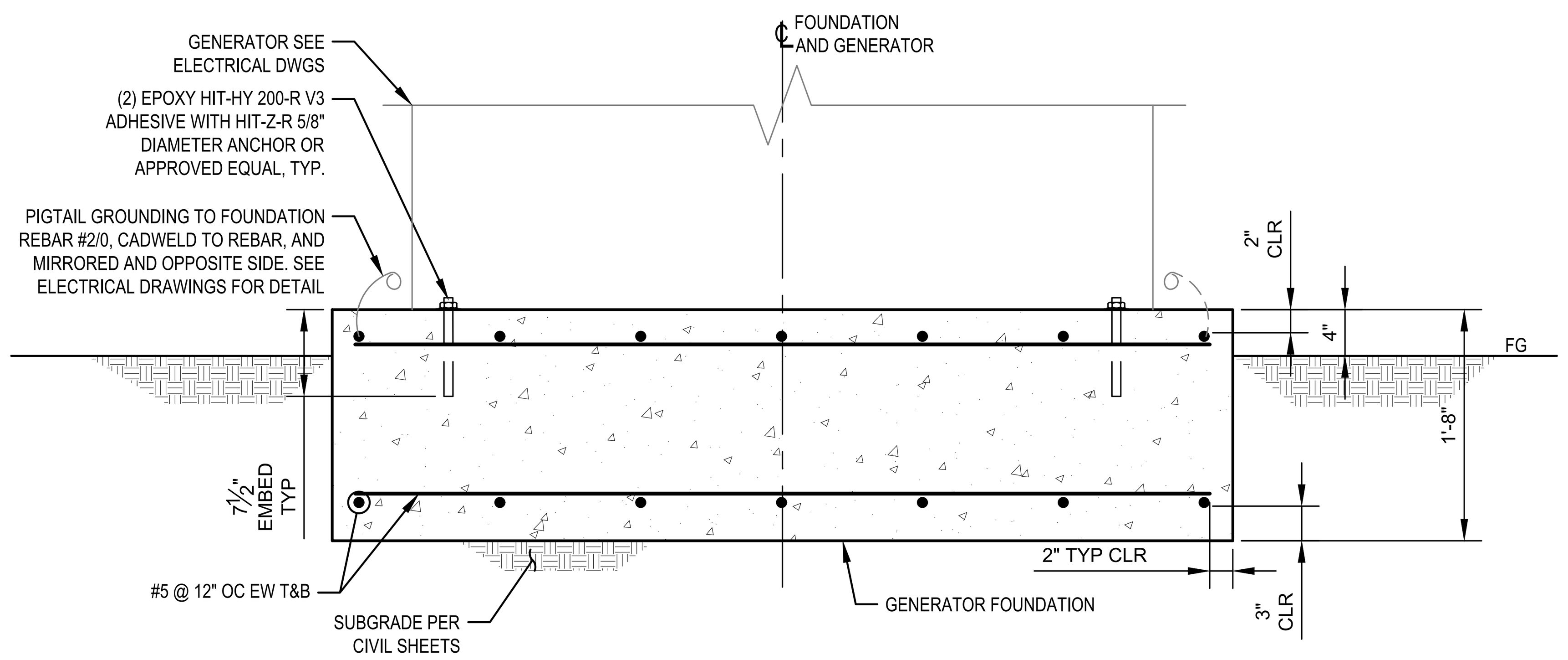
1. FOR STRUCTURAL GENERAL NOTES, SEE S-01.
2. FOR INFORMATION NOT SHOWN, SEE CIVIL & ELECTRICAL DRAWINGS.
3. FOR FOUNDATION LOCATION PLAN SEE SHEET E-02.



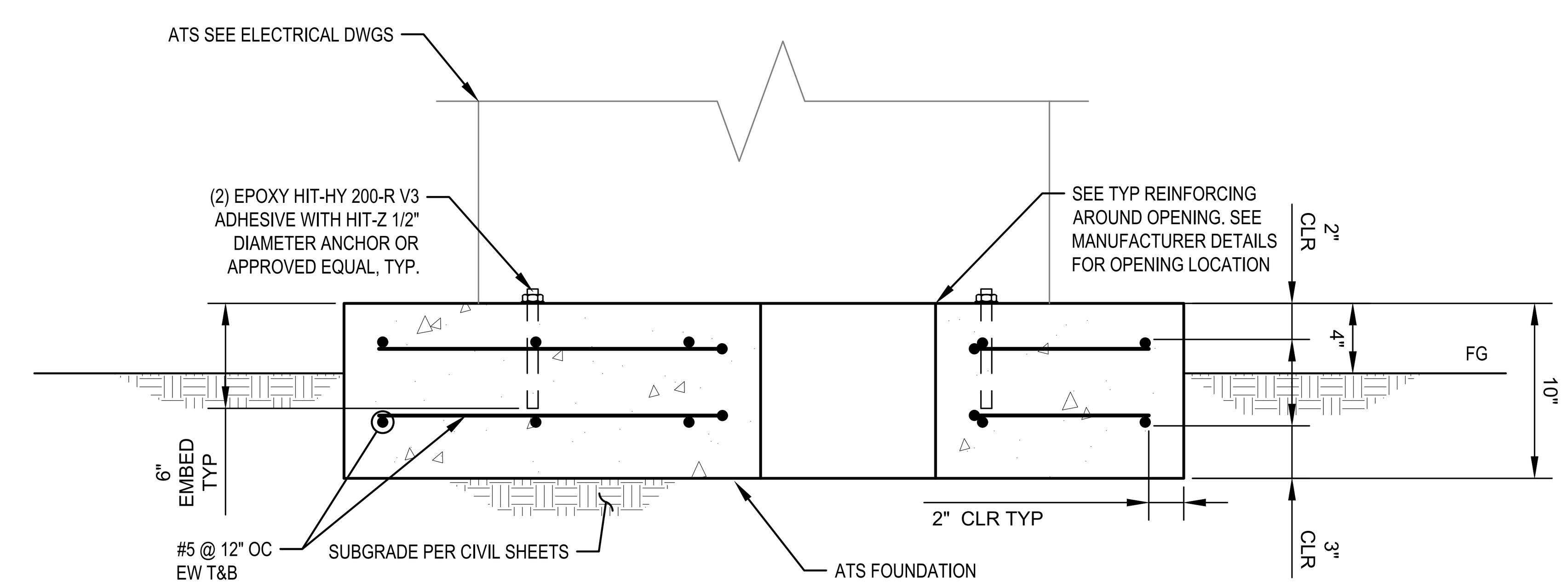
GENERATOR FOUNDATION PLAN
SCALE: 1/2" = 1'-0"



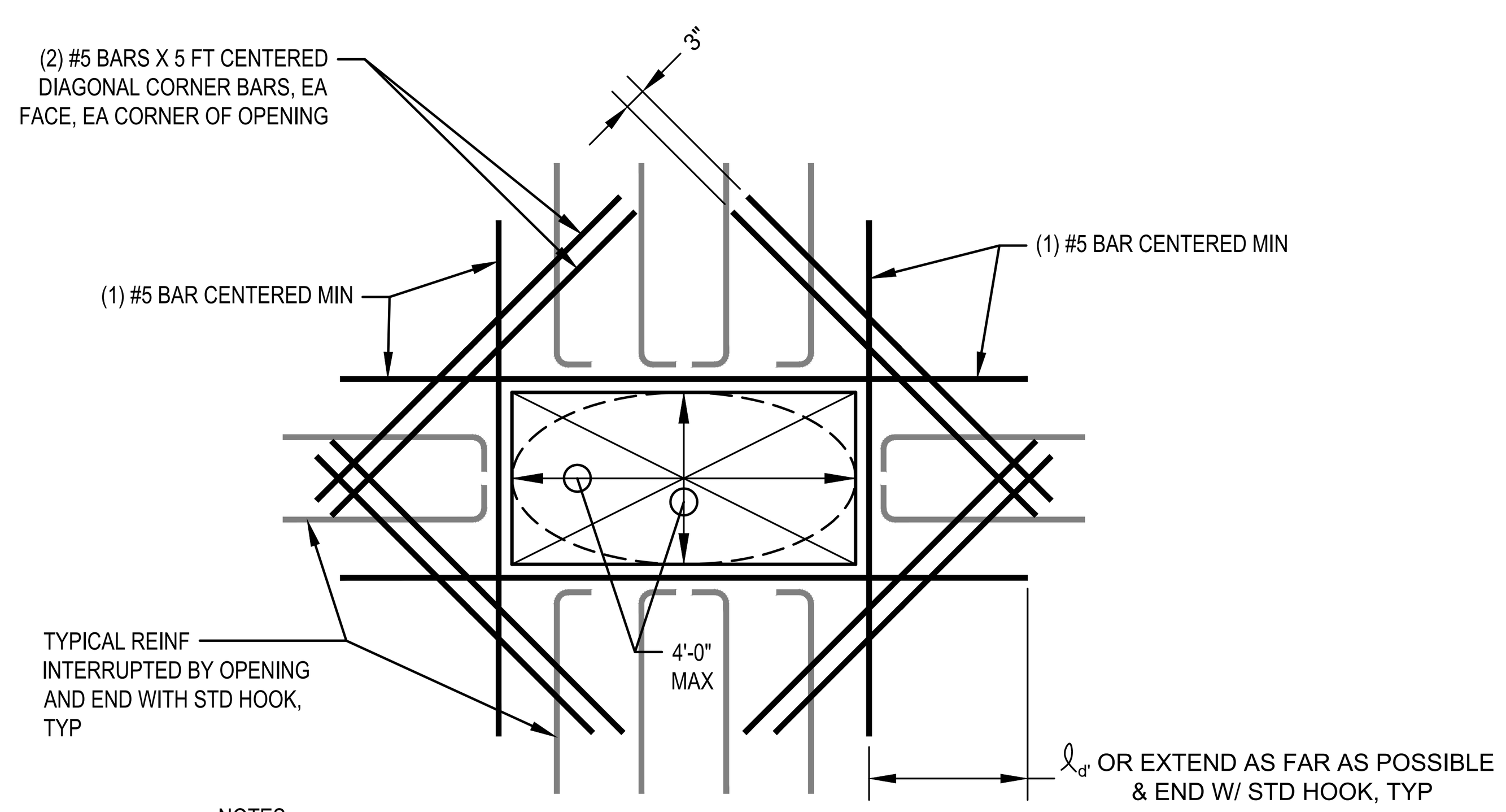
ATS FOUNDATION PLAN
SCALE: 1" = 1'-0"



SECTION A
SCALE: 1" = 1'-0"



SECTION B
SCALE: 1 1/2" = 1'-0"



NOTES:

1. FOR ROUND OPENING USE CIRCUMSCRIBING RECTANGLE FOR REINFORCING APPLICATION.
2. PROVIDE EXTRA BARS (NOT SHOWN) PARALLEL TO SIDES OF OPENINGS EQUAL TO AREAS OF INTERRUPTED SLAB BARS. EXTEND FULL LENGTH OF SPAN AND/OR LENGTH OF INTERRUPTED BARS AS APPLICABLE.
3. ALL REINFORCEMENT MUST BE 2" CLR FROM OPENING.

TYPICAL REINFORCING AT OPENINGS
NTS

REGISTERED PROFESSIONAL ENGINEER RICHARD RAMOSO No. C66286 CIVIL STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District — GHD

DESIGNED:	WKP
DRAWN:	WKP
CHECKED:	MM
QA/QC:	RR
CONSTRUCTABILITY:	

NAME ___ TITLE ___ R.C.E. XXXXX EXP. XX - XX - XXXX — XX/XX/XXXX DATE

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MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

FOUNDATION STRUCTURAL DETAILS AND SECTIONS

PROJECT NUMBER 12650565
DRAWING NUMBER S-02
SHEET NUMBER 8 OF 13

ABBREVIATIONS

(D)	DEMOLISH
(E)	EXISTING
(F)	FUTURE
(N)	NEW
A	AMPERES
AC	ALTERNATING CURRENT
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPS INTERRUPTING CAPACITY
ANN	ANNUNCIATOR
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BAT	BATTERY
BFG	BELOW FINISH GRADE
CATV	CABLE TELEVISION
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CO	CONDUIT ONLY
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
E	EXISTING
EF	EXHAUST FAN
EGU	ENGINE GENERATOR UNIT
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NON-METALLIC TUBING
EP	EXPLOSION PROOF
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FC	FOOT CANDLE
FU	FUSE
GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GFR	GROUND FAULT RELAY
HID	HIGH INTENSITY DISCHARGE
HOA	"HAND-OFF-AUTO" SWITCH
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING, VENTILATION & AIR-CONDITIONING
IG	ISOLATED GROUND
JB	JUNCTION BOX
KAIC	KILO-AMPS INTERRUPTING CAPACITY
KV	KILOVOLT
KVA	KILOVOLT-AMP
KW	KILOWATT
KWH	KILOWATT-HOUR
LOTO	LOCK OUT TAG OUT
LPS	LOW PRESSURE SODIUM
LV	LOW VOLTAGE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MFR	MANUFACTURER
MH	METAL HALIDE
MLO	MAIN LUGS ONLY
MV	MEDIUM VOLTAGE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NTS	NOT TO SCALE
OC	ON CENTER
PA	PUBLIC ADDRESS
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PB	PULL BOX, ELECTRICAL
RECPT	RECEPTACLE, OUTLET
RGS	RIGID GALVANIZED STEEL (CONDUIT)
RVSS	REDUCED VOLTAGE SOFT START
RTU	REMOTE TERMINAL UNIT
TV	TELEVISION MONITOR (SET)
TVSS	TRANS. VOLT. SURGE SUPPRESSOR
UF	UNDER FLOOR
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VA	VOLT-AMP
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
WPI	WEATHERPROOF IN USE
XFMR	TRANSFORMER

ELECTRICAL SYMBOLS LEGEND

POWER

- J OR J — JUNCTION BOX, CODE SIZED UON
- FLOOR JUNCTION BOX
- DISCONNECT SWITCH - FUSED WHERE APPLICABLE
- M — MOTOR CONNECTION
- CEILING EXHAUST FAN
- WH OR WH — WATER HEATER
- P — POWER POLE: P=POWER, T=TELEPHONE, D=DATA, C=COMBINATION
- TEST PORT
- OR — GROUND ROD
- GUY WIRE AND ANCHOR

DIAGRAM

- ALARM, INDICATING LIGHT, SIGNAL LIGHT OR STROBE
- AT / AF — CIRCUIT BREAKER - SIZE AND TYPE AS INDICATED
- XXX/X NEMA XX — CIRCUIT BREAKER IN NEMA ENCLOSURE SIZE AND TYPE AS INDICATED
- OL — THERMAL OVERLOAD RELAY
- XXX/X SIZE OL — COMBINATION MOTOR CONTROLLER, STARTER, CIRCUIT BREAKER TYPE
- SHUNT TRIP
- DRAW-OUT TYPE CONNECTION
- DISCONNECT SWITCH WITH FUSE
- FUSE - SIZE AS INDICATED
- I — INTERLOCK, ELECTRICAL
- M — METER, ELECTRICAL
- M — MOTOR - SIZE AS INDICATED
- TRANSFER SWITCH, ATS: AUTOMATIC, MTS: MANUAL
- G — GENERATOR UNIT - RATED AS INDICATED
- Δ — TRANSFORMER, PAD MOUNT
- Δ — TRANSFORMER, DRY TYPE
- POTENTIAL TRANSFORMER WITH FUSE
- CURRENT TRANSFORMER
- SURGE ARRESTOR - LIGHTING
- GROUNDING ELECTRODE OR CONNECTION

EQUIPMENT

- MAIN SWITCHBOARD
- DISTRIBUTION PANEL BOARD
- COMBINATION METER/MAIN SERVICE PANEL
- OR — BRANCH CIRCUIT PANEL BOARD, SURFACE OR FLUSH MOUNTED
- OR — LIGHTING CONTROL PANEL
- OR — SIGNAL TERMINAL CABINET OR CONTROL PANEL SURFACE OR FLUSH MOUNTED
- SIGNAL TERMINAL BACKBOARD
- N30 — CONCRETE UNDERGROUND HAND HOLE (NUMBER DENOTES CHRISTY SIZE)
- T OR — TRANSFORMER

CONDUIT

- CONDUIT INSTALLED ABOVE GRADE
- CONDUIT INSTALLED UNDERGROUND OR UNDER SLAB
- CONDUIT STUB-OUT WITH CAP
- FLEXIBLE CONDUIT WHIP TO LIGHT FIXTURE OR EQUIPMENT

INDICATES CIRCUIT BREAKER I.D.

L1-4

INDICATES BRANCH PANEL

CONDUIT HOME RUN TO DESIGNATED PANEL, TERMINAL, OR CONTROL CABINET EXAMPLES:

L1-6,8 — COMMA INDICATES MULTIPLE SINGLE POLE CIRCUITS

L1-10/12 — SLASH INDICATES MULTI-POLE CIRCUIT

NOTE FOR CONDUIT: THE TIC MARKS INDICATE THE QUANTITY OF #12 AWG WIRES OR, IF INDICATED, THE QUANTITY OF OTHER SIZE WIRE OR CABLES.

SEE THE SINGLE LINE DIAGRAM FOR FEEDER SIZES.

EXAMPLES: = (3) #12   #10 = (2) #10

F1 = (1) TYPE F1 CABLE. SEE CABLE SCHEDULE.

OBJECT LINES

- NEW OBJECTS (HEAVY CONTINUOUS LINES, UNDERGROUND CONDUIT HEAVY DASHED LINES)
- EXISTING OBJECTS TO REMAIN. MAY INCLUDE NEW CIRCUITING ETC. (FINE CONTINUOUS LINES, UNDERGROUND CONDUIT FINE DASHED LINES)
- EXISTING OBJECTS TO BE DEMOLISHED (EXTRA FINE DASHED LINES, SCREENED)

ANNOTATION

- 1 — KEYNOTE
- 10 — RACEWAY, FEEDER OR CIRCUIT DESIGNATION (SEE SCHEDULE)
- DENOTES TYPE / A / 180 / DENOTES WATTS — LIGHTING FIXTURE TYPE DESIGNATION (SEE SCHEDULE)
- DETAIL NUMBER / 1 / E-501 — DETAIL INDICATOR / SHEET NUMBER ON WHICH DETAIL APPEARS
- SECTION LETTER / A / E-301 — SECTION INDICATOR / SHEET NUMBER ON WHICH SECTION APPEARS
- WH / 1 — MECHANICAL EQUIPMENT DESIGNATION (SEE SCHEDULE)

ELECTRICAL NOTES

SHEET GENERAL NOTES

1. THE COMPLETE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE 2019 CEC BASED ON 2023 EDITION OF THE NATIONAL ELECTRIC CODE, THE LATEST RULES AND REGULATIONS OF THE SAFETY ORDERS ISSUED BY THE DIVISION OF INDUSTRIAL SAFETY, THE NATIONAL BOARD OF FIRE UNDERWRITERS AND ALL APPLICABLE STATE AND LOCAL CODES ISSUED BY THE AUTHORITIES HAVING JURISDICTION.
2. THE CONTRACTOR, PRIOR TO BIDDING, SHALL VISIT THE JOB SITE TO BECOME ACQUAINTED WITH THE EXISTING INSTALLATION AND SYSTEMS RELATED TO THEIR WORK AND SHALL INCLUDE IN THE BID PROPOSAL ALL LABOR AND MATERIALS REQUIRED FOR THE ELECTRICAL INSTALLATION TO BE COMPETE AND OPERATIVE.
3. **CONSTRUCTION SEQUENCING AND PHASING.** PROVIDE CONSTRUCTION IN PHASES AND IN CONJUNCTION WITH THE CONSTRUCTION SEQUENCE INDICATED ON THESE PLANS AND AS REQUIRED BY THE PROJECT.
4. **RODENT CONTROL.** RODENTS ARE A PERSISTENT NUISANCE AT THIS SITE. ALL CONDUITS, J-BOXES, AND PANELS SHALL BE SEALED TO PREVENT RODENTS FROM GAINING ACCESS TO ELECTRICAL EQUIPMENT OR BUILDINGS BY MEANS OF CONDUITS, WIREWAYS, OR BUILDING PENETRATIONS.
5. THE CONTRACTOR SHALL REVIEW THE ELECTRICAL SPECIFICATIONS AND THE CASITAS MUNICIPAL WATER DISTRICT (CMWD) ADDITIONAL DRAWINGS RELATED TO THIS PROJECT FOR REQUIRED WORK TO BE PROVIDED.
6. ANY POWER SHUTDOWN SHALL BE COORDINATED WITH THE OWNER. A SHUTDOWN SCHEDULE SHALL BE PRESENTED TO THE OWNER FOR APPROVAL TWO WEEKS PRIOR TO COMMENCEMENT OF WORK.
7. THE OWNER RETAINS FIRST SALVAGE RIGHTS TO ALL EXISTING EQUIPMENT REMOVED UNDER THIS CONTRACT. THE CONTRACTOR SHALL CONSULT WITH THE OWNER FOR DISPOSITION OF THE EXISTING EQUIPMENT TO BE REMOVED. THE CONTRACTOR SHALL INCLUDE IN THEIR BID PROPOSAL ALL COSTS RELATED TO THE DISPOSITION OF EXISTING EQUIPMENT REMOVED UNDER THIS CONTRACT.
8. DEMOLITION WORK SHALL BE PROVIDED AS REQUIRED TO ACCOMPLISH NEW WORK CALLED FOR AND AS NOTED. WORK SHALL BE PERFORMED CAREFULLY TO AVOID DAMAGE TO SURFACES, STRUCTURES, AND EQUIPMENT NOT BEING REMOVED. EXISTING EQUIPMENT AND/OR ELECTRICAL WIRING WHICH IS TO REMAIN, BUT HAS BEEN REMOVED TO FACILITATE THE INSTALLATION OF THE NEW EQUIPMENT, SHALL BE RESTORED TO ITS ORIGINAL OPERATING CONDITION.
9. THE CONTRACTOR SHALL REMOVE ALL ELECTRICAL ITEMS INDICATED ON PLANS, WHICH WILL BE REMOVED FOR THE RENOVATION WORK OF THIS PROJECT. DISCONNECT COMPLETELY BEFORE START OF REMOVAL.
10. WHERE OUTLETS ARE REMOVED AND/OR CONDUIT IS CUT OFF, ALL EXISTING CONDUCTORS SHALL BE REMOVED BACK TO THE NEXT OUTLET, JUNCTION BOX, OR BACK TO MCC.
11. EXISTING CONDUCTORS REMOVED FROM SERVICE SHALL NOT BE PERMITTED TO BE USED FOR NEW WORK UNDER THIS CONTRACT, EXCEPT ON A TEMPORARY BASIS AS SHOWN ON DRAWINGS.
12. EXISTING CONDUIT RUNS REMAINING IN PLACE MAY BE UTILIZED FOR THE RENOVATION WORK, PROVIDED THAT CONDUIT IS OF ADEQUATE SIZE PER NEC FOR THE NUMBER AND SIZE OF CONDUCTORS BEING INSTALLED.
13. BLANK COVERS SHALL BE INSTALLED WHEREVER DEVICE IS REMOVED AND OUTLET BOX REMAINS IN PLACE.
14. SEPARATE INSULATED GROUND CONDUCTORS SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUIT CONDUITS.
15. PROVIDE LABELS ON ALL EQUIPMENT AND DEVICES. LABELS SHALL BE SELF-ADHESIVE PHENOLIC TYPE WITH WHITE LETTERS ON BLACK BACKGROUND.
16. THE CONTRACTOR SHALL PROVIDE TYPEWRITTEN DIRECTORIES FOR THE ELECTRICAL PANELS INVOLVED IN THIS PROJECT. THE PANEL DIRECTORY SHALL REFLECT THE AS-BUILT CIRCUITS. ONE COPY OF SCHEDULE SHALL BE TAPED TO THE INSIDE OF THE PANEL DOOR, AND ONE COPY SHALL BE SUBMITTED TO THE OWNER AS AN "AS-BUILT" DRAWING.
17. ELECTRICAL EQUIPMENT AND FEEDERS SHALL BE SUPPORTED AND/OR ANCHORED IN ACCORDANCE WITH UBC ZONE 4, IMPORTANCE FACTOR 1.5 SEISMIC REQUIREMENTS.
18. THE CONTRACTOR SHALL MAINTAIN, AT THE JOB SITE, AN UP TO DATE DRAWING SET. THE DRAWING SET SHALL REFLECT ALL APPROVED CHANGES TO THE DESIGN DRAWINGS. AN "AS-BUILT" DRAWING SET SHALL BE KEPT CLEAN AND IN GOOD CONDITION AND SHALL BE TURNED OVER TO THE CMWD AT THE COMPLETION OF THE PROJECT.
19. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL SCHEDULE AND PERFORM A COMPLETE FUNCTIONAL TEST TO DEMONSTRATE TO THE OWNER THAT THE NEW INSTALLATION IS OPERATING AS INTENDED. ANY DEFECTS OF DEFICIENCIES IN THE MATERIALS OR WORK SHALL BE CORRECTED IMMEDIATELY BY AND AT THE CONTRACTOR'S EXPENSE.
20. THE OWNER SHALL BE RESPONSIBLE FOR SECURING ANY REQUIRED ELECTRICAL PERMITS AND INSPECTIONS.
21. PROVIDE 120V AC CIRCUITS AS REQUIRED TO SERVE AUXILIARY EQUIPMENT SUCH AS CONTROL PANELS AND SERVICE OUTLETS.
22. CONTRACTOR SHALL PROVIDE ANY TEST REPORTS AS PART OF TURNOVER PACKAGE TO THE OWNER.
23. CONDUITS SHALL BE SUPPORTED AND BRACED PER THE SMACNA "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL AND PLUMBING PIPING SYSTEMS", OR THE SUPERSTRUT "SEISMIC RESTRAINT SYSTEM".
24. ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT SHALL BE WEATHERPROOF TYPE, NEMA 3R.
25. GROUNDING: IN ADDITION TO ALL OTHER GROUNDING REQUIREMENTS, ADJACENT CABLE TRAY SECTIONS ON EACH SHALL BE SECURELY GROUNDED.
26. VAPOR-SEAL ALL CONDUITS AT POINT OF ENTRY INTO BUILDINGS OR ENCLOSURES.
27. EXPOSED EMT ACCEPTABLE FOR NEW INTERIOR 208/120V CONDUIT RUNS. COORDINATE WITH CASITAS MUNICIPAL WATER DISTRICT REPRESENTATIVE.

GENERAL ELECTRICAL NOTES

1. AL WORK SHALL CONFORM TO THE LATEST ADOPTED VERSION OF THE CALIFORNIA ELECTRICAL CODE (CEC).
2. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN ALL EQUIPMENT IN A SAFE AND RESPONSIBLE MANNER. KEEP DEAD FRONT EQUIPMENT IN PLACE WHILE EQUIPMENT IS ENERGIZED. CONDUCT ALL CONSTRUCTION OPERATIONS IN A SAFE MANNER FOR EMPLOYEES AS WELL AS OTHER WORK PERSONS OR ANYONE VISITING THE JOB SITE. PROVIDE BARRIERS, FLAGS, TAPE, ETC. AS REQUIRED TO MAINTAIN SAFETY.
3. PRIOR TO COMMENCING WORK ON EXISTING SYSTEMS OR WHERE EXISTING SYSTEMS REQUIRE TEMPORARY SHUT DOWNS, COORDINATE WITH OWNER'S REPRESENTATIVE. WHERE DISCONNECTING, MODIFYING OR WORKING ON EXISTING EQUIPMENT OR SYSTEMS, PROVIDE A WRITTEN METHOD OF PROCEDURE OUTLINING DATES, TIMES, DURATION AND DESCRIPTION OF PROPOSED WORK FOR APPROVAL PRIOR TO COMMENCING WORK . WORK ON EXISTING EQUIPMENT SHALL NOT COMMENCE UNTIL WRITTEN AUTHORIZATION IS GIVEN BY THE OWNER'S REPRESENTATIVE.
4. ALL EQUIPMENT SHALL BE LISTED AND LABELED PER RECOGNIZED ELECTRICAL TESTING LABORATORY AND INSTALLED PER THE LISTING REQUIREMENTS AND THE MANUFACTURER'S INSTRUCTIONS.
5. ALL EQUIPMENT SHALL BE GROUNDED PER THE REQUIREMENTS OF CEC ARTICLES 250. EQUIPMENT GROUNDING CONDUCTORS SHALL BE INSTALLED IN ALL POWER SYSTEM RACEWAYS.
6. APPROVED CONDUIT FOR THIS PROJECT SHALL BE AS FOLLOWS:
   - 6.A. PVC SCHEDULE 40 - UNDERGROUND AND BELOW / IN SLAB.
   - 6.B. PVC COATED RIGID GALVANIZED STEEL (RGS) - UNDERGROUND ELBOW / RISER TO ABOVE GRADE AND WHERE CONDUIT IS EXPOSED.
   - 6.C. MINIMUM CONDUIT SIZE: 1".
7. PULLROPES: ALL RACEWAYS WITHOUT CONDUCTORS SHALL BE INSTALLED WITH MINIMUM 200 POUND TEST PULL LINE.

REGISTERED PROFESSIONAL ENGINEER — MEHDI MARDI — No. E20033 — ELECTRICAL — STATE OF CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District

GHD

DESIGNED: TM
DRAWN: TM
CHECKED: MM
QA/QC: MM
CONSTRUCTABILITY:

NAME   XX/XX/XXXX
TITLE   DATE
R.C.E. XXXXX   EXP. XX - XX - XXXX

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SCALE:
NO SCALE

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

ELECTRICAL SYMBOLS, ABBREVIATIONS AND NOTES

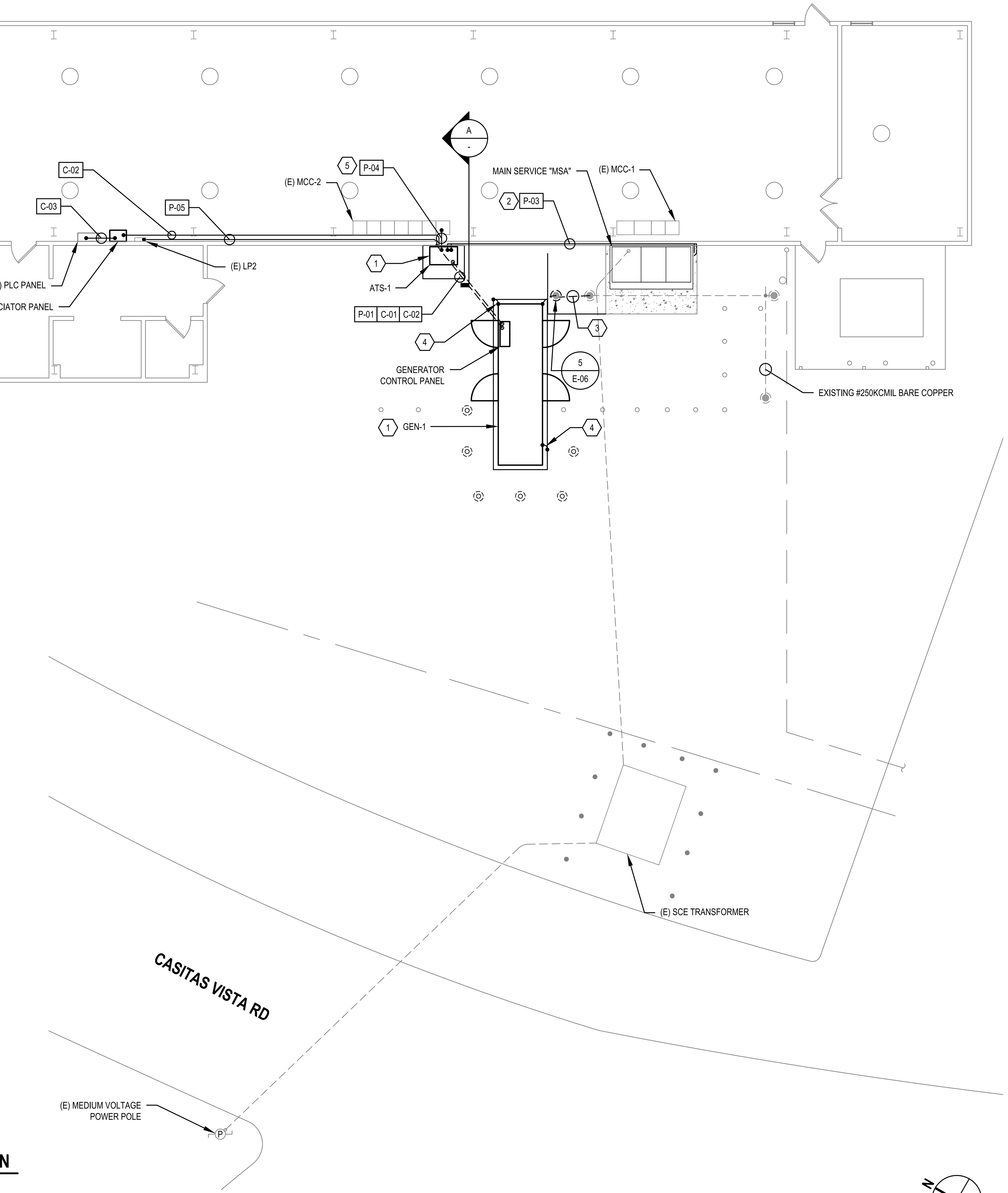
PROJECT NUMBER: 12650565
DRAWING NUMBER: E-01
SHEET NUMBER: 9 OF 13

SHEET GENERAL NOTES

1. REFER TO E-04 FOR NEW GENERATOR SINGLE LINE DIAGRAM AND CONDUIT SCHEDULE.

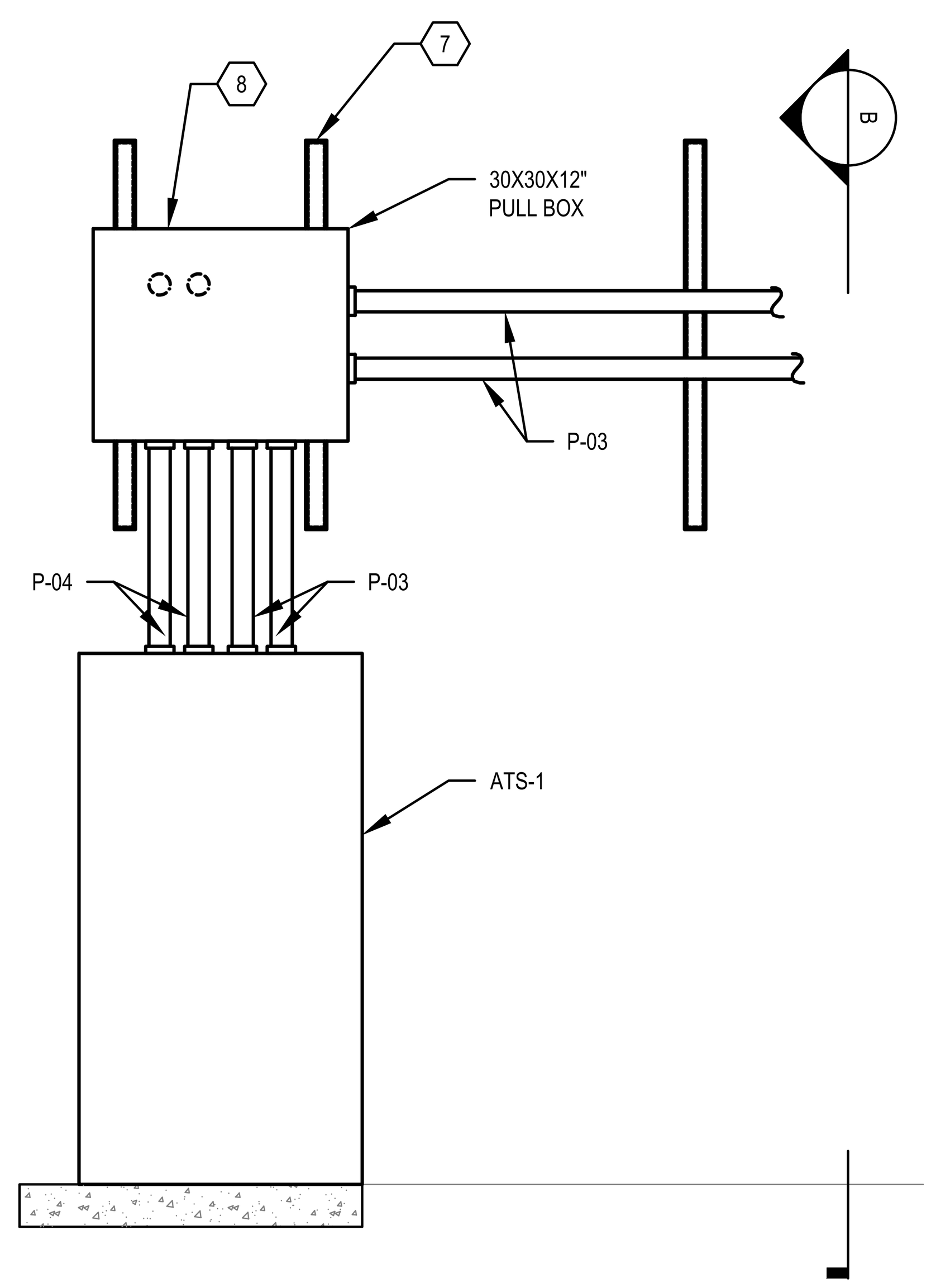
SHEET KEYNOTES

1. INSTALLATION NOTES.
   - 1.1. OFCI 450KW, 480V, 3ϕ DIESEL GENERATOR AND ATS.
   - 1.2. INSTALL GEN-1 AND ATS-1.
   - 1.3. LOTO 800A CB IN MAIN SERVICE "MSA" THAT FEEDS (E) ATS. REMOVE WIRING FROM (E) ATS. CONNECT NEW WIRES FROM MSA TO ATS-1 IN P-03.
   - 1.4. DISCONNECT (E) ATS TO (E) MCC-2. REMOVE OVERHEAD CONDUIT AND CABLE.
   - 1.5. CONNECT ATS-1 TO (E) MCC-2, P-04. CONNECT TO EXISTING 800A MAIN CB.
   - 1.6. DEMOLISH (E) ATS AND WIRING AND CONDUITS ASSOCIATED WITH IT. PATCH AND SEAL WALL PENETRATIONS OF CONDUITS.
   - 1.7. OWNER TO REMOVE THE TEMPORARY GENERATOR AND ASSOCIATED CABLES.
2. INTERCEPT EXISTING (2) 3" CONDUITS FROM MAIN SERVICE TO (E) ATS, THEN ROUTE P-03 ALONG THE WALL FROM MAIN SERVICE TO ATS-1.
3. CONNECT TO EXISTING GROUND RING WITH #250KCMIL BARE COPPER.
4. GROUND TO REBAR. REFER TO DETAIL 7/E-05.
5. FOR CONDUIT PENETRATION, REFER TO DETAIL 6/E-05.
6. PROVIDE A 24"X30"X10" FIBERGLASS ENCLOSURE AND INSTALL THE ANNUNCIATOR AND PUSHBUTTON (PROVIDED LOOSE WITH THE GENERATOR) INSIDE IT.
7. REFER TO DETAIL 1 ON SHEET D-01 FOR UNISTRUT SUPPORT. TYP.
8. PROVIDE A 30"X30"X12" NEMA 4X PULLBOX.



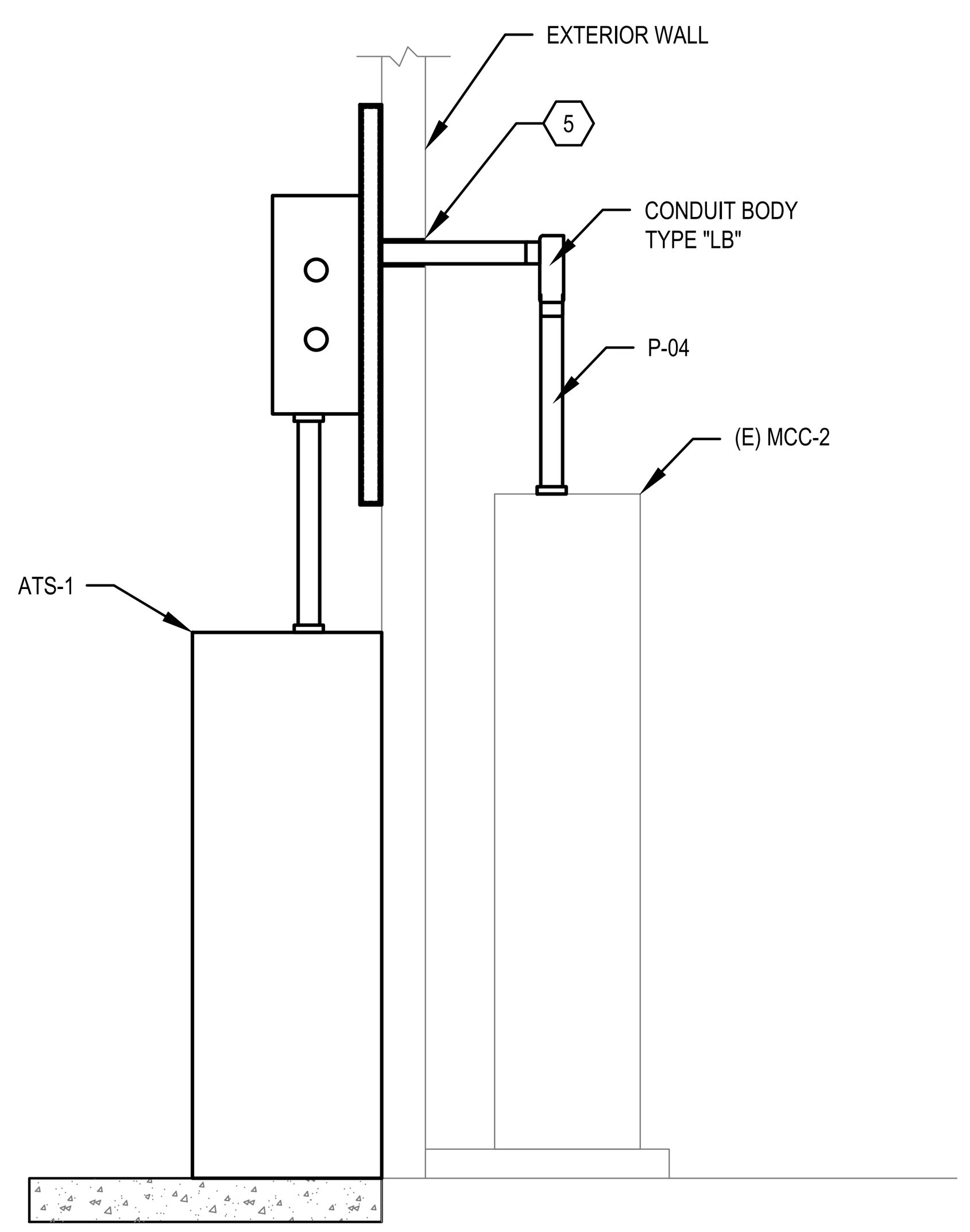
ELECTRICAL SITE PLAN
SCALE 1/8" = 1'-0"

0 4' 8' 16'



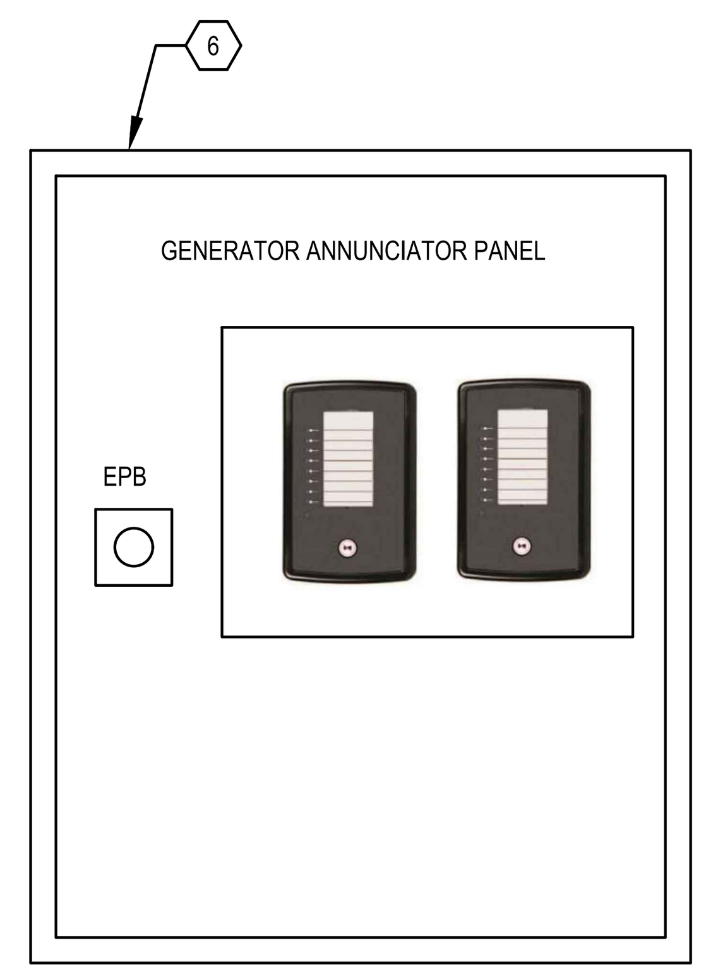
A — ATS-1 FRONT VIEW
SCALE 1/2" = 1'-0"

0 1' 2' 4'



B — ATS-1, MCC-2 ELEVATION SECTION VIEW
SCALE 1/2" = 1'-0"

0 1' 2' 4'



C — ANNUNCIATOR PANEL ELEVATION
NOT SCALE

811 Know what's below. Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

REV	DATE	BY	DESCRIPTION

CASITAS Municipal Water District — GHD

DESIGNED:	TM
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NAME ___ XX/XX/XXXX
TITLE ___ DATE
R.C.E. XXXXX EXP. XX - XX - XXXX

REGISTERED PROFESSIONAL ENGINEER — MEHDI MARDI — No. E20033 — ELECTRICAL — STATE OF CALIFORNIA

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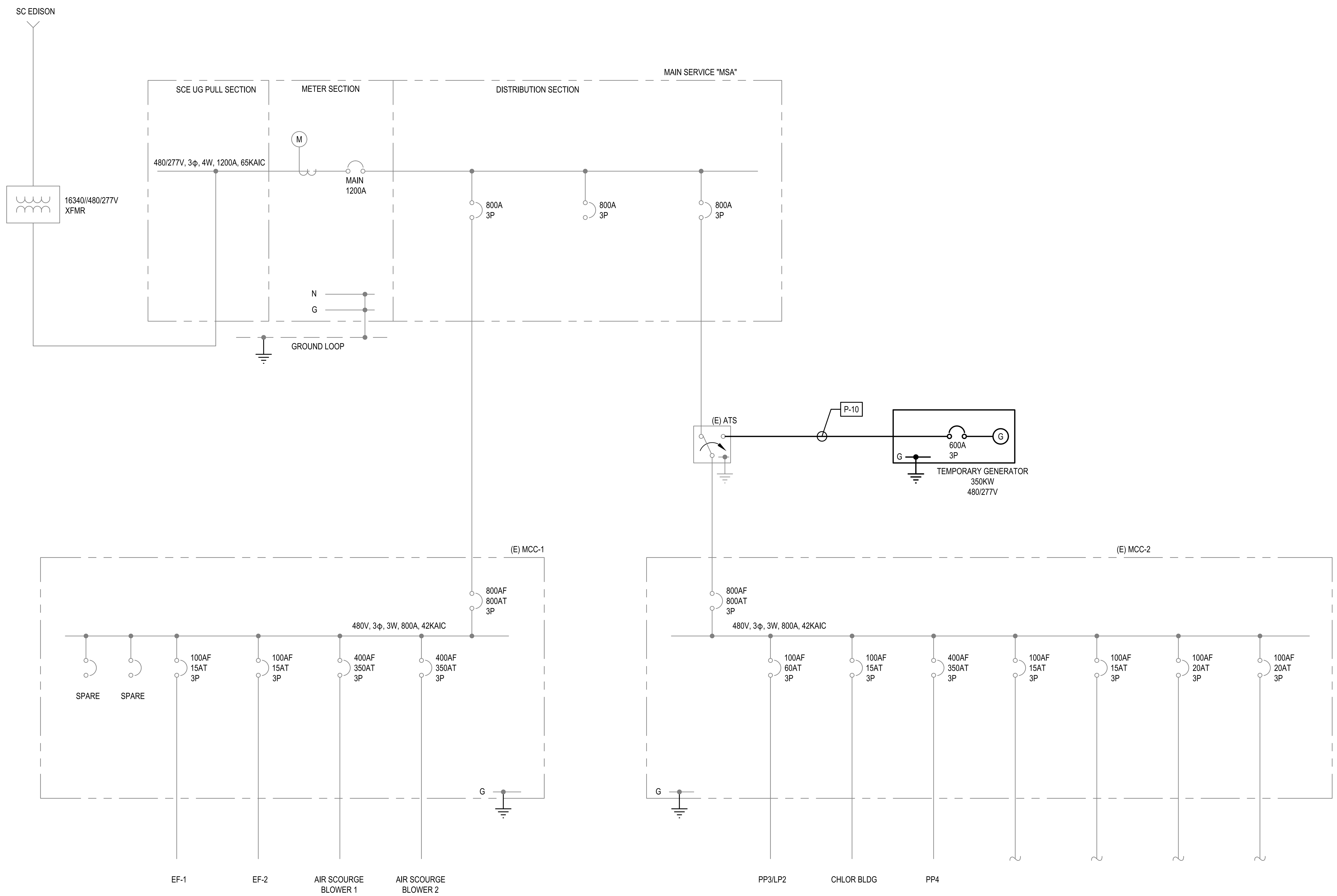
MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT
CASITAS MUNICIPAL WATER DISTRICT

ELECTRICAL SITE PLAN NEW GENERATOR AND ATS INSTALLATION

PROJECT NUMBER 12650565
DRAWING NUMBER E-02
SHEET NUMBER 10 OF 13

SHEET GENERAL NOTES

1. REFER TO SHEET D-01 FOR TEMPORARY GENERATOR INSTALLATION.



ELECTRICAL SINGLE LINE DIAGRAM

NO SCALE

CONDUIT SCHEDULE					
CONDUIT TAG	FROM	TO	SIZE	WIRE/CABLE	NOTES
P-10	TEMPORARY GENERATOR	(E) ATS	NO CONDUIT	3#4/0AWG & #4/0 GND	PORTABLE, FLEXIBLE CABLE
C-10	TEMPORARY GENERATOR CONTROL PANEL	(E) ATS	1"	EXISTING WIRES	MARK ALL CONTROL WIRING AND TERMINAL THAT IS CONNECTED FROM GENERATOR TO ATS. PULL BACK ALL WIRING FROM EXISTING 350KW GENERATOR INTO THE ATS AND RECONNECT IT TO THE GEN-SET CONTROL PANEL THE SAME WAY AS IT WAS PREVIOUSLY INSTALLED. USE IMC CONDUIT ABOVE GROUND.

CONDUIT SCHEDULE

NO SCALE

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MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

CASITAS MUNICIPAL WATER DISTRICT

SINGLE LINE DIAGRAM TEMPORARY GENERATOR INSTALLATION

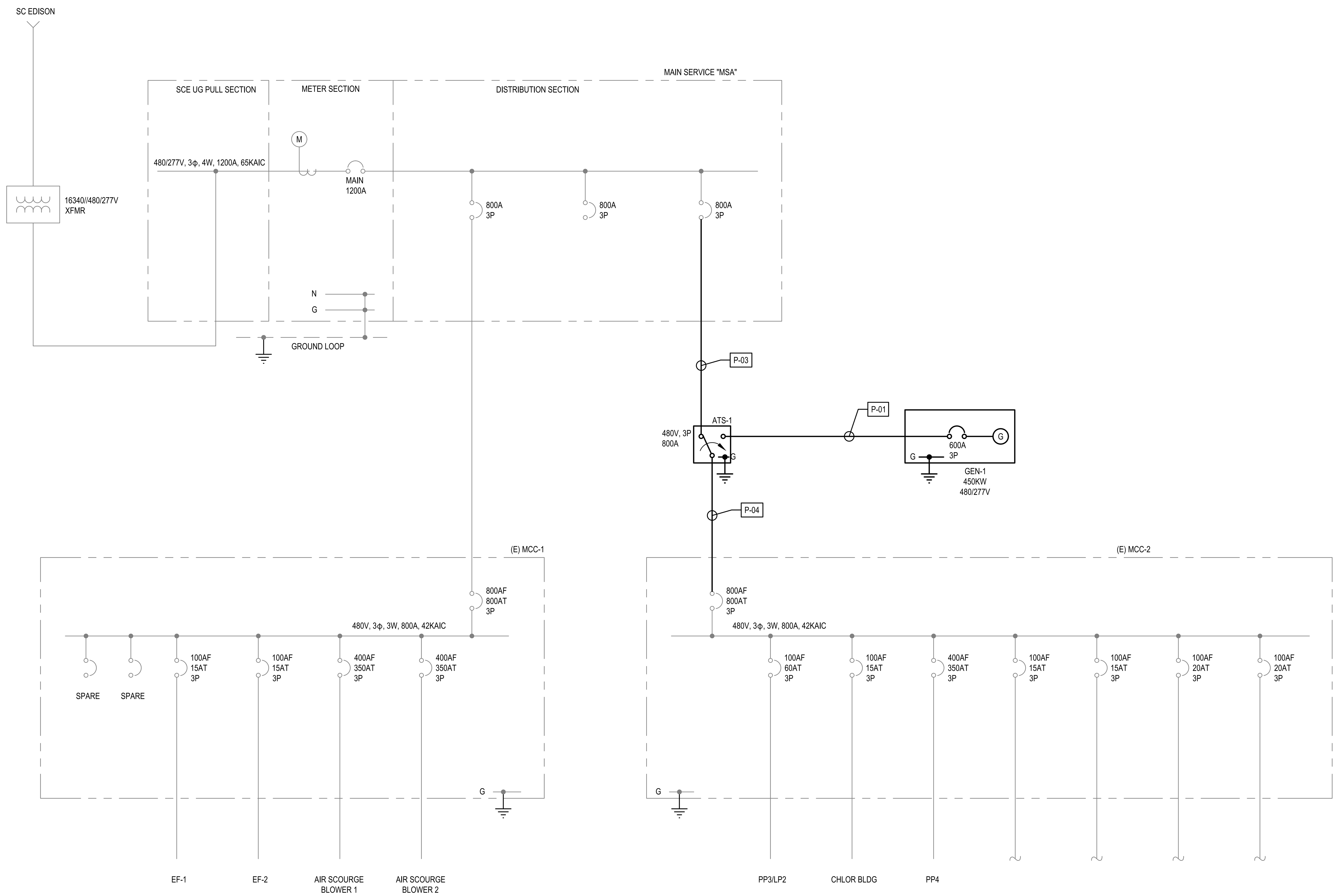
PROJECT NUMBER 12650565

DRAWING NUMBER E-03

SHEET NUMBER 11 OF 13

SHEET GENERAL NOTES

1. REFER TO SITE PLAN E-02 FOR NEW GENERATOR INSTALLATION.
2. SEE GENERATOR AND ATS CONTROL WIRING DIAGRAM .



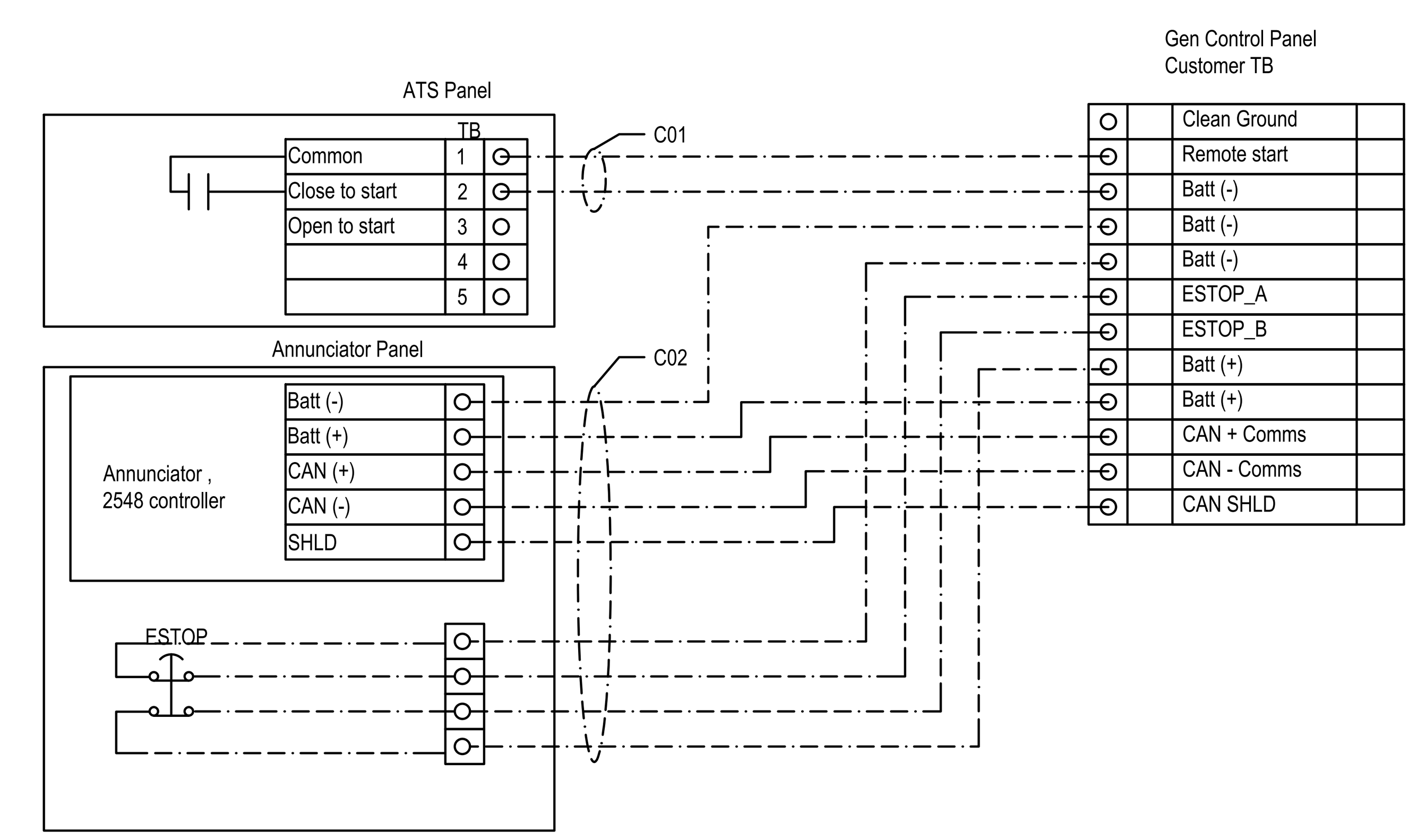
ELECTRICAL SINGLE LINE DIAGRAM

NO SCALE

CONDUIT SCHEDULE					
CONDUIT TAG	FROM	TO	SIZE	WIRE/CABLE	NOTES
P-01	GEN-1	ATS-1	(2) 3"	2 - [3#500KCMIL & #2/0 GND]	
P-03	MAIN SERVICE "MSA"	ATS-1	(2) 3"	2 - [3#500KCMIL & #2/0 GND]	VIA PB-01
P-04	ATS-1	(E) MCC-2	(2) 3"	2 - [3#500KCMIL & #2/0 GND]	VIA PB-01
P-05	(E) LP2	PDP-GEN	1"	(2) #10 AWG & #12 GND	CONNECT TO TERMINAL L1 AND L2, SEE GENERATOR DWG CE116674 SHT 5 of 6
C-01	GEN-1	ATS-1	1"	(2) #14 AWG & #14 GND	SEE THE WIRING DIAGRAM ON THIS SHEET
C-02	GEN-1/CONTROL PANEL	ANNUNCIATOR PANEL	1 1/2"	VENDOR SUPPLIED CABLE FOR ANNCIATOR AND (4) #14 AWG & #14 GND FOR ESTOP	SEE GEN-SET MANUAL, GCCP CONTROL SCHEMATIC SHEET # CE116674 and WIRING DIAGRAM ON THIS SHEET
C-03	ANNUNCIATOR PANEL	(E) PLC PANEL	1"	(10) #14 AWG & #14 GND	SIGNALS (GEN RUN, GEN FAULT,SPARE) TO PLC SEE ANNUNCIATOR DIGITAL OUTPUT MODULE 2548 MANUAL. USE TWO DIGITAL OUTPUT FOR GEN RUNNING AND GEN FAULT, USE SPARE WIRES FOR ADDITIONAL SIGNAL IF REQUIRED

CONDUIT SCHEDULE

NO SCALE



CONTROL WIRING DIAGRAM

NO SCALE

REGISTERED PROFESSIONAL ENGINEER MEHDI MARD No.E20033 ELECTRICAL STATE OF CALIFORNIA

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GHD

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MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

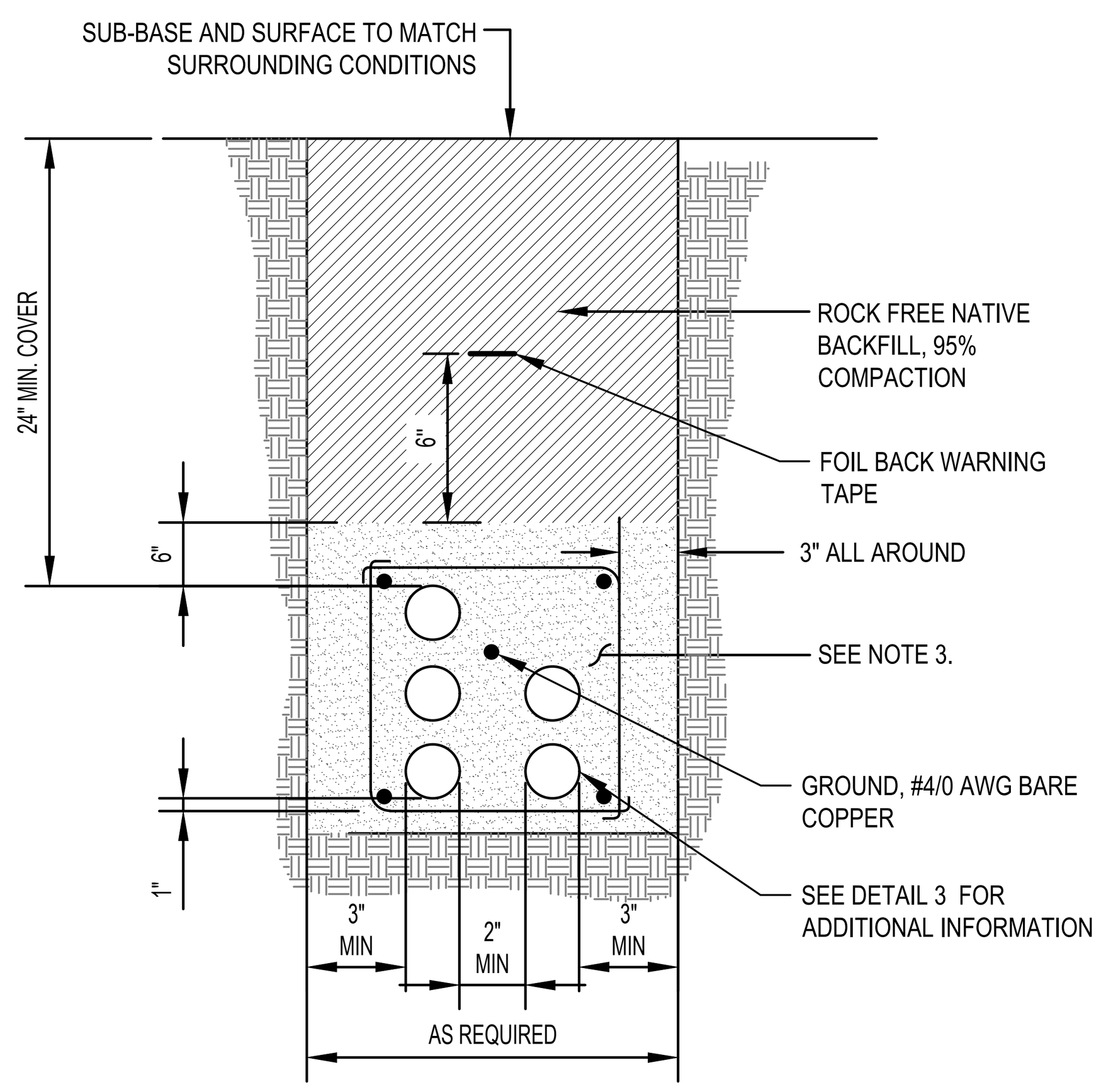
CASITAS MUNICIPAL WATER DISTRICT

SINGLE LINE DIAGRAM NEW GENERATOR AND ATS INSTALLATION

PROJECT NUMBER 12650565

DRAWING NUMBER E-04

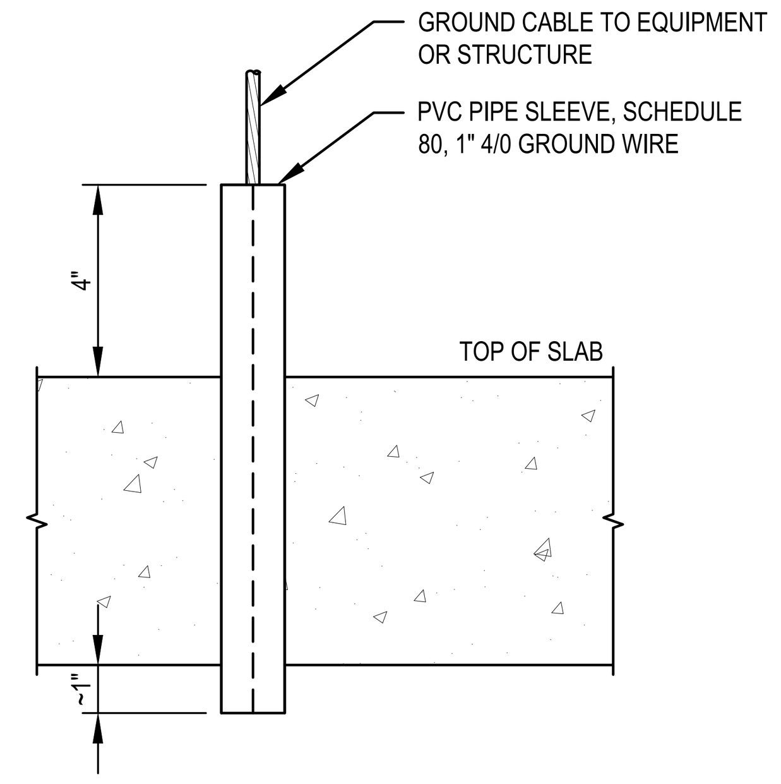
SHEET NUMBER 12 OF 13



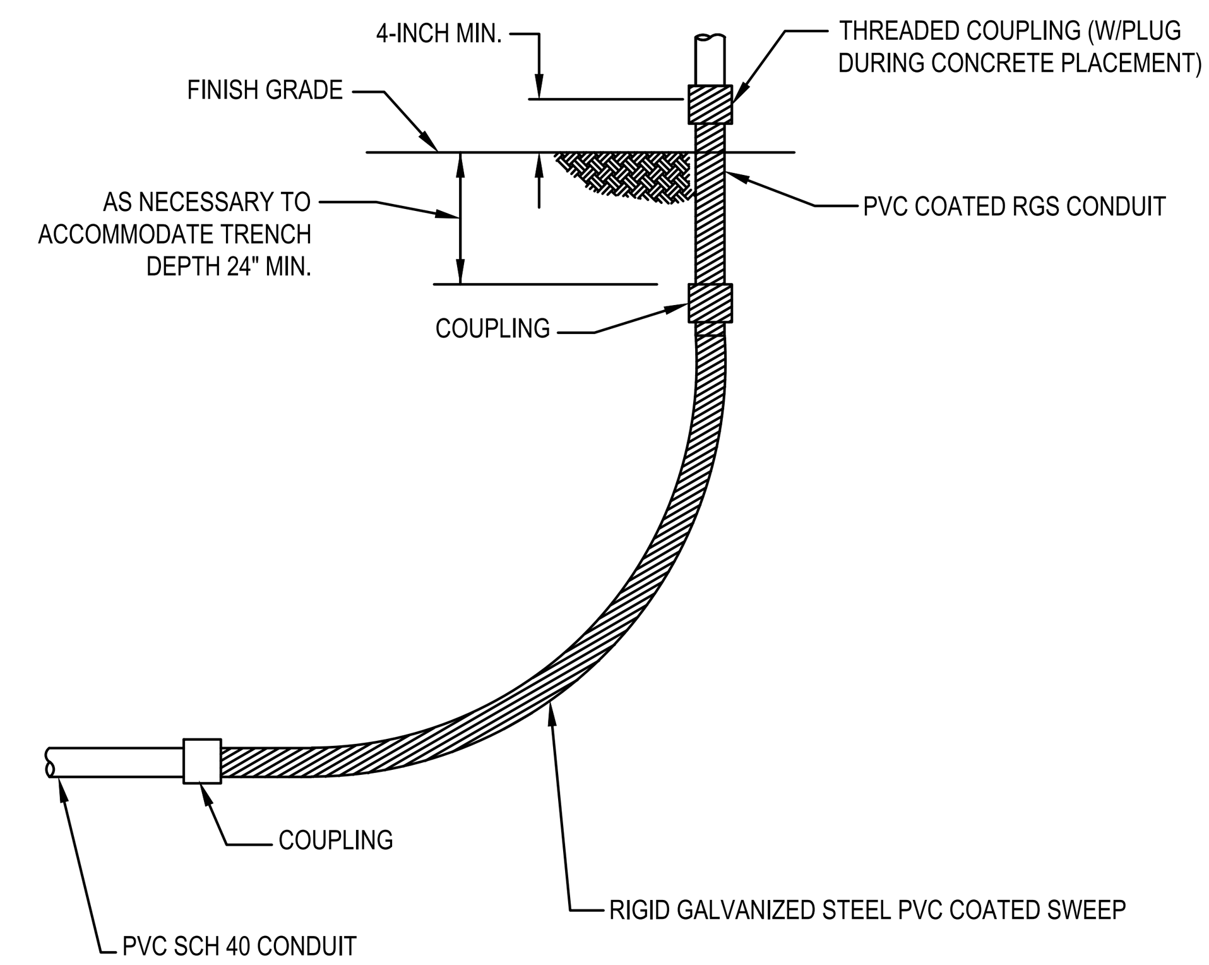
NOTE:

1. MAINTAIN A MINIMUM VERTICAL SEPARATION OF 12" WHEN CROSSING UTILITIES. ROUTE CONDUIT EITHER ABOVE OR BELOW OTHER UTILITIES AS NECESSARY TO ACHIEVE THIS SEPARATION WHILE MAINTAINING THE MINIMUM BACKFILL COVERAGE.
2. PROVIDE BASE AND INTERMEDIATE CONDUIT SPACERS.
3. USE 3500 PSI RED CONCRETE FOR LIGHT TRAFFIC. APPLY REBAR (#4) FOR HEAVY TRAFFIC RATED AREA.

1 TRENCH SECTION — NOT TO SCALE



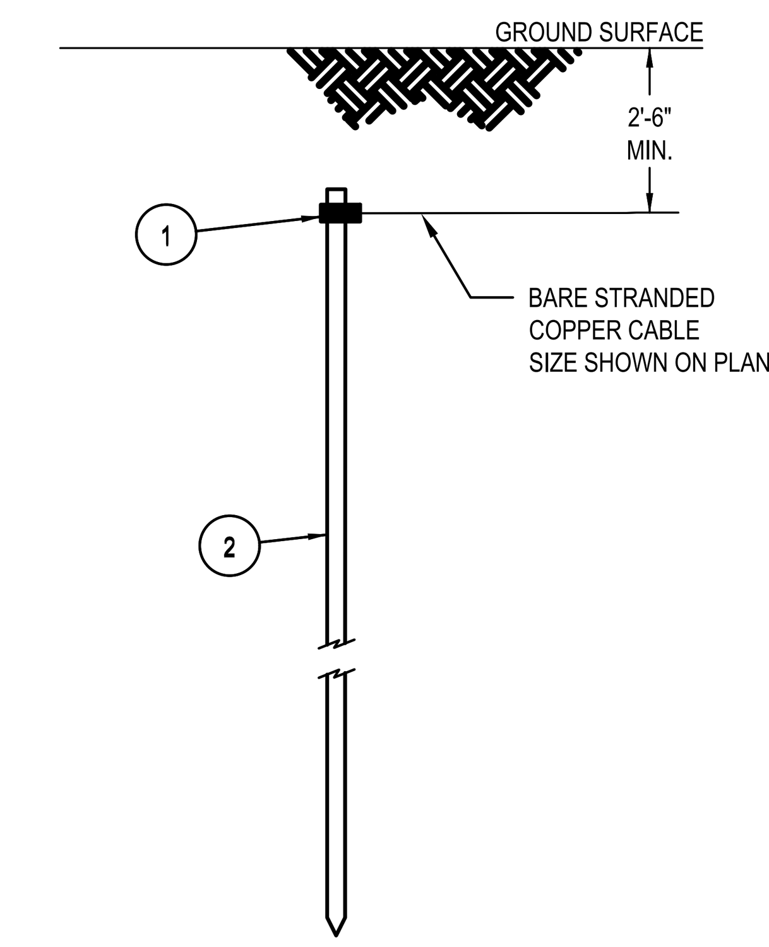
2 GROUND CABLE STUB UP — NOT TO SCALE



NOTE:

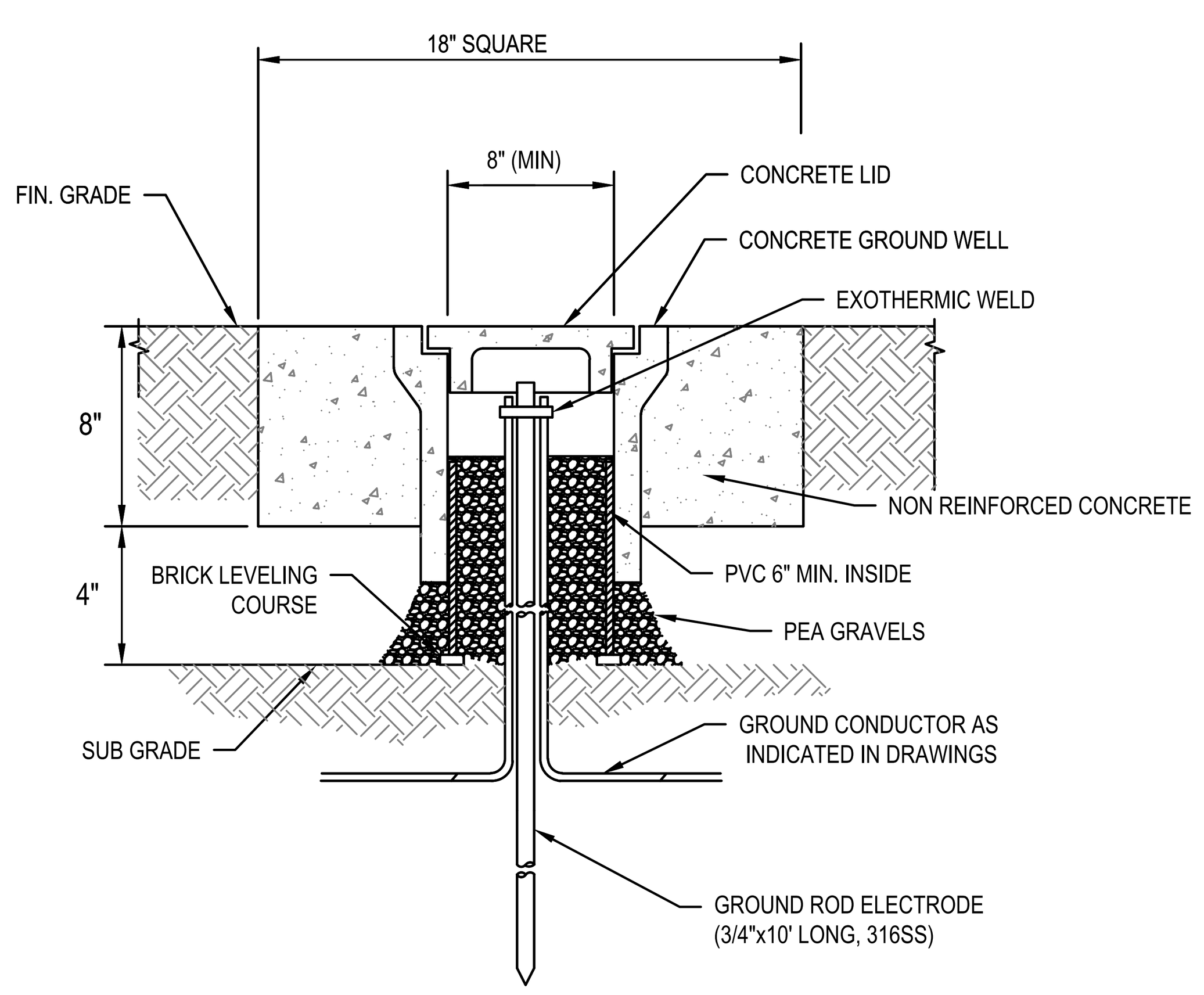
1. CONDUIT STUB UP FOR EXPOSED CONDUIT INSTALLATION.

3 TYPICAL CONDUIT STUB UP — NOT TO SCALE

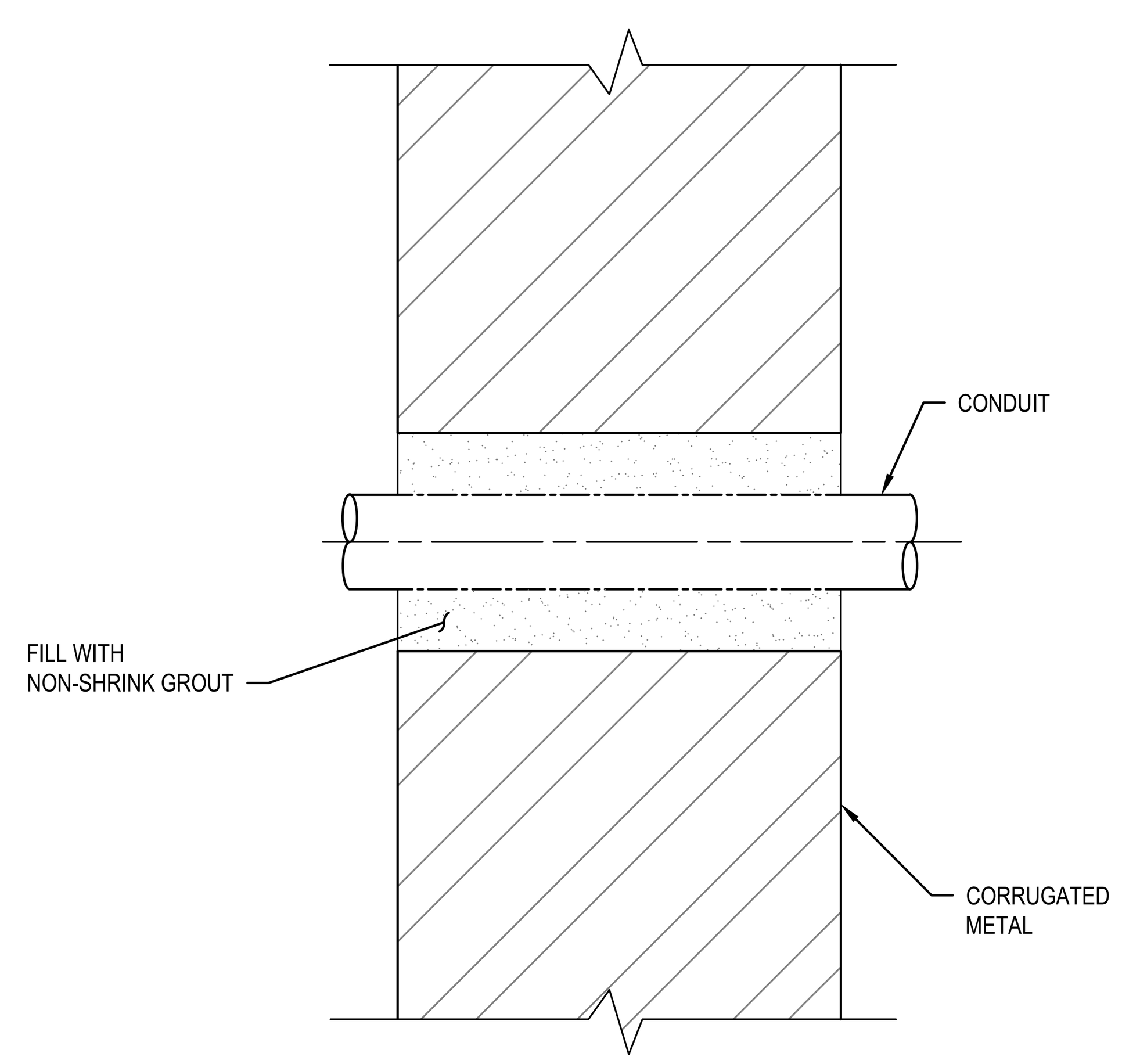


1. CONNECTOR: EXOTHERMIC WELD
2. GROUND ROD: COPPER CLAD, 3/4" DIA. X 10' LG.

4 GROUND ROD — NOT TO SCALE



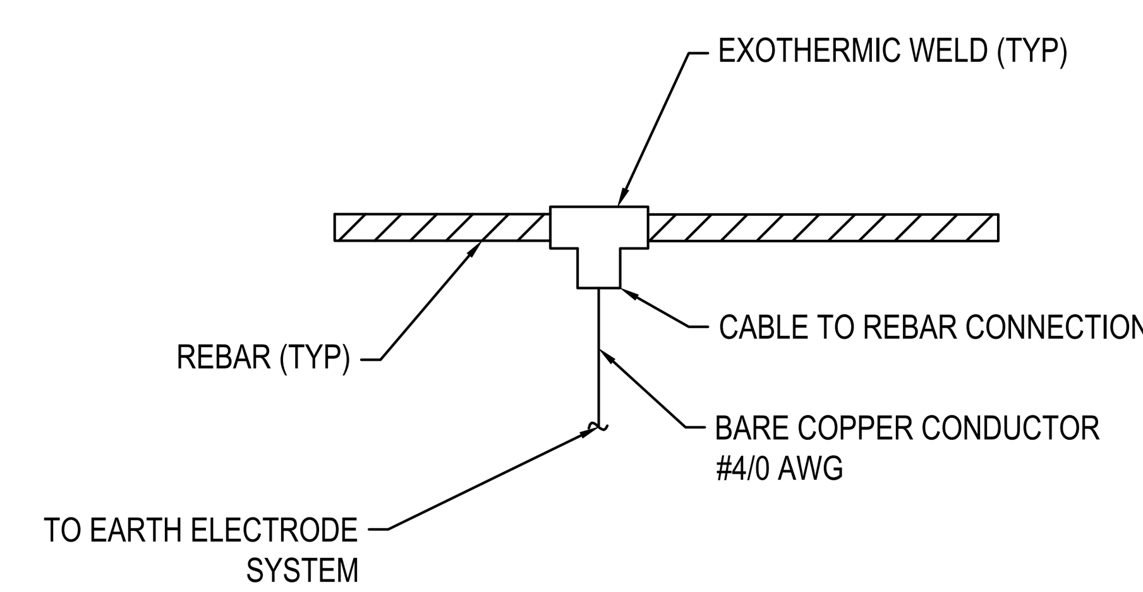
5 TYPICAL GROUND WELL DETAIL — NOT TO SCALE



NOTE:

1. FILL IN THE SPACING ON THE PENETRATION AS SHOWN.
2. AFTER COMPLETING THE CONDUIT PENETRATION, THE CONTRACTOR SHOULD FILL THE HOLE WITH SILICONE AND REPAIR THE WALL TO MATCH THE EXISTING COLOR.

6 CONDUIT PENETRATION — NOT TO SCALE



7 GROUND REBAR CONNECTION — NOT TO SCALE

REV	DATE	BY	DESCRIPTION

Casitas Municipal Water District

GHD

DESIGNED:	TM
DRAWN:	TM
CHECKED:	MM
QA/QC:	MM
CONSTRUCTABILITY:	

NAME
TITLE
R.C.E. XXXXX EXP. XX - XX - XXXX

XX/XX/XXXX
DATE

0 1/2 1 2

THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
NO SCALE

MWPFP EMERGENCY GENERATOR AND ATS REPLACEMENT

CASITAS MUNICIPAL WATER DISTRICT

ELECTRICAL DETAILS

PROJECT NUMBER
12650565

DRAWING NUMBER
E-05

SHEET NUMBER
13 OF 13

Appendix B

Cut Sheets for Deisel Generator (Owner Furnished/Contractor Installed)

Cut Sheets for Automatic Transfer Switch (ATS) (Owner Furnished/Contractor Installed)

Box 227044, Los Angeles, CA 90022-0744
3500 Shepherd St., City of Industry, CA 90601
Phone: (562) 463-6000 Fax: (562) 699-8614

8/29/2024

Submittal Package

Rev. 0

Project Name

Casitas Municipal Water District
1055 North Ventura Ave.
Ventura, CA 93022

Project Number: 240417
Equipment ID: CE16674 & XE15509

(1) NEW CATERPILLAR MODEL C15 D450GC TIER III GENERATOR SET, 450KW STANDBY RATED, 277/480V, 3 PHASE, 60 HZ WITH FAN AT 1800 RPM, 960 GALLON EXTENDED INTEGRAL FUEL TANK, SOUND ATTENUATED LEVEL 2 ENCLOSURE

(1) NEW ASCO 300 SERIES AUTOMATIC TRANSFER SWITCH, OPEN TRANSITION, RATED 800A, 3 POLE, 277/480V, 3 PHASE, 60HZ, NEMA 3R ENCLOSURE

Project Engineer: Brian Bennett
Email: brian.bennett@quinnpower.com
Phone: (559) 891-5445

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Bill of Materials

Configuration:

(1) NEW CATERPILLAR MODEL C15 D450GC TIER III GENERATOR SET, 450KW STANDBY RATED, 277/480V, 3 PHASE, 60 HZ WITH FAN AT 1800 RPM, 960 GALLON EXTENDED INTEGRAL FUEL TANK, SOUND ATTENUATED LEVEL 2 ENCLOSURE

CAT Standard Features and options

Engine Package Description:

Heavy duty Caterpillar diesel engine
Model C15, In-line 6-cylinder, 15.2 liter engine
450 ekW w/1800 RPM Fan
Electrical system, 24 VDC
Coolant and lube drains piped to the edge of base
Fuel filters
Full flow oil filters
Electronic Governor, ADEM-A4
D350 Automatic Voltage Regulator
Voltage within +/- 0.25% at steady state from not load to full load

Charging System:

CAT Battery with rack and cables
Installed (wet) 1000CCA; 90A hr; 12V (x2)
24V, 45A Charging Alternator
24V Electric starting motor

Control System:

GCCP 1.2 Auto Start Control Panel (RHS Mounted)
Features Include:

- 4-line back-lit LCD text display
- Multiple display languages
- Five-key menu navigation
- LCD alarm indication
- Customizable power-up text and images
- Data logging facility
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB & RS485 communication
- Front panel configuration with PIN protection
- Power save mode
- 3-phase generator sensing and protection
- Generator current and power monitoring (kW, kvar, kVA, pf)
- kW and kvar overload and reverse power alarms
- Over current protection
- Unbalanced load protection
- Breaker control via fascia buttons

- Fuel/start outputs configurable when using CAN Support for 0-10 V & 4 mA to 20 mA sensors
- 8 configurable digital inputs (3 available for Customer use)
- 8 configurable digital outputs (5 available for Customer use)
- 4 configurable analogue/digital inputs (3 available for Customer Use
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Manual and automatic fuel pump control
- Engine pre-heat and post-heat functions
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel usage monitor and low fuel level alarms
- 3 configurable maintenance alarms

Safety Shutoff for:
High Water Temp
Overspeed
Low Oil Pressure
Low Coolant Level

MODBUS RS485

Circuit Breaker:

NEMA 1 Enclosure with hinged door
Electrical stub-up area directly below circuit breaker
UL listed mainline breaker
100% Rated 3-pole with solid neutral

Cooling System:

Thermostats and housing
Radiator sight gauge
Radiator and cooling fan with protective guards
50% coolant anti-freeze and corrosion inhibitor
Standard ambient temperatures up to 50°C (122°F)

Generators:

IP23 Protection
Class H Insulation
Drip proof, self-excited, brushless, 12 lead, reconnectable

Finish:

All electroplated hardware or stainless steel
Anticorrosive paint protection
High gloss polyurethane paint for durability and scuff resistance

Mounting System:

Heavy-duty fabricated steel base with lifting points
Anti-vibration pads to ensure vibration isolation
Complete OSHA guarding
Stub-up pipe ready for connection to silencer pipework
Flexible fuel lines to base with NPT connections

Exhaust:	
	Installed inside enclosure on enclosed units
	Critical grade silencer system internally incorporated with enclosure
Manuals:	
	(1) Set Operations and Maintenance, wiring diagrams, troubleshooting leaflets
Tests:	
	Factory load test, control and device checks
	Alternator test report

Additional Optional Generator Set Equipment Included in Sale Quotation:

Enclosure:	
	Level 2 Sound Attenuated Enclosure (White)
	External emergency stop button
	20A GFCI Receptacle
	Enclosure lights (DC only)
	100A Load Center (Located inside enclosure)
Circuit Breaker:	
	800A LSI Manually-Operated Main Breaker, 100% UL Rated
	Neutral bar
	800:5 Current Transformer
	Auxiliary Contacts
	SUSE Decals & Films
Generator:	
	Alternator M3136L41
	Permanent magnet excitation
	Anti-condensation heater
Control System (Upgrade control panel GCCP 1.2 with options):	
	Generator running & fault relay
	Ground fault relay
	Panel mounted audible alarm
	Remote Emergency Stop Button **[shipped loose, installed by others]**
	Remote Annunciator **[shipped loose, installed by others]**
	Input Expansion Module
	Output Expansion Module
Mounting Accessories:	
	Seismic vibration isolators
Fuel System:	
	UL-listed Extended Integral fuel tank (24 hour run time)
	(960 Gallon Total Capacity / 868 Usable Gallon Capacity)
	5 gallon spill containment
	Overfill prevention valve (95% shutoff)

Audio & visual fuel alarms (90% level)

Cooling System:

Jacket Water Heater (pump style)

Battery Charger:

Battery charger, 10A, UL listed

Miscellaneous:

Initial fill of oil and coolant
Standard air cleaner (light duty)
PL444 Product Link
EPA Emissions Certification
UL 2200 Listing
NFPA 110 Upgrade
IBC Seismic Certification
Standard factory warranty - 2 years from startup service
1-year Customer Value Agreement (Preventative Maintenance - 1 visit)

Quinn Engine Systems Services Included:

Prep and assembly
Freight allowed to jobsite (**Offload/crane service by others**)
Level 2 Startup Service (**includes generator inspection/transfer test**)
NFPA 110 Startup Service
Basic demonstration

Quinn Engine Systems Services NOT Included:

Sales tax
Air, building or construct permits
Offloading/crane service of equipment off delivery truck
Installation, wiring, piping, plumbing or anchoring of equipment
Diesel fuel, initial fill or for testing

Configuration:

(1) NEW ASCO 300 SERIES AUTOMATIC TRANSFER SWITCH, OPEN TRANSITION, RATED 800A, 3 POLE, 277/480V, 3 PHASE, 60HZ, NEMA 3R ENCLOSURE

Automatic Transfer Switch:

Series 300, 3 phase, 4 wire
Open transition
Standard - No bypass
800A Rating, 3 Poles
H-frame housing
Solid Neutral Configuration

NEMA 3R Secure Double-Door Enclosure
Group G Controller with Modbus Communication card

*Feature 11BE: Feature Bundle; Programmable engine exerciser with 7 independent routines run the generator with or without loads, on a daily, weekly, bi-weekly, or monthly basis. Controlled from the user interface keypad.

*Feature 18RX: Relay Expansion Module provides accessory relays and includes one Form C contact for normal source availability (18G), and one Form C contact for emergency source availability (18B). Additional output relay is provided, the default is to indicate a common alarm.

*Feature 31Z: Load disconnect contacts, with TD which operate before/after transfer

*Feature 44G: Strip heater with thermostat; wired to load terminals: 208-600 volts

*Feature 125A: IBC Seismic Certified

SCOPE OF WORK

QPS to Supply the following Equipment as described in above Bill of Materials:

- C15 D450-GC (450kW) Generator package set
- ASCO 300 Series (800A Rating) Automatic Transfer Switch

QPS will notify Casitas Municipal Water District of the following:

- Estimated factory ready to ship date upon arrival.
- When equipment received in our QPS yard and unit has been inspected.
- When equipment is unit ready for jobsite delivery.
- QPS will schedule carrier and delivery of above equipment to jobsite on single flatbed truck.

Casitas Municipal Water District will be responsible for the following:

- Offload equipment from truck, via forklift or crane service and set in place.
- Mount, anchor, plump and wire QPS supplied equipment on site.
- Terminate all electrical wires, exhaust piping and fuel piping from QPS supplied equipment.
- Fill out and submit QPS Startup Checklist.
- Provide 2 week notice for prospective startup date.

****Startup (if applicable) will not be conducted until the following items have been completed and received by QPS****

1. QPS Startup Checklist
- Complete installation/anchoring
- Confirm wiring termination - including customer shore power for auxiliary equipment
- Confirm fuel is available for testing - must be done before technician's arrival
- Confirm building load available if necessary - NFPA 110
2. Permit to Operate, Authority to Construct, etc.

NOTES, EXCEPTION, CLARIFICATION

*** Quinn Power Systems is not a general, electrical or installing contractor. Providing equipment and services as described above only.**

*** The equipment offered in this proposal is CAT standard product in accordance with verbal request. No other written details, plans, specifications sections, contract documents, general or supplementary conditions apply to this quotation. Equipment is as stated above, call for any revisions to equipment quoted. Exception taken to anything not included in this proposal and as listed below.**

*** Quotation does not include any Sales Tax, Air District or Building Permits, Initial fill or Test fuel, Major Testing unless otherwise specified in the Bill of Materials.**

*** Depending on final height of installed generator set, a working platform may be required to access the control panel and maintenance doors. Platforms are not included in this proposal, unless stated above. Call for revised quotation if required.**

*** Startup/Commissioning Services are provided for CAT factory/QPS supplied equipment only. Scope of work for Startup Services available upon request. Out of Scope services are billed on a Time & Material basis in the field at purchaser's expense. QPS standard labor rates apply. Technician services are provided during normal business hours Monday through Friday.**

*** Exception taken to any NETA 3rd party or independent testing requirements. Any and all testing as listed above to be provided by QPS technicians.**

Cat® D450 GC
Diesel Generator Sets

Standby : 60 Hz

Image shown may not reflect actual configuration.

Engine Model	Cat® C15 In-line 6, 4-cycle diesel
Bore x Stroke	137 mm x 171 mm (5.4 in x 6.8 in)
Displacement	15.2 L (928 in³)
Compression Ratio	16.1:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	MEUI
Governor	Electronic ADEM™ A4

Model	Standby	Emission Strategy
D450 GC	450 ekW, 562.5 kVA	EPA Certified for Stationary Emergency Application

PACKAGE PERFORMANCE

Performance	Standby
Frequency	60 Hz
Genset Power Rating	562.5 kVA
Genset power rating with fan @ 0.8 power factor	450 ekW
Emissions	EPA TIER 3
Performance Number	DM8153
Fuel Consumption	
100% load with fan, L/hr (gal/hr)	131.7 (34.8)
75% load with fan, L/hr (gal/hr)	106.1 (28.0)
50% load with fan, L/hr (gal/hr)	79.1 (20.9)
25% load with fan, L/hr (gal/hr)	45.1 (11.9)
Cooling System[1]	
Radiator air flow restriction (system), kPa (in water)	0.12 (0.48)
Radiator air flow, m³/min (cfm)	720 (25426)
Engine coolant capacity, L (gal)	20.8 (5.5)
Radiator coolant capacity, L (gal)	54 (14)
Total coolant capacity, L (gal)	75 (20)
Inlet Air	
Combustion air inlet flow rate m³/min (cfm)	41.9 (1479.3)
Max. allowable combustion air inlet temp, °C (°F)	48 (118)
Exhaust System	
Exhaust stack gas temperature, °C (°F)	491.3 (916.3)
Exhaust gas flow rate, m³/min (cfm)	111.3 (3929.1)
Exhaust system backpressure (maximum allowable) kPa (in. water)	10.0 (40.0)
Heat Rejection	
Heat rejection to jacket water, kW (Btu/min)	177 (10047)
Heat rejection to exhaust (total), kW (Btu/min)	505 (28699)
Heat rejection to aftercooler, kW (Btu/min)	133 (7546)
Heat rejection to atmosphere from engine, kW (Btu/min)	70 (4000)
Heat rejection from alternator, kW (Btu/min)	26 (1462)
Emissions	

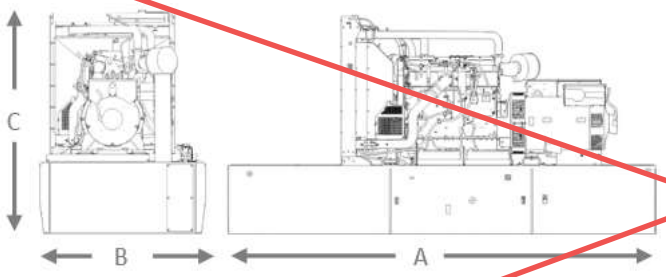
EPA Engine Certification (2024) (g/bhp-hr)

HP	Family Name	HC	NOx	NMHC + NOx	CO	PM
689	RCPXL15.2NYS	0.16	2.60	2.76	2.16	0.07

D450 GC Diesel Generator Sets
Electric Power

Alternator[3]		
Voltages	480V	600V
Motor starting capability @ 30% Voltage Dip, skVA	1333	1335
Current Amps	676.6	541.3
Frame Size	M3136L41	M3136L41
Excitation	PMG	AREP
Temperature Rise, °C	105	105

WEIGHTS & DIMENSIONS – OPEN SET



FUEL TANK CAPACITY

Tank Design	Total Capacity L (gal)	Useable Capacity L (gal)
Integral	3671 (969.7)	3323 (877.8

Base	Length "A" mm (in)	Width "B" mm (in)	Height "C" mm (in)	Generator Set Weight kg (lb)
Skid (Wide Base)	4815 (189.6)	1630 (64.2)	2034 (80.1)	3707 (8172.5)
Integral Tank Base	4815 (189.6)	1630 (64.2)	2584 (101.7)	4644 (10238.3)

Note: General configuration not to be used for installation. See general dimension drawings for detail.

*Refer to Mechanical Drawings for Dimensions and Weights.

APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.
Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

STANDBY: Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

RATINGS: Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

FUEL RATES: Based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/litre (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details.
For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

DEFINITIONS AND CONDITIONS

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[3] UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

LET'S DO THE WORK.™

LEHE2010-06 (06/22)

Engine Controller

ADEM™ A4 Engine Controller

The ADEM™ A4 is the main Electronic Control Module (ECM) used on select diesel engines. The ADEM A4 provides a higher degree of control over a large number of combustion variables. The ADEM A4 is designed to control/interface Electronic Unit Injector (EUI) equipped engines. The ADEM A4 engine system is composed of the ADEM A4 ECM, control software, sensors, actuators, fuel injectors, and interface to the generator system. The prime benefit of an ADEM A4 engine system is to better control and maintain the particulate emissions, both steady state and transient, while improving engine performance.

Features

Reliable, Durable

All ADEM A4 controllers are designed to survive the harshest environments.

- Environmentally sealed, die-cast aluminum housing solates and protects electronic components from moisture and dirt contamination
- Rigorous vibration testing ensures product reliability and durability
- Accuracy maintained from –40°C to 85°C
- Electrical noise immunity to 100 volts / meter
- Internal circuits are designed to withstand shorts to + battery and – battery

Simple Servicing

Each ADEM A4 system works in combination with the Cat® ET service tool software to keep the engine operating at peak performance.

- Displays measured parameters
- Retrieves active and logged event code documenting abnormal system operation
- Performs calibrations and diagnostic tests
- Supports flash programming of new software into the ADEM A4 ECM

Self Diagnostics

Each ADEM A4 ECM has a full compliment of diagnostics. The ECM can detect faults in the electrical system and report those faults to the service technician for quick repair.

- Self-diagnostic capability pinpoints operational prob-lems in need of attention.

Advanced Features

- Enhanced performance from fuel injection timing and limiting
- Adjustable monitoring of vital engine parameters
- Programmable speed acceleration ramp rate
- Data link interfaces

Description

The ECM is housed in an environmentally sealed cast-ing. All wiring connections to the ECM are made using two sealed connectors: a single seventy-pin connector and a single one hundred twenty-pin connector.

Engine Speed Governing

Desired engine speed is calculated by the ECM and held within ±0.2 Hz for isochronous and droop mode. The ECM accounts for droop that is requested. The proper amount of fuel is sent to the injectors due to these calculations. The ECM also employs cooldown/shutdown strategies, acceleration delays on startup, acceleration ramp times and speed reference.

Fuel Limiting

Warm and cold fuel-air ratio control limits are con-trolled by the ECM. Electronic monitoring system derates, torque limit, and cranking limit, programmable torque scaling, and cold cylinder cutout mode are standard features.

Fuel Injection Timing

Master timing for injection is controlled by the ECM control. Temperature dependencies are accounted for in the fuel injection calculations.

Electronic Monitoring

Electronic monitoring of vital engine parameters can be programmed. Warning, derate, and shutdown event conditions may be customized by the user.

Information Management

The ECM stores information to assist with electronic troubleshooting. Active and logged diagnostic codes, active events, logged events, fuel consumption, engine hours, and instantaneous totals aid service technicians when diagnosing electronic faults and scheduling preventive maintenance.

Calibrations

Engine performance is optimized through injection timing. Auto/manual sensor calibrations are standard features.

On-Board System Tests

System tests are available to assist in electronic trou-bleshooting. These tests include: injector activation, injector cutout, and override of control outputs.

Data Link Interfaces

The ADEM A4 communicates with the EMCP via a dedicated communication network.

Electronic Sensing

The following sensing is available on the ADEM A4: oil pressure, fuel pressure, fuel temperature, atmospheric pressure, air inlet temperature, turbo outlet pressure, engine coolant temperature, engine speed, throttle, position, exhaust temperature, oil filter pressure differential, fuel filter pressure differential, air filter pressure differential and crankcase pressure.

Engine Controller

SPECIFICATIONS

Impervious to:

Salt spray, fuel, oil and oil additives, coolant, spray cleaners, chlorinated solvents, hydrogen sulfide and methane gas, and dust.

Input and output protection

All inputs and outputs are protected against short circuits to +battery and –battery

Input voltage range (24 VDC nominal)

18 to 32 VDC

Mounting

Engine mounted

Reverse polarity protected

Shock, withstands 20g

Temperature range

Operating: –40°C to 85°C (–40°F to 185°F)
Storage: –50°C to 120°C (–58°F to 248°F)

Vibration

Withstands 8.0g @ 24 to 2 kHz

www.cat.com/electricpower

LEHE5347-03 (02/19)

AIR CLEANERS

Image shown might not reflect actual configuration

AIR CLEANERS FOR C13/C15/C18 ENGINES

GENERAL DESCRIPTION

Air Cleaner reduce contaminants flowing into the air intake system, provide a high level of Engine protection from harmful contaminants and increase engine performance and fuel efficiency.

Dual element air cleaners provide additional protection for the Engine

FEATURES

- Radial Seal Technology
- Easy to read CAT filter service indicator with manual reset
- Standard Yellow Media
- Constant torque clamps
- Engine rear mounted filters with easy access to service filter to open and enclosed Gensets
- Air filters Designed for 500 hrs of service*
  *based on dust Concentration levels

Feature Code	Engine model	Dust Environment	Industry	Element	Housing
Dust Concentration level - 1-5mg/m3					
STD AIR	C13, C15, C18	Standard Duty	Factory, Office	Non-Canister	N-A
Dust Concentration level - 5-10mg/m3					
ACLSS04	C13, C15	Medium Duty	Construction, Factory	Single Element	Radial Seal, Metal Body
ACLSS05	C18	Medium Duty	Construction, Factory	Single Element	15" Radial Seal, Metal Body
ACLSS05	C18 PD 50 Hz	Medium Duty	Construction, Factory	Single Element	2off PowerCore Glass Filled Polypropylene Housing
ACLSS06	C18 60HZ	Medium Duty	Construction, Factory	Single Element	18" Radial Seal, Metal Body
ACLSS06	C18 PD 60 HZ	Medium Duty	Construction, Factory	Single Element	2off PowerCore Glass Filled Polypropylene Housing

Cat® GC ENCLOSURES

Image shown may not reflect actual configuration.

D250 GC – D600 GC Sound Attenuated Enclosures

60 Hz

Features

Robust/Highly Corrosion Resistant Construction

- Safeguards genset against environmental and weather conditions
- Factory installed on skid base or tanks base
- Environmentally friendly, polyester powder baked paint
- Enclosure constructed with 18-gauge steel
- Interior zinc plated fasteners
- Internally mounted exhaust silencing system
- Comply with ASCE /SEI 7 for Wind loads up to 100 mph
- Designed and tested to comply with UL 2200 Listed generator set package

Excellent Access

- Large cable entry area for installation ease
- Accommodates side mounted single or multiple breakers
- Two doors on both sides
- Vertically hinged allow 180° opening rotation
- Radiator fill cover

Security and Safety

- Lockable access doors which give full access to control panel and breaker
- Cooling fan and battery charging alternator fully guarded
- Fuel fill, oil fill and battery can only be reached via lockable access
- Externally mounted emergency stop button (Optional)
- Designed for spreader bar lifting to ensure safety
- Stub-up area is rodent proof

Sound Attenuated Level 2

- Caterpillar white paint
- UL Listed integral fuel tank with 24 hours running time capacity (Optional)
- DC lighting package (Optional)

Cat® GC ENCLOSURES

Enclosure Package Operating Characteristics

Enclosure Type	Standby	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at 7m (23 ft)
	ekW	m^3/s	cfm	°C	°F	100% Load
Level 2 Sound Attenuated Enclosure (Steel)	250	6.4	13561	57	135	74
	300	6.4	13561	51	125	74
	350	7.4	15680	57	134	71
	400	7.4	15680	53	127	71
	450	8.4	17692	54	130	73
	500	8.4	17692	50	122	73
	550	11.2	23731	56	133	73
	600	11.2	23731	53	127	73

*Cooling system performance at sea level. Consult your Cat® dealer for site specific ambient and altitude capabilities.

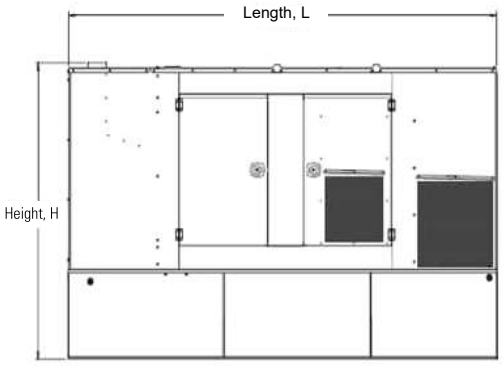
Note: Sound level measurements are subject to instrumentation, installation and manufacturing variability, as well as ambient site conditions

Cat® GC ENCLOSURES

Weights and Dimensions

Enclosure Type	Standby Ratings	Length, L		Width, W		Height, H		Package Weights	
	ekW	mm	in	mm	in	mm	in	kg	lb
Sound Attenuated Enclosure on Skid Base	250	3958	155.8	1440	56.7	1991	78.4	2857	6298.6
	300							2945	6492.6
	350	4633	182.4	1630	64.2	2227	87.7	3983	8781.0
	400							4017	8856.0
	450	4823	189.8	1630	64.2	2227	87.7	4408	9718.0
	500							4457	9826.0
	550	4980	196.1	1865	73.4	2172	85.5	4754	10480.8
	600							4837	10663.8
Sound Attenuated Enclosure on UL Listed Integral Fuel Tank Base	250	3958	155.8	1440	56.7	2487	97.9	3497	7709.6
	300							3585	7903.6
	350	4633	182.4	1630	64.2	2644	104.1	4765	10505.0
	400							4799	10580.0
	450	4823	189.8	1630	64.2	2777	109.3	5345	11783.7
	500							5394	11891.7
	550	4980	196.1	1865	73.4	2723	107.2	5973	13168.2
	600							6056	13351.2
Sound Attenuated Enclosure on UL Listed Extended Integral Fuel Tank Base	250	4608	181.4	1430	56.3	2379	93.7	3590	7914.6
	300							3678	8108.6
	350	5251	203.7	1620	63.8	2561	100.8	4876	10749.7
	400							4910	10824.7
	450	5909	232.6	1620	63.8	2612	102.8	5497	12118.8
	500							5546	12226.8
	550	6759	266.1	1865	73.4	2487	97.9	6237	13750.2
	600							6320	13933.2

*Refer to Mechanical Drawings for Enclosure Dimensions.



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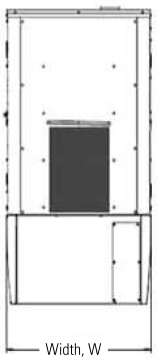
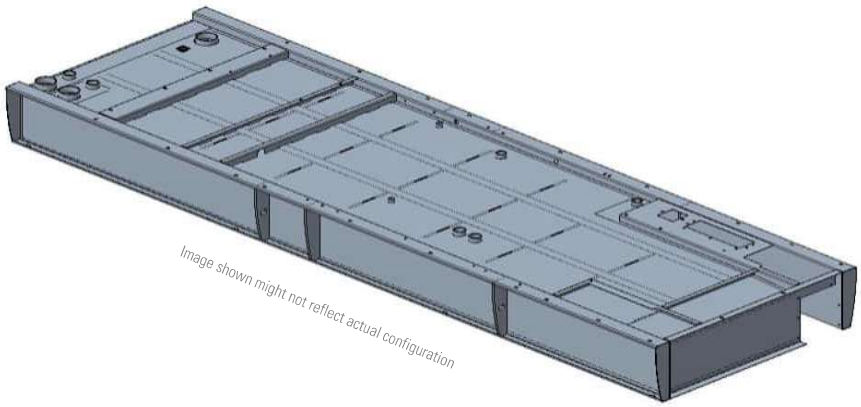


Sound Attenuated Enclosure on a UL Listed Integral Fuel Tank Base

LET'S DO THE WORK.™

Cat® GC FUEL TANKS



EXTENDED FUEL TANKS

D250 GC – D600 GC

FEATURES

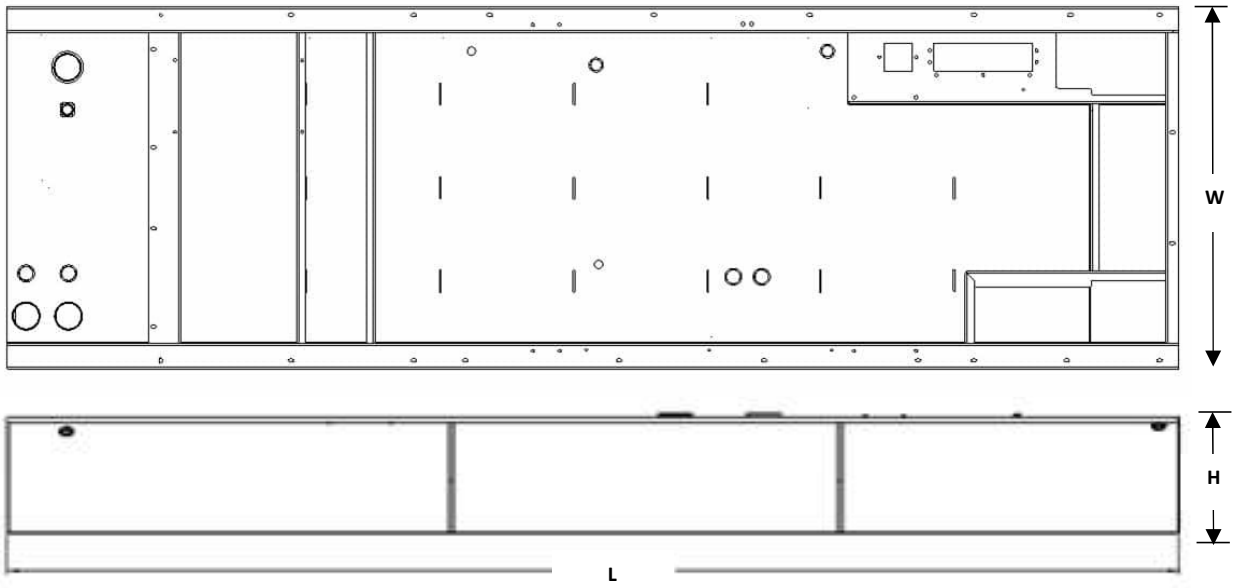
- UL Listed for United States (UL 142) and Canada (CAN/ULC S601)
- Facilitates compliance with NFPA 30 code, NFPA 37 and 110 standards and CSA C282 code
- Dual wall
- Low fuel level warning standard, customer configurable warning or shutdown
- Primary tank leak detection switch in containment basin
- Tank design provides capacity for thermal expansion of fuel
- Fuel supply dip tube is positioned so as not to pick up fuel sediment
- Fuel return and supply dip tube is separated by an internal baffle to prevent immediate re-supply of heated return fuel
- Pressure washed with an iron phosphate solution
- Interior tank surfaces coated with a solvent-based thin-film rust preventative
- Heavy gauge steel gussets with internal lifting rings
- Primary and secondary tanks are leak tested at 20.7 kPa (3 psi) minimum
- Compatible with open packages and enclosures
- Gloss black polyester alkyd enamel exterior paint
- Welded steel containment basin (minimum of 110% of primary tank capacity)
- Direct reading fuel gauge with variable electrical output
- Emergency vents on primary and secondary tanks are sized in accordance with NFPA 30.

OPTIONS

- Audio/visual fuel level alarm panel
- ULC / CSA Accessory Kit
- 5gal (18.9 L) spill containment
- Overfill prevention Valve
- Fuel tank fill pipe & lockable cap

Cat® GC FUEL TANKS

Fuel Tank Base Useable Capacities with Fuel Tank Dimensions & Weights



The heights listed above do not include lumber used during manufacturing and shipping

*Refer to Mechanical Drawings for Fuel Tank Dimensions.

A. Open Set & Sound Attenuated Enclosure

Tank Design	Feature Code	Total Capacity		Useable Capacity		Tank Only								Overall Package Height with Tank			
						Dry Weight		Height 'H'		Length 'L'		Width'W'		Open		Enclosure	
		Litre	Gallon	Litre	Gallon	kg	lb	mm	in	mm	in	mm	in	mm	in	mm	in
Extended Tank	FTDW039	2341	618.4	2060	538.9	1075	2370	639	25.1	4608	181.4	1430	56.3	2095	82.4	2385	93.9
	FTDW040	2862	756	2540	671	1294	2852	586	23	5252	206.7	1620	63.8	2503	98.5	2563	100.9
	FTDW041	3633	959.7	3286	868.1	1506	3302	635	25	5910	228.7	1620	63.8	2291	90.1	2479	97.6
	FTDW042	4271	1128.2	3878	1024	1944	4285	585	23	6759	266.1	1865	73.4	2345	92.3	1957	77.0

B. Estimated Run Time (Hours)

Tank Design	Feature Code	Standby Ratings (kVA)						
		ekW	100%		75%		50%	
			Hrs	L/hr	Hrs	L/hr	Hrs	L/hr
Tank	FTDW039	250	28.1	73.3	35	35.0	47	47.0
		300	24	86	30.8	30.8	40	40.0
	FTDW040	350	26.9	94.3	31.2	81.9	42.4	60.2
		400	24.0	105.8	28.1	90.7	38.6	66.2
	FTDW041	450	25.0	131.7	31.3	106.1	42.0	79.1
		500	24.0	137	30.1	110.5	46.6	71.3
	FTDW042	550	25.7	151.1	32.9	118.1	45.2	86.1
		600	24.1	161.6	30.0	129.6	42.4	91.7

Tanks with full electrical stub-up area include removable end channel. Tanks with RH stub-up include stubup area directly below the circuit breaker or power terminal strips.

Fuel tanks and applicable options facilitate compliance with the following United States NFPA Code and Standards:

NFPA 30: Flammable and Combustible Liquids Code

NFPA 37: Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

NFPA 110: Standard for Emergency and Standby Power Systems

Fuel tanks and applicable options facilitate compliance with the following Canadian Standard and Code:

CSA C282 – Emergency Electrical Power Supply for Buildings

CSA B139-09 – Installation Code for Oil-Burning Equipment

Image shown may not reflect actual configuration

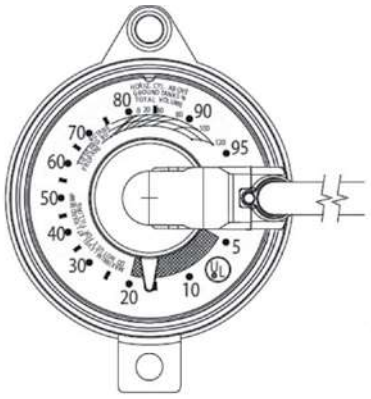
Fuel Level Gauge and Sender

The unit consists of a magnetically driven dial for direct reading with a snap fit Hall Effect Module attached to the lens. This module sends an electrical signal to a remote fuel level monitor.

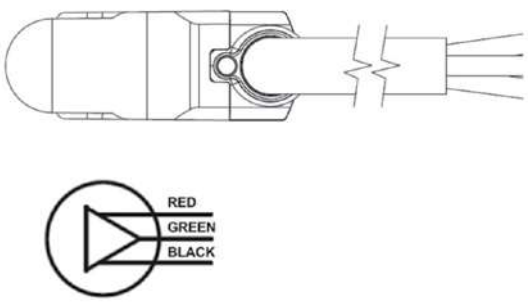
The module can provide ratiometric voltage output proportional to the liquid volume inside the tank.

Features

- A magnetic drive allows a signal from the float mechanism inside the tank to be transmitted through a solid bulkhead.
- The dial is designed to allow a second magnetic coupling. This is a coupling from the pointer magnet, through the sealed lens and into the Hall Effect Module.
- The magnetic connection of the Hall Effect sensor is more reliable than systems that depend on the sliding contact of variable resistor devices.
- Hall Effect is a solid state technology with no moving contacts. It counts on the fact that a magnet bends the path of electrons moving through a semiconductor. The bending of the electrons can be detected and converted into an electrical signal.
- The dial is able to provide an electrical output which can be utilized for remote monitoring of tank levels.
- The dial case is hermetically sealed by ultrasonic welding to melt and fuse the case into one solid piece. This keeps weather out, ensuring “no-fog” read ability while greatly extending mechanical life.
- The seal is a high reliability, no-gasket design.
- The plastic case is far more resistant to corrosion than any metal-cased version and is capable of withstanding broad variations in temperature. The lens and case are a special, UV stabilized plastic material.



Remote-ready Dial, with Hall Effect Module



Hall Effect Module

General and Functional Specifications*

- Conformity: ±3% at 5 VDC
- Operating temperature: -40° to 80°C (-40°F to 176°F)
- Accuracy: ±4% of full scale. (float gauge errors not included.)
- Repeatability: ±1%.
- Operational voltage range: 3.5 to 6.0 VDC
- Output voltage: ratiometric 10−90% of input voltage @ 10−90% volume
- Resolution – infinite
- Operating current: 4.5 mA
- Output current: ± 1 mA
- Hall Effect modules are UL classified as intrinsically safe for Class 1, Division 1, Groups C and D (hazardous locations)

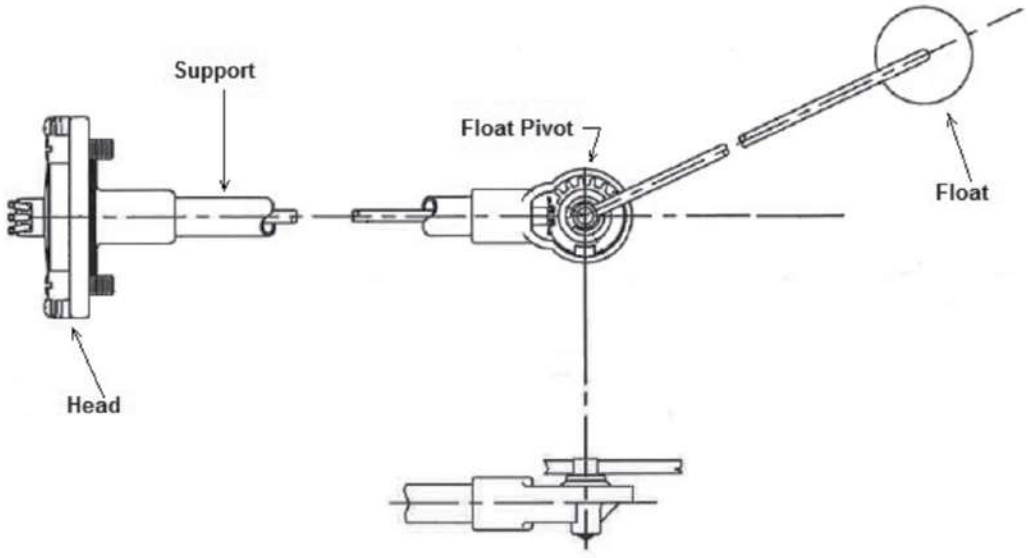
Gauge Materials of Construction*

- Head – die cast aluminum.
- Center shaft, support tube, and float rod – tempered aluminum
- Gears, cross stud, and bearing – stainless steel
- Drive magnet – alnico
- Gear housing – acetal
- Float – nitrile rubber

Dial Materials of Construction*

- Crystal and case: polycarbonate.
- Dial – painted aluminum

*Materials and specifications are subject to change without notice. Ratings subject to change due to temperature and other environmental considerations.



FUEL ALARMS

Image shown might not reflect actual configuration

FUEL LEVEL ALARMS – (FL1/EMCLFS3), (FL2 /EMCLFA2) and (FL3/EMCHFA2)

LOW FUEL LEVEL SHUTDOWN (FL1 / EMCLFS3) AND LOW FUEL LEVEL ALARM (FL2 / EMCLFA2)

These options provide an alarm on low fuel level and a shutdown on low fuel level. When fuel level reaches to a preset value, the fuel level sender senses the Low Fuel condition and activates a relay which in turn activates the alarm and Shut down. This warning is reported by an indicator light on the control panel with an audible alarm also available as an option. This warning can additionally be relayed to a remote annunciator.

HIGH FUEL LEVEL ALARM (FL3/ EMCHFA2)

This option provides an alarm on high fuel level. This warning is reported by an indicator light on the control panel with an audible alarm also available as an option. When Fuel level reaches to 90% the fuel level sender senses the condition and activates a relay which in turn activates.

PERFORMANCE

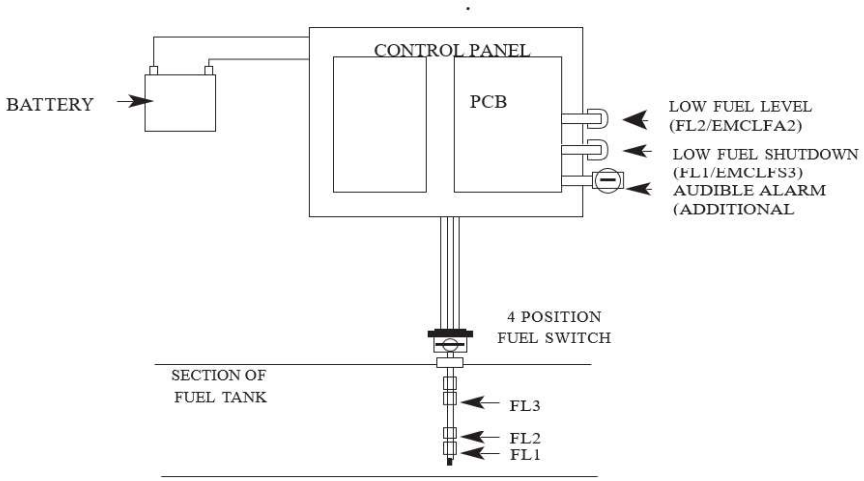
- Accuracy : +/- 2% of depth @ 20°C

MATERIALS

- Enclosure : 30% glass filled nylon
- Internal Electrode : PTFE
- Sensor Tube : 316 Stainless Steel
- Internal Spacers : polypropylene
- End Plug : PTFE
- Wetted Seals : Viton (FKM)

ENVIRONMENTAL RATINGS

- Sealing : IP67 with Mating Connector
- Max.Pressure : 1 bar
- Operating Temp : -20°C to +85°C
- Shock : 50g, 6.3 ms
- Vibration : 15.3 gms BS EN 60068-2-64:1993
- Weight : 300 g (1 m long sensor)



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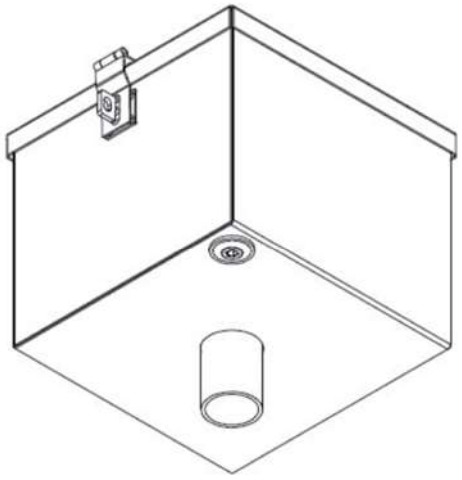

Image shown may not reflect actual configuration

5 Gallon Steel Spill Containment Box

Durable spill containment box designed for containment of small spills during filling of an above ground storage tank.

Features

- Optional overfill prevention valve
- Lockable hinged cover.

Dimensions

- Height: 13.08"
- Height with pipe: 13.40"
- Body Width: 12.38"
- Width: 13.68"
- Weight: 22 lbs.

Image shown may not reflect actual configuration

Overfill Prevention Valve
for use with 5 and 7.5 Gallon Spill Containment

The overfill prevention valve is installed at the fill port of a fuel tank.

Used in a pressurized tight fill application, the valve helps prevent tank overfills by closing when the liquid level reaches shut off capacity level.

The overfill prevention valve can eliminate hazardous liquid spills.

Features

- Installs in a 2" NPT or 4" NPT opening
- Accepts pressure delivery of product
- Provides tanks with large fuel storage capacity at shutoff height
- Provides positive shut off of fuel
- Retro-fits to an existing AST*
- Mechanical in operation – no user interface required
- Compatible with diesel fuel
- Minimum operating pressure of 5 PSI
- Maximum operating pressure of 40 PSI

* Aboveground Storage Tank

Code Compliance

- UL listed, ULC listed

GCCP 1.2
Control Panel

Image shown may not reflect actual configuration.

GCCP 1.2 – Control Panel

GCCP 1.2 is an Auto Start Control Module suitable for a wide variety of diesel gen-set applications. Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs and remote PC.

Description

The controller is compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements.

The extensive list of features includes enhanced event and performance monitoring, remote communications & PLC functionality. The modules can be easily configured using a configuration suite PC software.

Full Range of Attachments

- Wide range of system expansion attachments, designed specifically to work with the GCCP controller
- Flexible packaging options for easy and cost effective installation

Benefits

- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility
- PLC editor allows user configurable functions to meet user specific application requirements
- RS485 Communication port can be used for the Remote Monitoring Communication (Compatible with Cat PLG)

World Wide Product Support

- Cat dealers provide extensive pre and post sale support
- Cat dealers have over 1,600 dealer branch stores operating in 200 countries

Features

- 4-line back-lit LCD text display
- Multiple display languages
- Five-key menu navigation
- LCD alarm indication
- Customisable power-up text and images
- Data logging facility
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB & RS485 communication
- Front panel configuration with PIN protection
- Power save mode
- 3-phase generator sensing and protection
- Generator current and power monitoring (kW, kvar, kVA, pf) kW and kvar overload and reverse power alarms
- Over current protection
- Unbalanced load protection
- Breaker control via fascia buttons
- Fuel and start outputs configurable when using CAN Support for 0V to 10V & 4 mA to 20 mA sensors
- 8 Configurable digital inputs (3 available for Customer use)
- 8 Configurable digital outputs (5 available for Customer use)
- 4 Configurable analogue inputs (3 available for Customer use)
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Engine pre-heat and post-heat functions
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel usage monitor and low fuel level alarms
- 3 Configurable maintenance alarms

SPECIFICATIONS

DC SUPPLY

CONTINUOUS VOLTAGE RATING

8V to 35V continuous
5V for upto 1 minute

CRANKING DROPOUTS

Able to survive 0V for 100 mS, providing supply was at least 10V before dropout and supply recovers to 5V. This is achieved without the need for internal batteries.

LEDs and backlight will not be maintained during cranking

MAXIMUM OPERATING CURRENT

260 mA at 12V, 150 mA at 24V

MAXIMUM STANDBY CURRENT

145 mA at 12V, 85 mA at 24V

CHARGE FAIL/EXCITATION RANGE

0V to 35V

GENERATOR & MAINS (UTILITY) VOLTAGE RANGE

15V to 415 V AC (Ph to N)
26 V to 719 V AC (Ph to Ph)

MAGNETIC PICK-UP VOLTAGE RANGE

+/- 0.5 V to 70 V

FREQUENCY RANGE

10,000 Hz (max)

INPUTS

DIGITAL INPUTS A TO H

Negative switching

ANALOGUE INPUTS A TO D

Configurable as:

Negative switching digital input 0-10V sensor 4 mA to 20 mA Resistive Sensor

ANALOGUE INPUTS A TO C

Configurable as:

Negative switching digital input Resistive Sensor

OUTPUTS

OUTPUT A and B (FUEL & START)

15 A DC at supply voltage

AUXILIARY OUTPUTS C, D, E, F, G, H, I & J 2

A DC at supply voltage

DIMENSIONS

OVERALL

216 mm x 158 mm x 43 mm
8.5″ x 6.2″ x 1.5″

PANEL CUTOUT

184 mm x 137 mm
7.2″ x 5.3″

MAXIMUM PANEL THICKNESS

8 mm
0.3″

OPERATING TEMPERATURE

-30°C to +70°C
-22°F to +158°F

STORAGE TEMPERATURE RANGE

-40°C to +85°C
-40°F to +185°F

STANDARDS

UL, cUL Listed

NFPA 70#

Electro-Magnetic Compatibility: BS EN 61000-6-2/6-4 Electrical Safety: BS EN 60950

Temperature: BS EN 60068-2-1, BS EN 60068-2-2

Vibration: BS EN 60068-2-6

Humidity: BS EN 60068-2-30, BS EN 60068-2-78 Shock: BS EN 60068-2-27

Degrees of protection provided by enclosures: BS EN 60529 Ingress Protection: IP65 – Front of module when installed into the control panel with the optional sealing gasket

Applicable codes and standards facilitate compliance to NFPA 70

GCCP 1.2 Control Panel
Electric Power

OPTIONAL MODULES

Remote annunciator

The Remote annunciator with an integral sounder is an output LED expansion module is designed to display a maximum of eight individual LED indications up to a maximum distance of 1 km (0.6 miles). The annunciator will consist of two modules to provide a 16 Channel Fault annunciation. The Panels are fitted with removable label cards which can be used to identify the standard NFPA alarms.

Key Features:

- Panel mount
- Vertical design
- In-built alarm
- Alarm mute button
- Max of 80 configurable LED's

Input Expansion Module

The Input Expansion module is used in conjunction with supported GCCP controllers to provide additional, flexible, input functionality. The module's ID switch is configurable from the module and the 10 inputs can be configured from within the 'host controller'. The inputs can be configured in a number of ways to connect to digital switches, resistive sensors, 0-10V DC signals or 4-20 mA signals.

Key Features:

- DIN rail & chassis mount
- Power on/link lost LED
- 1.2 km (0.75 Mile) working range
- Connect maximum of 4 x Input Modules to a single host controller
- Max of 40 configurable inputs

Output Expansion Module

The output relay expansion module for use with compatible GCCP control modules has been designed to extend a host module's output capabilities.
A maximum of 10 relays can be connected to an individual module at any one time.
All outputs are configurable via the host controller.

Key Features:

- Power On/Link Lost LED ID SWITCH
- 10 Expansion modules can be connected to 1 host controller at a time
- 8 Configurable relay contacts with LED indicators:
  - o 4 Normally Open (N/O)
  - o 4 Change Over (C/O)
- Terminal strip connection for quick and easy set-up

LET'S DO THE WORK.™

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Annunciators

*Shipped loose, installed by others.

Picture shown may not reflect actual configuration.

Remote Annunicator Module

It is an LED expansion module that can be used with compatible control modules. The module has been designed to display a maximum of eight individual LED indications up to a maximum distance of 1 KM (0.6 miles).

The Annunciator will consist of two modules to provide a 16 Channel Fault annunciation.

It is presented in a vertical enclosure. It includes an alarm sounder that is triggered when the host controller detects an alarm condition. The alarm can be muted using the front push button.

The Panels will be fitted with removable label cards which can be used to identify the standard NFPA alarms if desired.

It includes individual LEDs for each channel and a 'Power On' LED that flashes when the link with the host controller is lost.

Features

- The Remote annunciator has an integral Sounder/Horn
- Eight configurable LEDs (per module)
- Works up to 1 KM (0.6 miles) from the host controller
- A single controller can support five Caterpillar configured remote annunciator control boxes

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES BS EN 60529

IP65 – Front of module when installed into the control panel with the supplied sealing gasket.

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

112 mA at 12 V, 53 mA at 24 V

MAXIMUM STANDBY CURRENT

74 mA at 12 V, 35 mA at 24 V

DIMENSIONS OVERALL

355 mm x 369 mm x 90 mm
13.6" x 14.5" x 3.5"

PANEL CUT-OUT

286 mm x 326 mm x 93 mm
11.2" x 12.8" x 3.6"

MAXIMUM PANEL THICKNESS

8 mm
0.3"

LET'S DO THE WORK.™

Product: 9841

RS485, 1 Pr #24 Str TC, PE Ins, OS+TC Brd, PVC Jkt, CM

Request Sample

*Recommended for Remote Annunciator, provided by others.

Product Description

RS-485, 1 Pair 24AWG (7x32) Tinned Copper, PE Insulation, Overall Beldfoil®+Tinned Copper Braid(90%) Shield, PVC Outer Jacket, CM

Technical Specifications

Product Overview

Suitable Applications:	RS-485, POS; Computer communications; Low Voltage Analog Signals (4-20ma, 0-10v, ...); Low Voltage Digital Control (24v, ...); Line Level Audio; Panel Wiring; serial communication (RS-485 standard) comprising of PLCs, VFDs, HMIs, motors, RTU, SCADA, etc. within noisy environments over long distance, etc.

Construction Details

Conductor

Element	No. of Elements	Size	Stranding	Material
Pair(s)	1	24 AWG	7x32	TC - Tinned Copper

Insulation

Element	Material	Nom. Thickness	Nom. Insulation Diameter	Color Code
Pair(s)	PE - Polyethylene	0.023 in (0.58 mm)	0.068 in (1.7 mm)	White/Blue Stripe & Blue/White Stripe

Outer Shield

Shield Type	Material	Coverage	Drainwire Type
Tape	Bi-Laminate (Alum+Poly)	100%	24 AWG (7x32) TC
Braid	Tinned Copper (TC)	90%	

Outer Jacket

Material	Nom. Thickness	Nom. Diameter
PVC - Polyvinyl Chloride	0.035 in (0.89 mm)	0.232 in (5.89 mm)

Table Notes:	Jacket OD +/- 0.020
Overall Cable Diameter (Nominal):	0.232 in (5.89 mm)

Electrical Characteristics

Electricals

Element	Nom. Conductor DCR	Nom. Capacitance Cond-to-Cond	Nom. Capacitance Cond-to-Other (Conds + Shield)	Nom. Characteristic Impedence	Nom. Velocity of Prop.	Max. Current
Pair(s)	24 Ohm/1000ft	12.8 pF/ft (42.0 pF/m)	23 pF/ft	120 Ohm	66%	2.1 Amps per Conductor at 25ºC (10°C Temperature Rise)

Nom. Outer Shield DCR:	3.4 Ohm/1000ft (11 Ohm/km)

High Frequency (Nominal/Typical)

Element	Frequency [MHz]	Nom. Insertion Loss (Attenuation)
Pair(s)	1	0.6 dB/100ft

Voltage

UL Voltage Rating
300 V (CM), 30 V (UL AWM 2919)

Mechanical Characteristics

Temperature

UL Temperature	Operating
80°C	-30°C to +80°C

Bend Radius

Stationary Min.	Installation Min.
2.5 in (64 mm)	2.5 in (64 mm)

Max. Pull Tension:	72.3 lbs (32.8 kg)
Bulk Cable Weight:	36 lbs/1000ft

Standards and Compliance

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	UL 1685 UL Loading, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	Article 800, CM
AWM Compliance:	AWM 2919
CEC / C(UL) Compliance:	CM
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE)
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Other Standard Compliance(s):	DMX-512
Plenum Number:	82841, 89841
Non-Plenum Number:	9841ZH

History

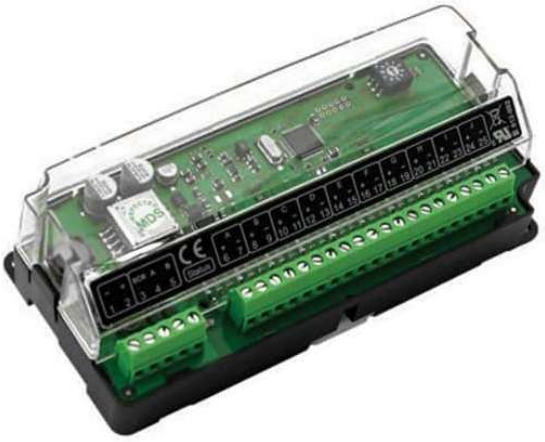
Update and Revision:	Revision Number: 0.558 Revision Date: 02-15-2024

Part Numbers

Variants

Item #	Color	Putup Type	Length	UPC/EAN	Footnote
9841.0030	Chrome	Reel	30 m	8719605022745	
9841 060100	Chrome	Reel	100 ft	612825259442	
9841.019999	Chrome	Reel	151 m	8719605022806	
9841.01152	Chrome	Reel	152 m	8719605022769	
9841.01305	Chrome	Reel	305 m	8719605022790	
9841 060500	Chrome	Reel	500 ft	612825259473	C
9841 0601000	Chrome	Reel	1,000 ft	612825259459	C
9841.011000	Chrome	Reel	1,000 m	8719605022752	
9841.011525	Chrome	Reel	1,525 m	8719605022776	
9841.012000	Chrome	Reel	2,000 m	8719605022783	
9841 0605000	Chrome	Reel	5,000 ft	612825259480	
9841 06010000	Chrome	Reel	10,000 ft	612825259466	C
9841.03305	Violet	Reel	305 m	8719605022837	
9841.031000	Violet	Reel	1,000 m	8719605022820	
9841.02305	Yellow	Reel	305 m	8719605022813	

Input Expansion Module



Picture shown may not reflect actual configuration.

Input Expansion Module

The Ratiometric Input Expansion module is used in conjunction with supported controllers to provide additional, flexible, input functionality. The module's ID switch is configurable from the module and the 10 inputs can be configured from within the 'host controller'.

The ratiometric inputs can be configured in a number of ways to connect to digital switches, resistive sensors, 0 – 10 V DC signals or 4 – 20 mA signals.

LED indication is provided for 'Power On' and 'Link Lost'.

Features

- Power On/Link Lost LED
- 10 inputs configurable for digital/resistive 4 – 20 mA and 0 – 10 V DC
- A maximum of 4 modules can be connected to 1 host control module to provide up to 40 additional configurable inputs
- Works up to 1.2 km (0.75 miles) from the host controller
- Terminal strip connection for quick and easy set-up

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55°C @ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40°C @ 93% RH 48 Hours

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES BS EN 60529

IP21

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs light will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

292 mA at 12 V, 167 mA at 24 V mA at 24 V

MAXIMUM STANDBY CURRENT

101 mA at 12 V, 167 mA at 24 V

INPUTS

10 inputs configurable for digital/resistive (3k ohms) 4 – 20 mA and 0 – 10 V DC

DIMENSIONS OVERALL

165 mm x 76 mm x 49 mm

STROAGE TEMPERATURE RANGE

-40°C to + 85°C

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Output Expansion Module

Picture shown may not reflect actual configuration.

Output Expansion Module

Output relay expansion module for use with compatible control modules. The Output Expansion module has been designed to extend a host module's output capabilities.

A maximum of 10 Output Expansion modules can be connected to an individual module at any one time. All outputs are configurable via the host controller.

The module will work up to 1 KM (0.6miles) from the host control module.

Features

- Power On/Link Lost LED ID SWITCH
- 10 expansion modules can be connected to 1 host controller at a time
- 8 configurable relay contacts with LED indicators
- 4 Normally Open (N/O)
- 4 Change Over (C/O)
- Terminal strip connection for quick and easy set-up

ENVIRONMENTAL TESTING STANDARD

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C BS EN 60068-2-2
Bb/Be Dry Heat +70°C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes 15 gn in 11 Ms

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours BS EN 60068-2-78
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

SPECIFICATION

CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT

325 mA at 12 V, 152 mA at 24 V

MAXIMUM STANDBY CURRENT

70 mA at 12 V, 32 mA at 24 V

AUXILIARY RELAY CONTACTS

2 Amp DC rated voltage free

DIMENSIONS OVERALL

165 mm x 76 mm x 49 mm
6.5" x 3" x 1.9"

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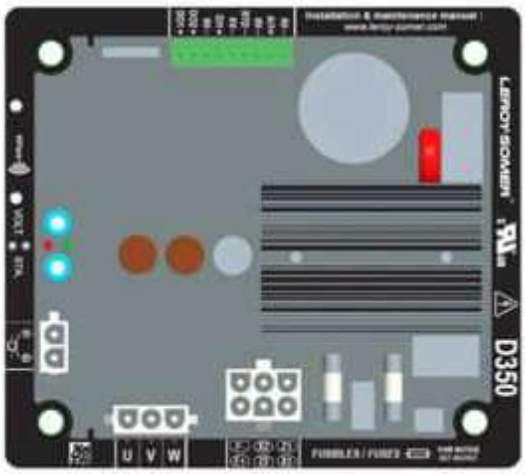
Automatic Voltage Regulator



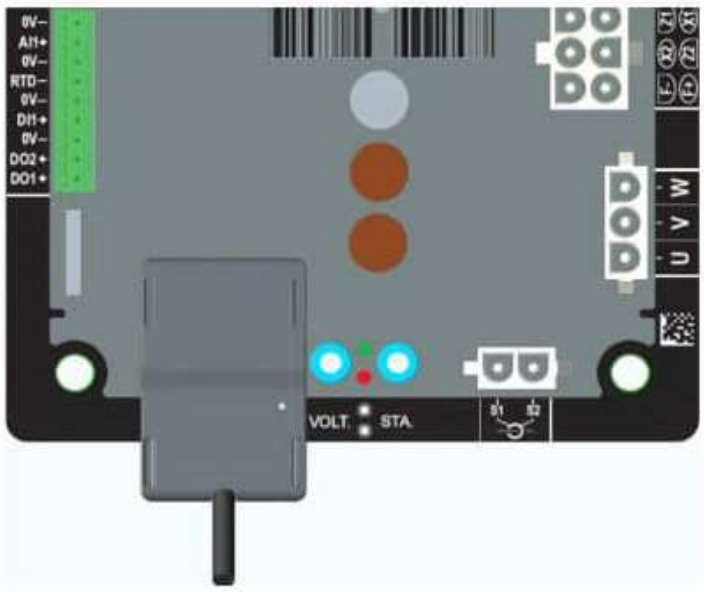
D350AVR

The D350, Digital Voltage Regulator is used to regulate alternators with a field current of less than 5 A in continuous operations, and 10 A maximum in the event of short-circuit for 10 seconds maximum.

Its design is in accordance with mounting in a generator terminal box or a control cabinet. It is required, at a minimum, to follow the local protection and safety standards, especially those specific to electrical installations for voltages of 300 VAC phase-to-neutral maximum.

NFLink™ configuration module

The D350 is equipped with NFC technology for communication and configuration purposes. The configuration module is placed over the two dedicated positioning holes on the plastic enclosure as shown below. Once the configuration is done, the NF Link must be removed as it is not supposed to be left on the D350 when it is in continuous operation.



Automatic Voltage Regulator

Technical Characteristics

D350 regulator can be used to perform the following functions:

Voltage regulation

- With or without reactive droop compensation (Reactive droop to allow parallel operation)
- With or without line droop compensation

Regulation of the field current, or manual mode, which allows direct control of the field current.

The D350 can also be used to:

- Adjust the reference for the regulation mode in progress, using an analogue input (0 – 10V and potentiometer)
- Monitoring of temperature sensor (Pt100 or CTP)
- Limit the minimum field current delivered to the exciter field
- Monitoring of the maximum stator current limit
- Loss of voltage sensing
- Withstand a sudden short-circuit for 10 seconds maximum in AREP, PMG
- Signals monitoring (events logger)
- 2 digital outputs for various trip, regulation mode and measurement data

Alternator voltage sensing:

- 3 phases without neutral, 2 phases or 1 phase with neutral
- Three-phase range 0 – 530 VAC
- Consumption < 2 VA

Stator current measurement with CT:

- Range 0 –1A or 0 – 5A
- Consumption < 2 VA

Power supply:

- 4 terminals for PMG, AREP, SHUNT
- Range 50 – 277 VAC
- Consumption max < 3000 VA

Field excitation:

- Rated 0 – 5A
- Short-circuit 10A max

Automatic Voltage Regulator

Frequency:

- Range 10-100 Hz
- Regulation accuracy: +/-0.25% of the average of the three phases on a linear load, with harmonic distortion less than 5%
- Voltage adjustment range: 0 to 150% of the rated voltage
- Quadrature droop adjustment range: -20% to 20%
- Under frequency protection: integrated, adjustable threshold, slope adjustable from 0.5 to 3V/Hz in steps of 0.1 V/Hz
- Excitation ceiling: adjustable by configuration at 3 points
- Environment: ambient temperature from -40°C to +65°C, relative humidity of less than 95% non-condensing, mounted in a cabinet or in a terminal box

Easy Reg Advanced:

- All the D350 settings are entered/configured using the "EasyReg Advanced" software
- This program is only compatible with computers running WINDOWS® versions Windows 7 and Windows 10 operating systems

Dimensions:

- Height: 52.9 mm
- Width: 125 mm
- Length: 140 mm

Mounting:

- Holes spacing on the Length: 115 mm
- Holes spacing on the width: 100 mm

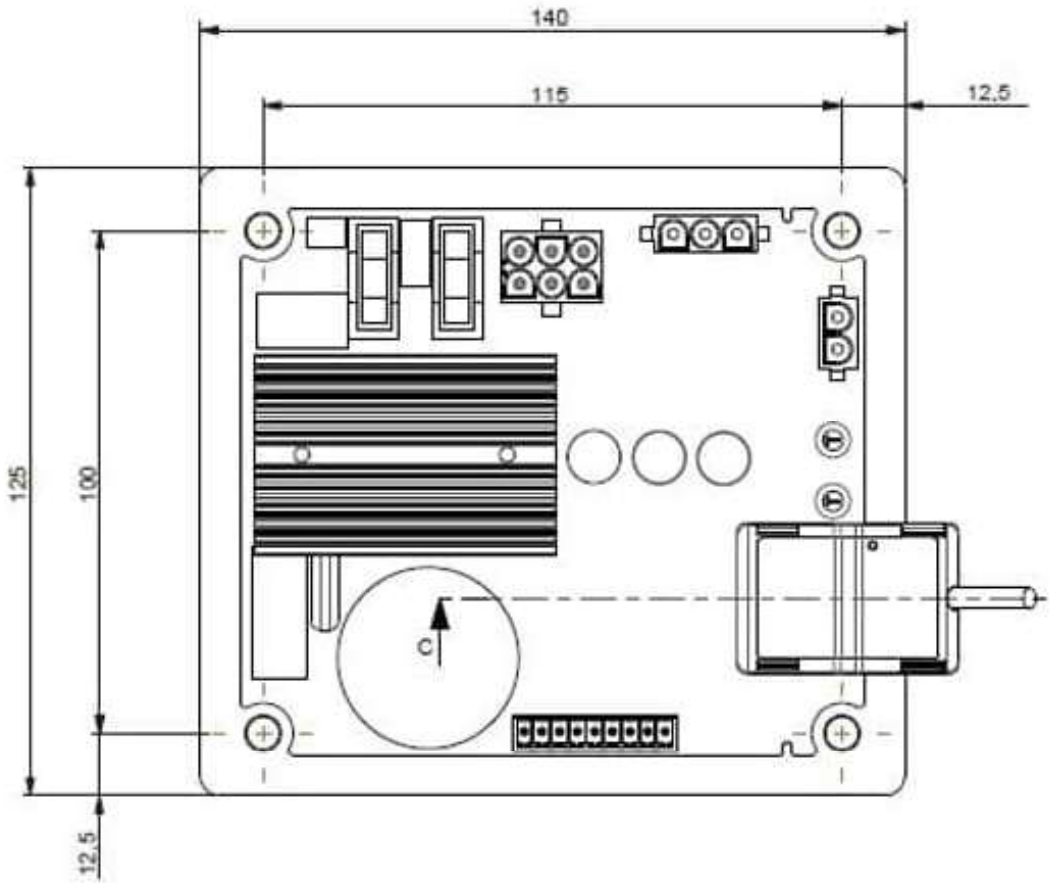
Weight:

- 0.45 kg

Conformity to standards:

- EMC: IEC 61000-6-2, IEC 61000-6-4
- Humidity: IEC 60068-1 and test in accordance with IEC 60068-2-14
- Dry heat: IEC 60068-2-2
- Damp heat: IEC 60028-2-30
- Cold: IEC 600068-2-1

D350 AVR and NFLink™ Dimensions



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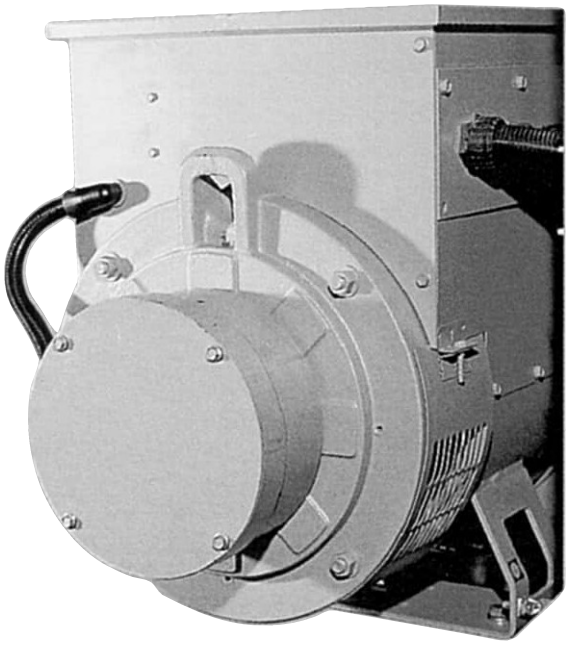
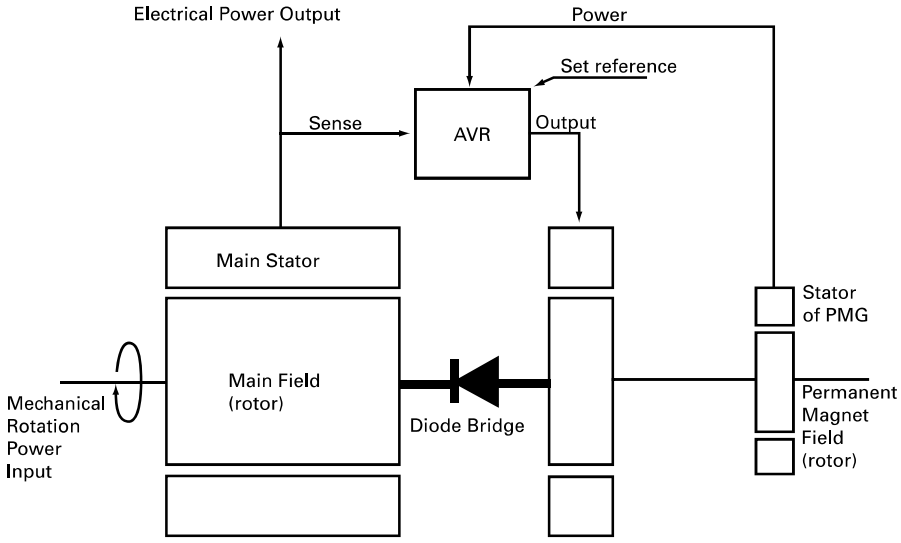
CATERPILLAR®



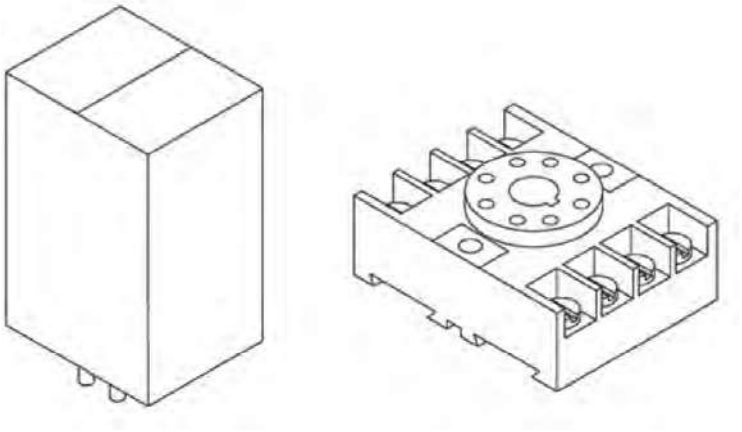
AVR12 – PERMANENT MAGNET GENERATOR

The permanent magnet generator (PMG) option upgrades the excitation system of the generator from the standard self-excited system to a separately-excited system. The PMG couples to the non-drive end of the generator and provides an independent source of excitation power that ensures initial voltage build-up. The PMG improves the voltage response of the generator during transient load application, such as motor starting, and provides a sustained short-circuit current for the operation of protective devices. Isolation of the excitation power ensures that regulation is not affected by non-linear distorting loads.



BLOCK DIAGRAM OF PMG

Engine-Run Relay



- 10 Amp contact rating
- 12 or 24 Volt DC input
- Contact open or closure on engine run

Generator Run and Fault Relay

SPECIFICATIONS

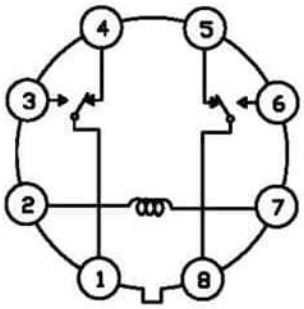
CONTACTS

- Type: DPDT
- Material: Silver
- Rating: UL
  10A @ 240VAC
  10A @ 30VDC

COILS

- Input Voltage: 24VDC
- Resistance: 400 Ohms
- Nominal Power: 1.5 W

PIN DETAIL



BUILT FOR IT.™

GROUND FAULT RELAY (GFR)

Picture shown may not reflect actual configuration

GENERAL DESCRIPTION

GFR is a microprocessor-based ground-fault relay for resistance- and solidly-grounded systems. In addition to common systems, it is uniquely suited for use on systems with significant harmonic content. GFR can provide main-plant protection, feeder-level protection, or individual-load protection. Proper current transformer selection provides the desired pickup range. The output contacts can be connected for use in protective tripping circuits or in alarm indication circuits. The analog output can be used with a PLC or a meter.

FEATURES & BENEFITS

Benefits

- Trip setting based on input CT primary, allows use with any CT. Minimum 50 mA with EFCT Series.
- Adjustable trip delay allows quick protection and system coordination
- Form A and Form B ground-fault output contacts for operation of separate annunciation and trip circuits
- Alarms when CT is not connected
- Compatible with variable-speed drives
- Eliminates nuisance tripping
- Retains trip state while de-energized to simplify troubleshooting
- No calibration required, saves on maintenance cost
- Allows operation in application where one side of PT is faulted, provides flexibility for numerous applications

Features

- Adjustable pickup (1-99%)
- Adjustable time delay (50 ms - 2.5 s)
- Output contacts
- Analog output (0 - 5 V)
- CT-Loop monitoring
- Selectable DFT or peak detection filtering
- Harmonic filtering
- Non-volatile trip memory
- Microprocessor based
- Universal power supply

FRONT-PANEL CONTROLS

Ground-fault trip level

The % CT PRIMARY selector switches are used to set the ground-fault trip level as a percentage of the CT-primary rating.
In tripping systems, a ground-fault trip level of 10 to 20% of the prospective ground-fault current is often used. In alarm-only systems, a value of 50% of the prospective ground-fault current is often used. To avoid sympathetic tripping, the trip level must be above the charging current of the protected feeder.
A 0% selection provides protection at 1%.

Ground-fault trip time

GFR has a definite-time trip characteristic. The TIME (s) selector switch is used to set the ground-fault trip delay time for coordination with upstream and downstream ground-fault devices. Coordination requires the same trip level for all ground-fault devices in a system and the trip time to progressively increase upstream. The amount of equipment removed from the system will be a minimum if the first ground-fault device to operate is the one immediately upstream from the fault.

Reset

If the Reset Mode switch is in the LATCHING position, a trip remains latched until the RESET button is pressed or the remote-reset terminals are momentarily connected. In the non-fail-safe mode, cycling the supply voltage will also reset the GFR.
If the Reset Mode switch is in the AUTORESET position, a trip will reset when the fault is removed. The reset circuit responds only to a momentary closure so that a jammed or shorted button will not prevent a trip. The front-panel RESET button is inoperative when the remote-reset terminals (6 and 7) are connected

Test

The TEST button is used to test the ground-fault circuit, the indication, and the output relay. When the TEST button is pressed for one second, a test signal is applied to the ground-fault-detection circuit, the circuit will trip, the TRIP LED will light, and the output relay will operate. If high-current inhibit has been selected, the INHB LED will light.

Front-panel indication

- **Power**
  The green LED labelled PWR indicates the presence of supply voltage.

- **Trip**
  The red LED labelled TRIP indicates a trip. A solid red LED indicates a ground-fault trip. A flashing LED indicates a trip initiated by a CT fault. Two fast flashes indicate a diagnostic trip.

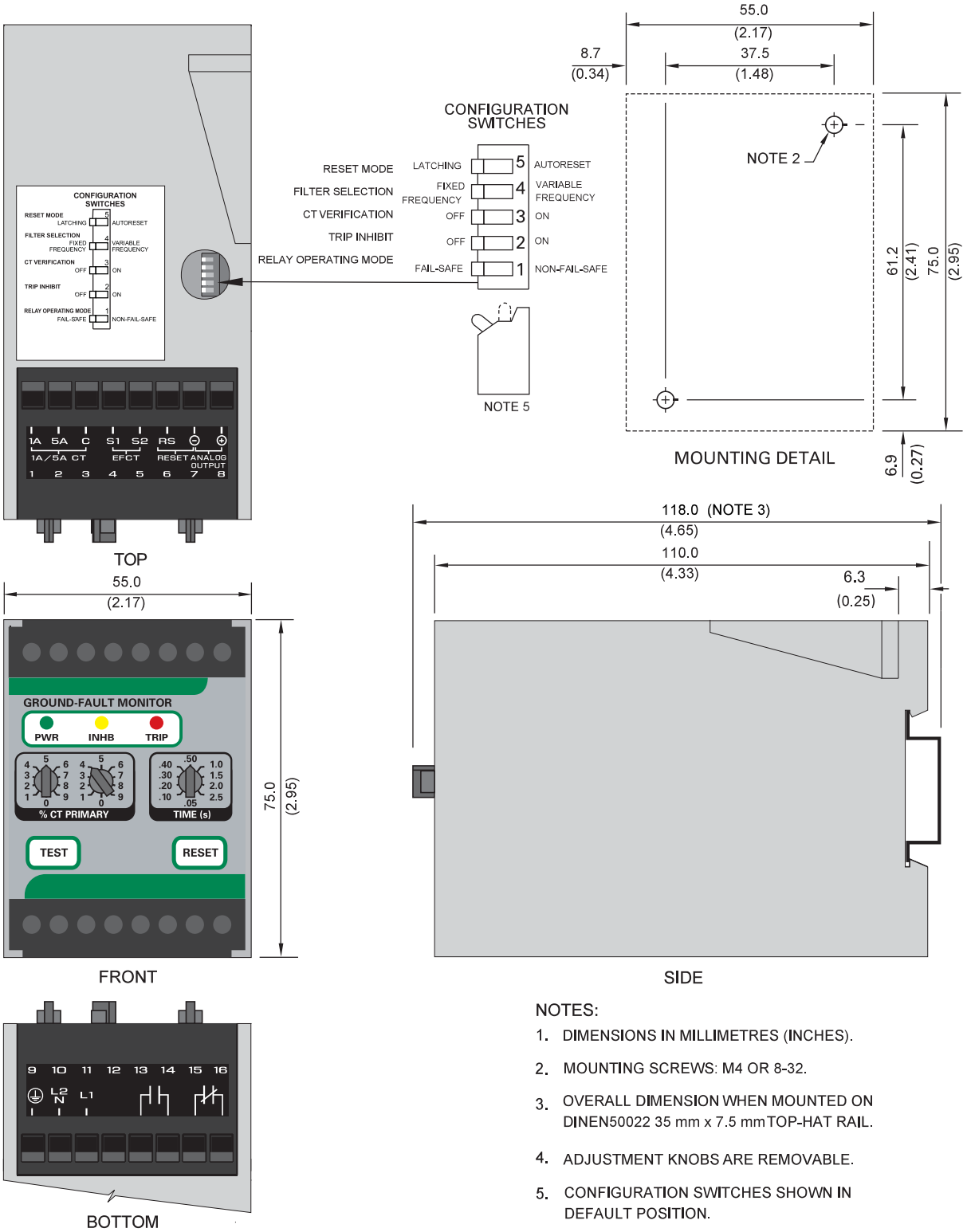
  Self diagnostics
  A diagnostic trip is indicated by two fast flashes of the TRIP LED. It can be caused by a diagnostic problem detected by the watchdog timer or from an incorrect reading from non-volatile memory. Press RESET or cycle supply voltage.

- **Trip inhibit**
  The yellow LED labelled INHB indicates that output relay operation was inhibited during a high-current ground fault. When a ground-fault trip occurs during a high-current ground fault, both the TRIP and INHB LED's will be ON. Inhibit indication is reset when the ground-fault trip is reset. Inhibit operation and indication will not respond if the trip-inhibit switch is in the OFF position.

SPECIFICATIONS

- IEEE Device Numbers - Ground fault (50G/N, 51G/N)
- Dimensions
  - H 75 mm (3.0")
  - W 55 mm (2.2")
  - D 115 mm (4.5")
- Trip Level Settings - 1-99% CT-Primary Rating
- Trip Time Settings - 0.05-2.5 s
- Contact Operating Mode - Selectable fail-safe or non-fail-safe
- Output Contacts Isolated Form A and Form B
- Approvals CSA certified, UL Listed (E340889), CE (European Union), C-Tick (Australian)
- Analog Output 0-5 V

OUTLINE AND MOUNTING DETAILS



NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES).
2. MOUNTING SCREWS: M4 OR 8-32.
3. OVERALL DIMENSION WHEN MOUNTED ON DINEN50022 35 mm x 7.5 mm TOP-HAT RAIL.
4. ADJUSTMENT KNOBS ARE REMOVABLE.
5. CONFIGURATION SWITCHES SHOWN IN DEFAULT POSITION.

Circuit Breakers [C9, C13, C15, C18]

D250 GC, D300 GC, D350 GC, D400 GC, D450 GC, D500 GC, D550 GC, D600 GC

Manually Operated Circuit Breakers

Current (A)	Frame	Number of Poles	Interrupting Ratings (kA ms)			Trip Unit	(Lugs) Cable Size Range / Phase	Auxilliary Options
			240V	480V	600V			
100	XT2	3	65	25	18	Electronic LS/I or LSI	14-1/0 AWG	1 Form C + 1 Bell Alarm Shunt Trip 24VDC
250	XT4	3	65	25	18	Electronic LS/I or LSI	14-1/0 AWG	1 Form C + 1 Bell Alarm Shunt Trip 24VDC
400	XT5	3	65	35	18	Electronic ~~LS/I~~ ~~or~~ LSI	4/0 AWG	1 Form C + 1 Bell Alarm Shunt Trip 24VDC
600	XT6	3	65	35	20		(3) 2/0 – 400 kcmil	
800	XT6	3	65	35	20		(3) 2/0 – 400 kcmil	
1200	XT7	3	65	50	25		(4) 4/0 – 500 kcmil	1 Form C + 1 Bell Alarm Shunt Trip 24VAC/VDC

1st Breaker Options (400 – 1200A)

Model	Current (A)	Operation
C9, C13, C15	400	Manually Operated
C9, C13, C15, C18	600	Manually Operated
C9, C13, C15, C18	800	Manually Operated
C9, C18	1200	Manually Operated

1st Breaker FLC Capacity or one frame less than FLC capacity except when 1st breaker is 400 A.

XT6 Ekip Dip LSI
L-S-I Functions

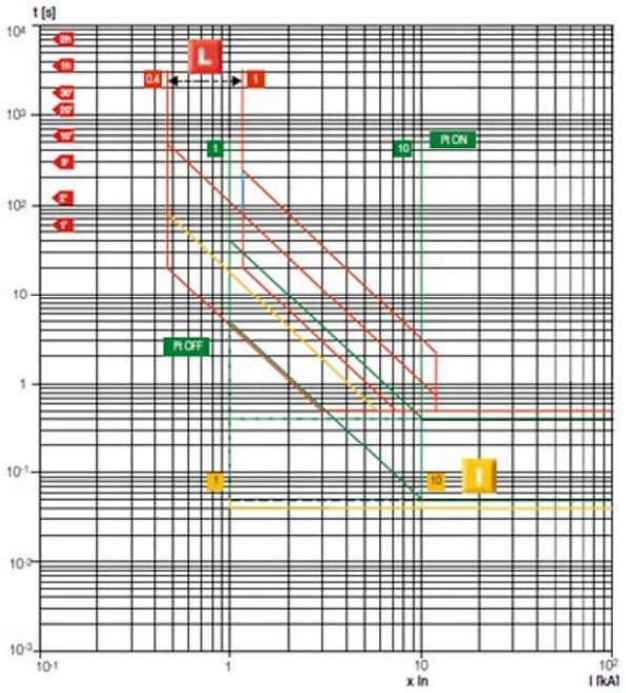
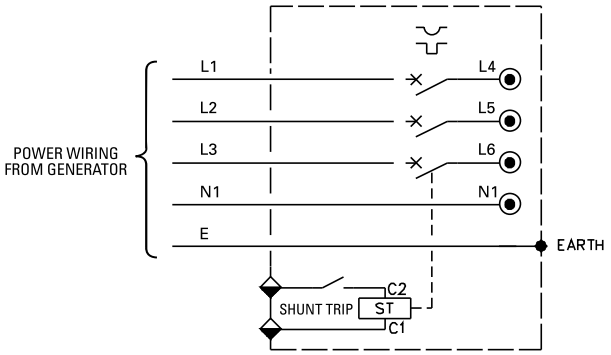
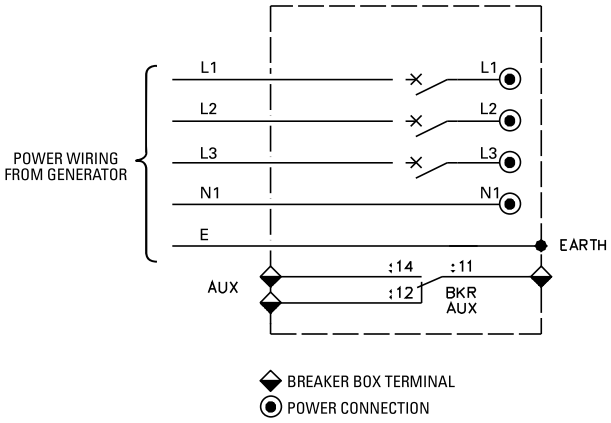


Figure 5





AUX – AUXILIARY CONTACTS SHT2 – 12/24 V SHUNT TRIP

Option SHT2 adds a DC operated shunt trip which can be used to automatically open the circuit breaker upon activation of a generator set shut down signal from the generator set control panel, or from a remote signal (supplied by others).

Option AUX adds an auxiliary changeover switch which can be used for remote indication of the circuit breaker status.

Product Update

Suitable for Use as Service Equipment

Overview

Retail Product Labeled Suitable for Use as Service Equipment (SUSE)

Features

- D40-D200, C9, C15, C18 models available with SUSE marking
- SUSE marking required by certain Authorities Having Jurisdiction (AHJs)
- Disconnecting device – UL Listed circuit breaker
- Neutral bar capable of being bonded to ground – Bonding jumper pre-installed
- Enclosure – Dedicated to disconnecting device and neutral bar and adequately sized to allow proper connection of customer's load cables

Certain Authorities Having Jurisdiction (AHJs) have begun requiring engine generator assemblies, particularly those installed outdoors, to be labeled as "Suitable for Use as Service Equipment" (SUSE). Service equipment provides a safe and quick method for removing an electrical source from a building or dwelling.

Product eligible to bear a SUSE label must be properly constructed and evaluated. The Standard governing service entrance equipment is UL 869A. Required are a disconnecting means and a provision for bonding the neutral bar to ground, both of which must be within a dedicated enclosure properly sized for the intended field wiring.

Cat® products employ a circuit breaker as the disconnecting means. A cable is provided and installed to bond the neutral bar to ground.

Underwriters Laboratories (UL) has evaluated enclosure construction and found certain Cat products eligible to be labeled as "Suitable for Use as Service Equipment", thus meeting AHJ requirements and expectations.

LEXE0855-00 (09/14)

www.Cat-ElectricPower.com

100 Amp Load Center

Image shown may not reflect actual package.

100 Amp Load Center

Specifications	
Number of Spaces	6
System Voltage	120 / 240VAC
Number of Tandem Circuit Breakers	6
Phase	1 Ph
NEMA Degree of Protection	NEMA 3R Outdoor
Electrical Connection	Lugs
Wiring Configuration	3-Wire
Material	Tin Plated Aluminum Busbar
Enclosure Material	Welded Galvanized Steel Gray
Cover Finish	Baked Enamel
Product Certifications	UL E-6294
Gauge	AWG 8…AWG 1 (Aluminium / Copper)

Dimensions and Load Ratings	
Height / Width / Depth	321 mm / 226 mm / 127 mm
GFCI	20A (120V)
Battery Charger	6A (120V)
Jacket Water Heater	15A (120V)
Alternator Heater	2.1A (120V)
Total Load	43.1A Max

L1	
GFCI	20A (120V)
Jacket Water Heater	15A (120V)
Alternator Heater	2.1A (120V)
Total Load	37.1A Max

L2	
Battery Charger	6A (120V)
Jacket Water Heater	15A (120V)
Alternator Heater	2.1A (120V)
Total Load	23.1A Max

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www.cat.com/electricpower

Image shown may not reflect actual configuration.

20A Tamper-Resistant, Weather-Resistant GFCI Receptacles

Features and Benefits

- Automatically tests the GFCI every time the reset button is pushed in. The GFCI will not reset if the GFCI circuit is not functioning properly.
- By blocking reset of the GFCI if protection has been compromised, SmartLockPRO reduces the possibility of end-users incorrectly assuming that a reset GFCI outlet is providing ground fault protection when it actually is not.
- A line-load reversal diagnostic feature is provided which prevents the GFCI from being reset and stops power from being fed to the GFCI receptacle face or through to downstream devices. A green LED indicator on the GFCI's face also illuminates to alert the installer to the line-load wiring reversal.

Weather-Resistant GFCIs

- Meet UL 498 requirements for weather-resistant receptacles.

Tamper-Resistant GFCIs

- Shutter mechanism inside the receptacle blocks access to the contacts unless a two-prong plug is inserted, helping ensure foreign objects will be locked out.

Product Features

- Grounding: GFCI ground fault
- Feature: Weather and tamper-resistant
- Amperage: 20 Amp
- Voltage: 125 Volt
- NEMA: 5-20R
- Trip Level: Class A, 5mA plus or minus 1mA
- Pole: 2
- Wire: 3
- Color: White

Standards and Certifications

- NEMA: WD-6
- ANSI: C-73
- UL498: File E13399
- CSA C22.2 No. 42: File LR-57811
- NOM: 057
- UL 943: File E48380

Receptacles contained in a weather resistant box and in-use cover.

Image shown may not reflect actual package.

LED Lights

Features

~~AC~~/DC Lighting Kit

- Capable of ~~AC and~~ DC operation with provided selector switch
- DC operation has a 60-minute timer switch to limit battery drain
- ~~AC operation is enabled by transformer~~
- Low voltage, low energy circuit and operation
- Installation includes one single LED light.

Technical Data	
Theoretical Lumens Output	1600 lm
Operational Lumens Output	1000 lm
Color Temperature	5700 K
Lens	PC
Body	Aluminum
Weight	0.6 kg
IP Rating	IP68, IP6K9K
EMC	CISPR 25 Class 3, EN 12895, ISO 13766, ISO 14982, ISO 7637-2
Operating Temperatures	-40°C to +85°C (Overheat protected)

www.Cat-ElectricPower.com

Image shown may not reflect actual configuration.

Remote Emergency Stop Button

*Shipped loose, installed by others.

Features and Benefits

- Enclosure degree of protection – IP 69K (NEMA 6)
- UL Listed (NKCR)
- Assembled enclosure with shroud
- 40 mm mushroom emergency stop
- Twist release
- 2NC – horizontally mounted

Dimensions

- Net Width: 0.065 m
- Net Height: 0.078 m
- Net Depth: 0.065 m
- Net Weight: 0.124 kg

Attachments

Jacket Water Heater (WHHH01/ WHHH03)

Appropriate when the generator set is to be sited in a low ambient environment, the heater maintains the engine coolant at a temperature [typically 38°C (100°F)] which facilitates rapid starting and load acceptance. The heater assembly uses UL compliant components (to UL1030) and has CSA certification which is to both CSA and UL Standards.

The heater itself is powered by a 240V for 60 Hz AC auxiliary supply. A thermostatic controller is included to regulate the output temperature to within safe limits. When the generator set is not running the heater is automatically connected to the AC supply through a power relay mounted in the control panel.

Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed, and the engine has stopped.

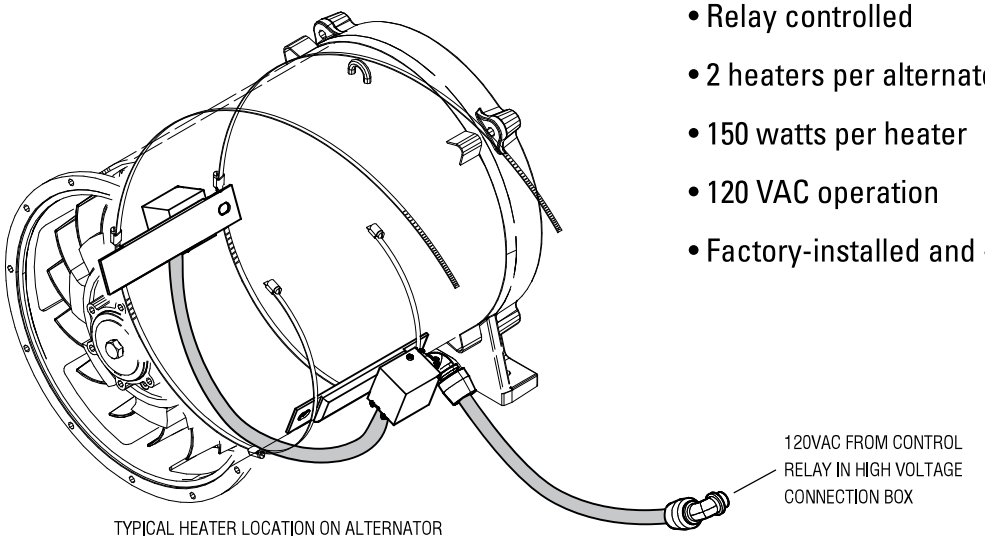
Features

- Uniform heat distribution
- Reduces wear from cold spots
- Improves startability
- Thermostatically controlled and protected
- 6’ (1.8m) cord length (577-1758)
- 16.4’ (5.0m) cord length (578-9355).
- Ensures generator is at optimal starting temperature and ready to accept load
- Durable pump with non-magnetic impeller that does not attract metal debris
- Robust die cast aluminum housing improves sealing of the hoses, eliminates leaking and breakage
- Corrosion resistant steel brackets for superior strength and durability
- Reduces thermal stress on coolant hoses
- Element designed for long life with maximum heat transfer
- IP44 Ingress Protection Rating
- No evaporation of coolant from hoses
- Reduces low coolant level alarms because coolant does not boil

Part No	Outlet Location	Watts	Volts	Amps	Regulating Thermostat	Safety Thermostat
577-1758/578-9355	Right	2700	240	11.25	On 90°F (32°C) Off 115°F (46°C)	210°F (98°C)

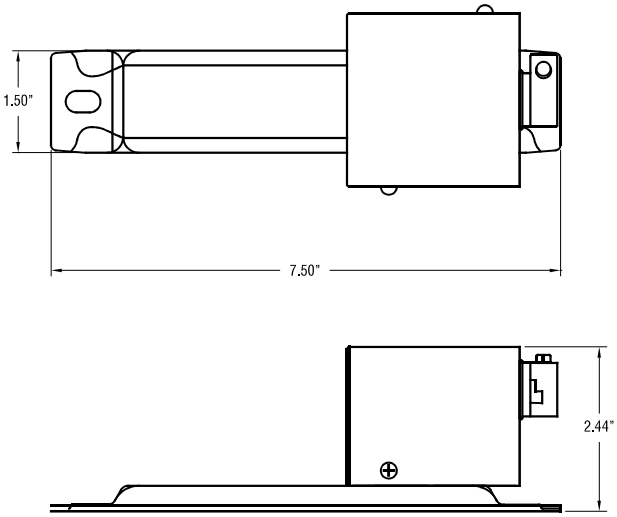
www.cat.com/electricpower

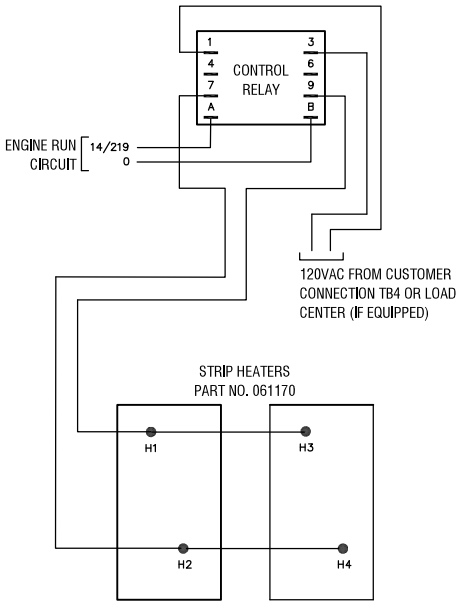
ALTERNATOR STRIP HEATER 120 VAC



TYPICAL HEATER LOCATION ON ALTERNATOR

- Relay controlled
- 2 heaters per alternator
- 150 watts per heater
- 120 VAC operation
- Factory-installed and -wired





WIRING DIAGRAM

Attachments

Image shown might not reflect actual configuration.

BATTERY CHARGER

The intelligent battery charger has been developed with safety, usability, optimised battery performance and maximum battery lifetimes in mind.

A comprehensive range of input and output protections ensures a continued safe charging environment also enabling the use of the charger as a power supply.

FEATURES

- Intelligent two, three and four stage charging profiles
- Configurable to suit most battery types (12V/24V)
- Adjustable current limit
- Can be used as a battery charger, power supply or both at the same time
- Automatic or Manual boost and storage charge functions to help maintain battery condition
- Digital Microprocessor Technology
- Temperature compensation for battery charging
- Low Output Ripple and superb line regulation
- Three LED Indicators
- AC input Under voltage
- AC input Over voltage
- Battery charger output Over voltage
- Battery charger output Over current
- Optional battery temperature compensation with over temperature protection
- Output short circuit and Inversion polarity with auto recovery
- Configurable charge termination
- UL1236 /UL1564 Compliant

Automatic Boost Mode
- Boosts and equalises cell charge improving battery performance and life

Power Save Mode
- Once the battery is fully charged the chargers switch to Eco-Power to save energy

Communication
- Can be integrated into external systems through MODBUS RTU using RS485
- Fully configurable via PC Software

BENEFITS

- Fully flexible to maximise the life of the battery
- Suitable for a wide range of battery types
- Switched mode design
- Minimum 86% efficiency throughout full operating range
- No external intervention for boost mode
- Multiple chargers can be linked together to provide larger current output
- Can be permanently connected to battery and mains (utility) supply. No need to disconnect through high load conditions.

SPECIFICATION

AC SUPPLY
VOLTAGE RANGE 90 V to 305 V (L-N)

FREQUENCY RANGE
48 Hz to 64 Hz (L-N)

DC OUTPUT RATING
10 A DC at 24 V DC

RIPPLE AND NOISE
<1%

EFFICIENCY
>86%

REGULATION LINE
<0.5%

LOAD
2%

TEMPERATURE SENSOR INPUT
PT1000

PROTECTIONS
Short Circuit
DC Over Voltage
DC Over Current
Reverse Polarity
Over Temperature
AC Under & Over Voltage

CHARGE FAILURE RELAY
3 A at 30 V DC volt free relay

DIMENSIONS OVERALL
70 mm x200 mm x 130 mm
2.7" x 7.9" x 5.1"

WEIGHT
0.75 kg

OPERATING TEMPERATURE RANGE
-30 °C to +80 °C
-22 °F to +176 °F

STORAGE TEMPERATURE RANGE
-30 °C to +80 °C
-22 °F to +176 °F

Cat® PL444 4G LTE Radio (Model: PL444 NA) Telematics Hardware

Product Description

The Caterpillar PL444 system is a Telematics product that is designed to record and store data from multiple datalinks (CAN J1939, Modbus RS485) present on higher level systems, then transmit the data offboard via wireless communications (cellular) to back office systems for end customer use.

Features

Design Specifications:

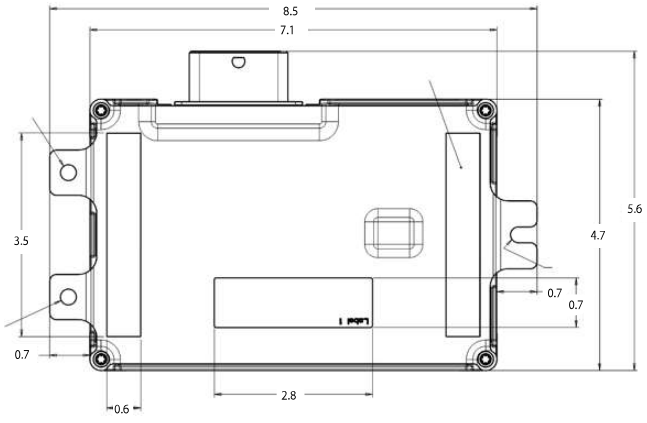
- 4G LTE Category 4 Radio
- GNSS signal tracking
- CAN datalink communication
- Modbus datalink communication
- Durable IP66/67-rated enclosure

Radio Connections / Pinout

	A	B	C	D	E	F	G	K	L	M
1	CAN_H	CAN_L	Not used	Not used	Not used	Not used	Not used	Not used	KSW	Batt+
2	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Wireless Disable	Not used	Batt-
3	RS485 RTN	Not used	Not used	Not used	Not used	Not used	LSD1	Not used	Not used	Not used
4	RS485_A	RS485_B	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used

CAN_H: CAN High
CAN_L: CAN Low
KSW: Keyswitch (Ignition) – Wakes the device up when tied to Batt+ voltage
Batt+: 12/24V Input
Batt-: Ground/Return
Wireless Disable: When pulled to ground, disables all RF transmissions (Cellular)
LSD1/2: Low Side Drivers 1 and 2. Connects a load with a voltage source, to ground when enabled, completing the circuit
RS485 RTN: RS-485 Shield
RS485A/B: RS-485 Modbus connections

Radio Dimensions



*All dimensions are in inches.

Technical Specifications

Input Voltage
Voltage Range ..... 9 to 32V DC
Protection ..... Reverse polarity

Current Consumption
Idle Current (non-transmitting) ..... < 300 mA
Peak Current ..... < 6A
Sleep Current ..... <3 mA

Physical Specifications
Enclosure Material ..... Plastic (PBT+ASA GF30 FR)
Aluminum (AlMg2.5 / H22; H23)
Dimensions (in) ..... 8.5 x 5.6 x 1.4
Weight ..... 0.45 kg
Interface Connectors ..... 48 pin Molex

Environment
Operating/Storage Temp ..... -40°C to +85°C
Ingress Protection IP66/67
Humidity ..... SAE J1455
Vibration ..... 9.8 Grms random (24-2000 Hz), up to 0.5 g^2/Hz

Regulatory Compliance
FCC, IC, CE RED, EN/UL/CSA 62368-1, RoHS, WEEE, REACH

LEDs
Orange — GNSS (Solid: GNSS Fix, 1Hz: Searching/no lock, Off: Fault)
Blue — Datalink (Flashing: Activity on J1939 or Modbus Off: Fault or No Connection)
Yellow — Cellular (Solid: Data connection established, Flashing: Searching for signal, Off: Modem off or Fault)
White — Bluetooth® (Solid: Connection established, Flashing: Advertising mode, Off: Bluetooth off or Fault)

Secure Key Injection
Security ..... Unique and cryptographic identity

Communications
Datalink J1939/CAN
Datalink ..... Modbus (RS-485)
Wireless ..... 4G LTE with 2G/3G fallback
Wireless ..... Bluetooth®/BLE 5.0

I/O
Low Side Drivers (300 mA max) 2
Switch to Ground 1
Keyswitch 1

Positioning (GNSS)
Signal Tracking ..... GPS/Galileo/GLONASS/BeiDou
Antenna ..... Internal

Cellular Communications

LTE Bands/Frequencies

Band	Frequencies (Uplink / Downlink) (MHz)
2	1850-1910 / 1930-1990
4	1710-1755 / 2110-2155
5	824-849 / 869-894
7	2500-2570 / 2620-2690
12/17	699-716 / 729-746
13	777-787 / 746-756

3G (UMTS) Bands/Frequencies

Band	Frequencies (Uplink / Downlink) (MHz)
2	1850-1910 / 1930-1990
4	1710-1755 / 2110-2155
5	824-849 / 869-894

2G (GSM) Bands/Frequencies

Band	Frequencies (Uplink / Downlink) (MHz)
2	1850-1910 / 1930-1990
5	824-849 / 869-894

Antennas ..... 2x internal (Primary + Diversity) to support 2x2 MIMO
SIM ..... eUICC chip
Operating Temperature ..... -30°C to +70°C

Bluetooth® Communications
Frequencies ..... 2402 – 2480 MHz
Version ..... BLE 5.0
Antenna ..... internal

LET'S DO THE WORK.™

www.cat.com/electricpower

LEHE20361-00 (06/21)

Cat® Batteries

Cat Batteries – Greater Starting Power – Lower Maintenance – Longer Life

Cat Premium High Output (PHO) batteries are used in all Caterpillar Machines and Engine Gen-Sets. They are designed to meet stringent Caterpillar design specifications, which provide industry leading cold cranking amp (CCA) capability and maximum vibration resistance.

Maintenance Free or low maintenance designs are available in wet and dry configurations.

General Service Line batteries are available in Maintenance Free or low maintenance designs and in wet or dry configurations. Wide selections of BCI group sizes are available for automotive, light truck, bus, industrial, agricultural, marine, recreational and valve regulated (VRLA-AGM & Gel) applications.

Caterpillar. The difference counts.™

Cat Dealers define world – class product support. We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts keeps your entire fleet up and running to maximize your equipment investments.

CATERPILLAR®

World's Toughest Batteries

Premium High Output – Maximum Vibration Resistance

- Vibration Resistance...five times the Industry Standard
- Exclusive "flat top" BCI group 4D & 8D batteries are Maintenance Free and have the industries highest cold cranking amps (CCA)
- Popular BCI group 31 Maintenance Free batteries with industry leading cold cranking amps...up to 1000 (CCA), for electric power, machine or on-highway truck and bus applications. Deep cycle models available for truck, marine or recreational usage

Specifications for Cat Premium High Output Batteries – Available Worldwide

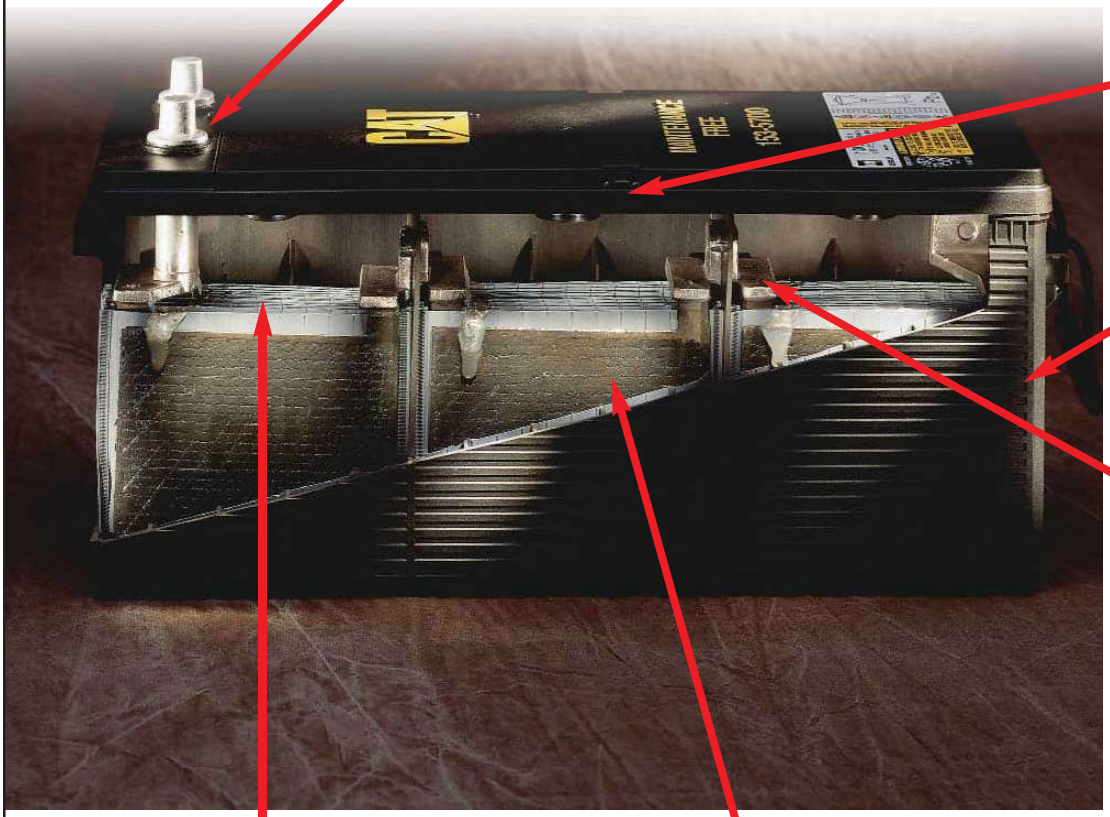
BCI Group Size	Part No.	Cold Cranking Amps"	Reserve Capacity Minutes'	Volts	Amp Hr. Capacity @ 20 Hrs.	Construction	Add Water Maintenance Check Hours	BCI Overall Dimensions Length In (mm)	Width In (mm)	Height In (mm)	Nominal Weight Wet Lb (kg)	Dry Lb (kg)	Nominal Acid to Fill Qt (liter)
8D	153-5720	1500	465	12	210	C	MF	20.47 (520)	10.8 (275)	9.76 (248)	132 (60)	–	–
8D	101-4000	1400	400	12	190	LAC+	1000	20.7 (526.5)	10.96 (278)	9.76 (248)	132 (60)	86 (39)	18.0 (17.0)
4D	153-5710	1400	425	12	200	C	MF	20.47 (520)	8.58 (218)	9.76 (248)	119 (54)	–	–
4D	153-5700	1125	305	12	145	C	MF	20.47 (520)	8.58 (218)	9.76 (248)	101 (46)	–	–
4D	9X-9730	1300	400	12	190	LAC+	1000	20.75 (527)	8.58 (218)	9.76 (248)	119 (54)	81 (37)	14.8 (14.0)
4D	9X-9720	1000	275	12	140	LAC+	1000	20.75 (527)	8.58 (218)	9.76 (248)	101 (46)	59 (27)	15.9 (15.0)
31	175-4390	1000	180	12	90	C/S	MFA	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	175-4370	825	190	12	100	C/S**	MFA	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	175-4360	710	185	12	100	C/S***	MFA	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	**250-0480**	710	185	12	100	C/SDT***	MF	12.9 (328.4)	6.74 (171.2)	9.29 (236)	60 (27)	–	–
31	115-2422	1000	170	12	90	C SAE	MFA	12.9 (328.4)	6.74 (171.2)	9.46 (240.3)	60 (27)	–	–
31	115-2421	950	170	12	90	C SAE +	MFA	12.9 (328.4)	6.74 (171.2)	9.46 (240.3)	60 (27)	44 (20)	6.6 (6.2)
31	9X-3404	950	165	12	100	C SAE	MF	13 (330.2)	6.77 (172)	9.46 (240.3)	58 (26)	–	–
31	3T-5760	750	165	12	100	C SAE	MF	13 (330.2)	6.77 (172)	9.46 (240.3)	55 (25)	–	–
24	153-5656	650	110	12	52	SC	MF	10.98 (278.9)	6.85 (174)	9.0 (229.1)	39 (18)	–	–
65	230-6368	880	140	12	80	SC	MF	11.9 (303.4)	7.5 (190.8)	7.5 (191.4)	45.5 (21)	–	–
74	153-5660	650	110	12	52	SC*	MF	10.98 (278.9)	7.0 (178.2)	8.15 (206.9)	39 (18)	–	–
58	175-4280	500	70	12	35	SC	MF	9.96 (253.1)	7.2 (182.5)	6.9 (176)	31 (14)	–	–
2	153-5690	765	210	6	90	LAC+	1000	10.24 (260)	6.8 (173)	8.72 (221.6)	37 (17)	22 (10)	4.8 (4.5)

Construction Notes:
LAC = Low Maintenance, Hybrid Construction
C = Calcium Lead Alloy Grid Design
MF = Maintenance Free
MFA = Maintenance Free with Accessible Vent Caps
S = Stud Terminals
+ = Shipped Dry Only
* = Side Terminals
** = Starting and Deep Cycle Battery
*** = Deep Cycle and Starting Battery
" = For 30 seconds at 0° F (-18° C)
' = Minimum of 25 amp output at 80° F (27° C)
SAE = Uses SAE Posts
SDT = Dual, Top mounted Terminals, Stud and SAE Post, Marine Deep Cycle/Starting Battery
SC = Silver (Ag) Calcium Alloy Grids for resistance to high underhood temperatures

Rugged Design – Built Tough – Reliable Starting

- Positive and Negative plates are anchored to container bottom and locked at the top of cell element for maximum vibration resistance.
- Heavy-duty forged terminal post bushings provide maximum strength and resistance to acid seepage.
- Hefty full-frame grids, no sharp edges, optimum acid/paste combination provides better charge acceptance after deep discharge.
- Manifold vented cover with built-in Flame Arrestor…a safety feature that directs corrosive gases away from the battery and hold-downs.
- Thick, robust container resists rugged treatment typical of heavy-duty commercial use. Embossed part number & descriptors for easy serviceability.

Cat Batteries



Robust Components = Long Life + Reliable Starts

- Heavy-duty forged terminal post bushings provide maximum strength and resistance to acid seepage that causes corrosion and black posts. Thicker internal terminal posts provide lower electrical resistance and higher cold cranking amp output.
- Rugged microporous polyethylene envelope separators protect against “shorts” and vibration damage. Deep Cycle batteries utilize double insulated Glass mat separators for longer cycling life.
- Maintenance Free batteries utilize calcium lead alloy on both positive and negative plates that reduces gassing and water consumption. Automotive batteries have Silver (Ag) Calcium Alloy Grids for resistance to high underhood temperatures.
- Heavy-duty, full frame battery grids with no sharp edges. An optimum acid/paste combination provides better charge acceptance after a deep discharge.
- Positive and Negative plates are anchored to the container bottom and the cell element is locked at the top for maximum vibration resistance. Straps are thicker, heavier and cast (not welded) into the plates.
- Manifold vented cover with built-in Flame Arrestor…a safety feature that directs corrosive gases away from the battery and hold-downs.
- Robust reinforced case provides extra strength in all temperature extremes. Brickwork design on sides reduces chance of punctures and case flexing. Embossed part number and descriptors for easy serviceability.

For more information, see us today or visit our web site at www.cat.com

Caterpillar. The difference counts.™

CATERPILLAR®

PEHJ0073-01 Printed in the U.S.A.

Cat® DEO™

Diesel Engine Oil for North America (Canada, Mexico, United States).

SAE 15W-40, SAE 10W-30

Recommended Use

- Cat earthmoving, commercial, marine* and on-highway truck diesel engines
- Low-emission diesel engines including Cat engines with ACERT® Technology
- Heavy-duty diesel engines made by other manufacturers that recommend API CI-4 PLUS, CH-4 or CG-4 category oil (See "Typical Characteristics" on page 2 for more information)
- Automotive gasoline engines that require API SL category oils

* Excluding 3600, C280, 3126 and 3116 MUI Marine and MaK diesel engines. The 3116 and 3126 MUI Marine diesel engines with closed crankcase ventilation systems should use Cat SAEO™.

Discover the Difference

Cat DEO is developed, tested and approved by Caterpillar to meet the same high standards as all Genuine Cat Parts.

Factory-Fill—Used as standard factory-fill for Cat machines.

Increased Engine Life—Resists oxidation and prevents build-up of deposits on pistons and rings.

Longer Intervals—Extends oil drain intervals while providing excellent engine protection and performance when used in conjunction with our S•O•S℠ Services oil analysis program.

Proven Performance—Tested thoroughly in Cat diesel engines including Cat engines with ACERT Technology to ensure excellent engine life and performance.

Long-Lasting Protection—Improved soot control and enhanced shear stability enable oil to maintain proper viscosity for longer operating periods in Cat engines with ACERT Technology, especially those equipped with HEUI systems.

Caterpillar. The difference counts.™

Cat Dealers define world-class product support. We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts keeps your entire fleet up and running to maximize your equipment investment.

CATERPILLAR®

Cat DEO

Cat DEO Performance

Performance Requirements	Test	Commercial ECF-1	Cat DEO
Cat 3406E Endurance Test	Cat Proprietary		
Cat C13 ACERT Endurance Test	Cat Proprietary		
Cat 3500 Series Test	Cat Proprietary		
Cat C13 ACERT Wheel Loader Test	Cat Proprietary		
Improved Soot-Viscosity & Shear Control			
High Temperature Shear			
Elastomer Compatibility			
Piston ring & Cylinder liner wear			
Valve train wear, sludge, oil filter plugging			
Aeration Control			
Bearing Corrosion			
Cam roller follower pin wear			
Copper, lead and tin erosion			
Foaming Control			
Viscosity Shear loss			
Viscosity Increase from soot			
Oxidation			
Piston deposits and oil control			

Tested Beyond Industry Standards

In addition to the tests required for the ECF-1 classification, Cat DEO undergoes four proprietary multi-cylinder endurance tests, a variety of quality assurance tests and thousands of hours of field service. Only when it has passed all these tests can it be approved by Caterpillar. The chart to the left indicates the differences between ECF-1 standards and the proprietary standards of Caterpillar.

Typical Characteristics*

	15W-40	10W-30
SAE Viscosity Grade		
API Service Classification		
Diesel	CI-4 PLUS, CI-4, CH-4, CG-4,CF-4/CF	CI-4, CH-4, CG-4, CF-4/CF
Gasoline	SL	SL
OEM Performance Level:		
Caterpillar	ECF-1	ECF-1
Volvo	VDS-3	VDS-2
DDC	93K214	
Cummins	CES 20071/76/78	CES 20071/76
Mack	EO-NPP '03, EO-M Plus	EO-M Plus
Flash Point, °C (ASTM D92)	224	227
Pour Point, °C (ASTM D97)	-30	-33
Viscosity		
cSt @ 40°C (ASTM D445)	120.5	76
cSt @ 100°C (ASTM D445)	15.5	11.5
Viscosity Index (ASTM D2270)	135	145
Sulfated Ash, % wt. (ASTM D874)	1.3	1.3
TBN (ASTM D2896)	11.3	11.3
Zinc, % wt. (ASTM D4951)	0.146	0.146
Gravity @ 16°C		
API (ASTM D287)	29.3	31.8
Specific	0.880	0.867

*The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.

Other Recommended Oils

Cat DEO SYN™ 5W-40

For engines that must be started in extremely low temperatures down to -30°C(-22°F) consider using Cat DEO SYN 5W-40. This is a full synthetic diesel engine oil.

S•O•S Services for early problem detection

Protect your investment with Cat S•O•S oil analysis, the ultimate detection and diagnostic tool for your equipment. S•O•S helps you detect potential problems before they can lead to major failures and costly, unscheduled downtime.

Cat Filters: Complete protection for your machine

Combine Cat Fluids with Cat Filters for the highest level of contamination control and protection for your machine. We recommend Cat Filters for all Cat machine applications.

Health and Safety

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. Read and understand the Material Safety Data Sheet (MSDS) before using this product. For a copy of the MSDS, visit us on the web at www.catmsds.com.

PEHJ0059-02 www.cat.com

Printed in USA

CATERPILLAR®

Cat® ELC

Extended Life Coolant for Caterpillar and original equipment manufacturer (OEM) diesel and gasoline engines

50/50 Premix

Recommended Use

Cat ELC meets or exceeds the requirements of the following specifications and guidelines:

- Cat EC-1
- TMC RP-329
- TMC RP-338
- ASTM D-3306
- ASTM D-6210
- SAE J1034

Cat ELC also meets the performance requirements of Cummins, Detroit Diesel, International, Mack and Volvo.

Discover the Difference

Cat ELC is developed, tested and approved by Caterpillar to meet the same high standards as all Genuine Cat Parts.

- Factory-Fill—Used as standard factory-fill for all Cat machine cooling systems.
- Lower Maintenance Costs—Reduces engine coolant and additive costs by as much as 500% compared to conventional coolants. It eliminates the need for supplemental coolant additives, extends coolant change-out intervals and reduces disposal requirements.
- Advanced Metal Protection—Incorporates an advanced formula technology with organic acid additive corrosion inhibitors, such as a combination of mono and dicarboxylates for maximum protection of copper, solder, brass, steel, cast iron and aluminum.

CATERPILLAR®

Cat ELC for Maximum Coolant Life

Cat DEAC™

3000 Hour Life or
333,000 km (200,000 miles)
Cat Supplemental Coolant Additives Every 250 Hours
or 25,000 km (15,000 miles)

Cat ELC (Machines and Commercial Engines)

Cat Extender Every 6000 Hours*

12,000 Hour Life or 6 Years**
(whichever comes first)

Cat ELC (Truck Engines)

Cat Extender Every 500,000 km (300,000 miles)* **1,000,000 km (600,000 miles) or 6 Years****
(whichever comes first)

* Or one-half of the coolant service life.

** These coolant change intervals are only possible with annual S•O•S Level 2 coolant sampling and analysis.

Typical Characteristics*

Color	Strawberry Red
Boiling protection with 15 psi (1 bar) radiator cap	
50% Cat ELC/50% water	129°C (265°F)
60% Cat ELC/40% water (ELC concentrate added)	132°C (270°F)
Freezing protection	
50% Cat ELC/50% water	-37°C (-34°F)
60% Cat ELC/40% water (ELC concentrate added)	-52°C (-62°F)
Nitrite (50% solution)	500 ppm
Molybdate (50% solution)	530 ppm

*The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.

S•O•S℠ services for early problem detection

Protect your investment with Cat S•O•S Coolant Analysis, the ultimate detection and diagnostic tool for your equipment. We recommend S•O•S Level 1 Coolant Analysis according to the engine's Operation and Maintenance Manual, and Level 2 Coolant Analysis annually for all your Cat equipment.

Cat ELC Extender for Longer Life

- Exceeds Cat EC-1 performance requirements
- Protects against cylinder liner/block pitting and cavitation erosion
- Should be added at 500,000 km (300,000 miles) for Cat powered on-highway trucks and 6,000 hours for commercial engines
- Extender is only necessary once during the life of the coolant
- Ensures Cat ELC performance to 1,000,000 km (600,000 miles) or 12,000 hours

Cat ELC Extender and Flush Intervals

Cat ELC Extender should be added after 6,000 hours or 300,000 miles (500,000 km) of operation, and the system should be drained and flushed with clean water after 12,000 hours or 600,000 miles (1,000,000 km). No cleaning agents are needed. If S•O•S℠ Services are used regularly, safe operation with Cat ELC may extend beyond 12,000 hours.

Health and Safety

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. Read and understand the Material Safety Data Sheet (MSDS) before using this product. For a copy of the MSDS, visit us on the web at www.catmsds.com.

CAT® DEALERS DEFINE WORLD-CLASS PRODUCT SUPPORT.

We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts can help you maximize your equipment investment.

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CATERPILLAR®
TODAY'S WORK. TOMORROW'S WORLD.™

Selected Model

Engine: C15	**Generator Frame:** M3136L41	**Genset Rating (kW):** 450.0	**Line Voltage:** 480
Fuel: Diesel	**Generator Arrangement:** 6263796	**Genset Rating (kVA):** 562.5	**Phase Voltage:** 277
Frequency: 60	**Excitation Type:** Permanent Magnet	**Pwr. Factor:** 0.8	**Rated Current:** 676.6
Duty: STANDBY	**Connection:** - STAR	**Application:** EPG	**Status:** Current

Version: 42423 /44804 /43655 /12016

Spec Information

Generator Specification

Frame: M3136L41	**Type:** SR500	**No. of Bearings:** 1
Winding Type: RANDOM WOUND		**Flywheel:** 14.0
Connection: - STAR		**Housing:** 1
Phases: 3		**No. of Leads:** 6
Poles: 4		**Wires per Lead:** 0
Sync Speed: 1800		**Generator Pitch:** 0.6667

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	112.5	91.9
0.5	225.0	94.4
0.75	337.5	94.9
1.0	450.0	94.7

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1099	0.0450
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1404	0.0575
TRANSIENT - SATURATED X'_d	0.1570	0.0643
SYNCHRONOUS - DIRECT AXIS X_d	3.1128	1.2750
SYNCHRONOUS - QUADRATURE AXIS X_q	1.5876	0.6503
NEGATIVE SEQUENCE X_2	0.1252	0.0513
ZERO SEQUENCE X_0	0.0063	0.0026

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	1.9823
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.1000
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_{d0}	0.0142
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_d	0.0100
OPEN CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_{q0}	0.1130
SHORT CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_q	0.0100
EXCITER TIME CONSTANT T_e	0.0200
ARMATURE SHORT CIRCUIT T_a	0.0150

Short Circuit Ratio: 0.49	Stator Resistance = 0.0097 Ohms	Field Resistance = 0.5566 Ohms

Voltage Regulation

Voltage level adjustment: +/-	5.0%
Voltage regulation, steady state: +/-	0.8%
Voltage regulation with 3% speed change: +/-	0.8%
Waveform deviation line - line, no load: less than	2.0%
Telephone influence factor: less than	50

Generator Excitation

	No Load	Full Load, (rated) pf	
		Series	Parallel
Excitation voltage:	11.39 Volts	40.4 Volts	Volts
Excitation current	1.07 Amps	3.12 Amps	Amps

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Generator Mechanical Information

Center of Gravity

Dimension X	-484.0 mm	-19.1 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

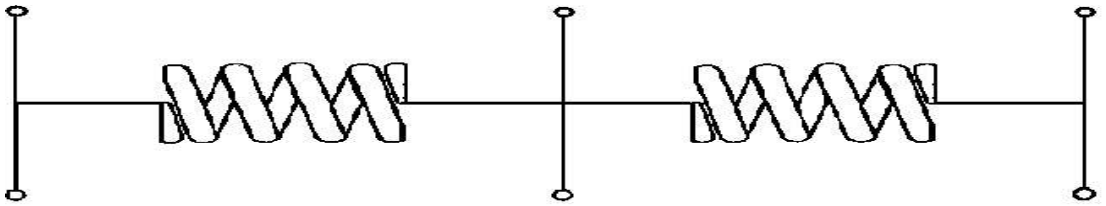
- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 1142 kg * Rotor WT = 457 kg * Stator WT = 685 kg
2,518 LB 1,008 LB 1,510 LB

Rotor Balance = 0.0 mm deflection PTP

Overspeed Capacity = 125% of synchronous speed

Generator Torsional Data



J1 = Coupling and Fan | **J2 = Rotor** | **J3 = Exciter End**

TOTAL J = J1 + J2 + J3

K1 = Shaft Stiffness between J1 + J2 (Diameter 1)

K2 = Shaft Stiffness between J2 + J3 (Diameter 2)

J1	K1	Min Shaft Dia 1	J2	K2	Min Shaft Dia 2	J3
0.0 LB IN. s^2	0.0 MLB IN./rad	0.0 IN.	0.0 LB IN. s^2	0.0 MLB IN./rad	0.0 IN.	0.0 LB IN. s^2
0.0 N m s^2	0.0 MN m/rad	0.0 mm	0.0 N m s^2	0.0 MN m/rad	0.0 mm	0.0 N m s^2

Total J

0.0 LB IN. s^2

0.0 N m s^2

Selected Model

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Version: 42423 /44804 /43655 /12016

Generator Cooling Requirements - Temperature - Insulation Data

Cooling Requirements:		Temperature Data: (Ambient 40 ^{0}C)	
Heat Dissipated: 25.2 kW		**Stator Rise:**	105.0 ^{0}C
Air Flow:	66.0 m^3/min	**Rotor Rise:**	105.0 ^{0}C

Insulation Class: H

Insulation Reg. as shipped: 100.0 MΩ minimum at 40 ^{0}C

Thermal Limits of Generator

Frequency:	60 Hz
Line to Line Voltage:	480 Volts
B BR 80/40	500.0 kVA
F BR -105/40	568.8 kVA
H BR - 125/40	625.0 kVA
F PR - 130/40	625.0 kVA
H PR - 150/40	662.5 kVA
H PR27 - 163/27	687.5 kVA

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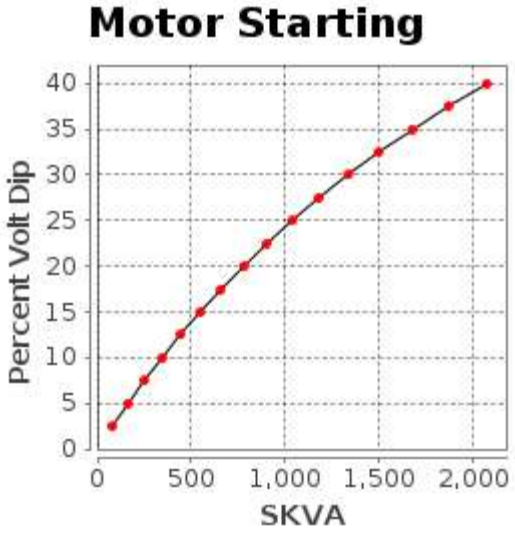
Version: 42423 /44804 /43655 /12016

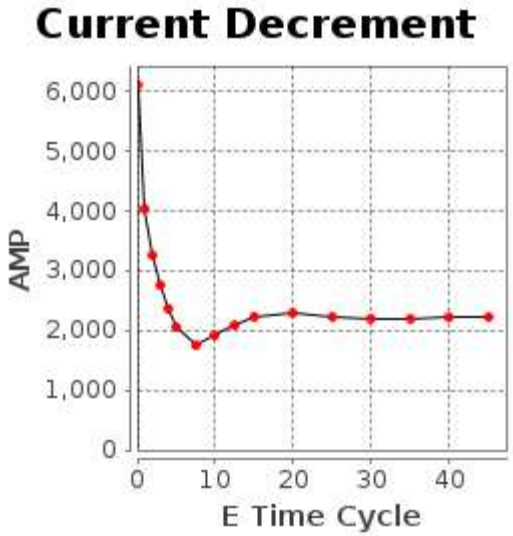
Starting Capability & Current Decrement
Motor Starting Capability (0.6 pf)

SKVA	Percent Volt Dip
80	2.5
164	5.0
252	7.5
346	10.0
444	12.5
549	15.0
660	17.5
778	20.0
903	22.5
1,037	25.0
1,180	27.5
1,333	30.0
1,497	32.5
1,675	35.0
1,866	37.5
2,073	40.0



Current Decrement Data

E Time Cycle	AMP
0.0	6,118
1.0	4,047
2.0	3,247
3.0	2,756
4.0	2,375
5.0	2,060
7.5	1,751
10.0	1,910
12.5	2,082
15.0	2,241
20.0	2,298
25.0	2,235
30.0	2,208
35.0	2,208
40.0	2,219
45.0	2,230



Instantaneous 3 Phase Fault Current: 6118 Amps **Instantaneous Line - Line Fault Current:** 4954 Amps

Instantaneous Line - Neutral Fault Current: 8352 Amps

Selected Model

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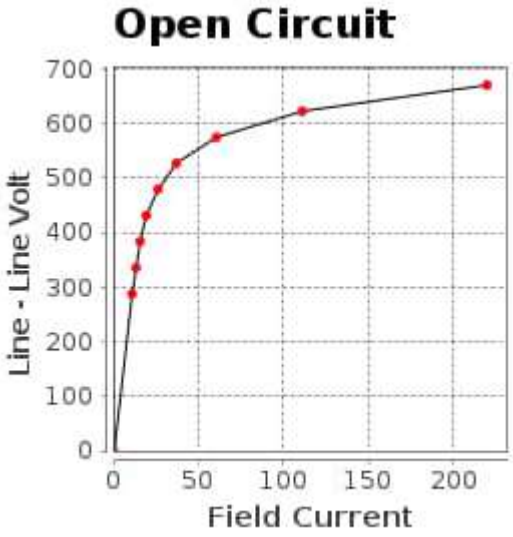
Fuel: Diesel	**Generator Arrangement:** 6263796	**Genset Rating (kVA):** 562.5	**Phase Voltage:** 277
Frequency: 60	**Excitation Type:** Permanent Magnet	**Pwr. Factor:** 0.8	**Rated Current:** 676.6
Duty: STANDBY	**Connection: -** STAR	**Application:** EPG	**Status:** Current

Version: 42423 /44804 /43655 /12016

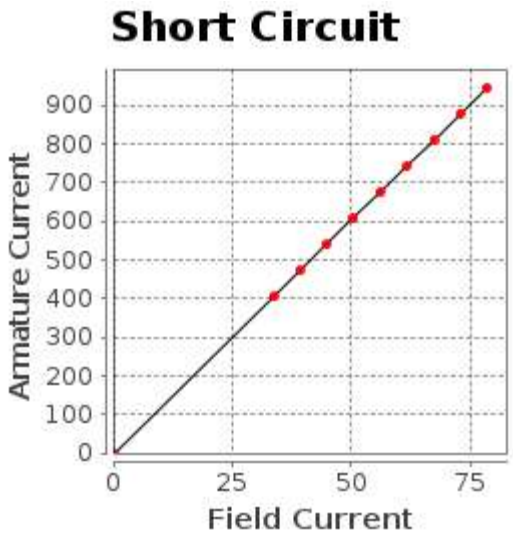
Generator Output Characteristic Curves
Open Circuit Curve

Field Current	Line - Line Volt
0.0	0
11.1	288
13.4	336
16.0	384
19.8	432
26.0	480
37.6	528
61.2	576
111.2	624
220.1	672



Short Circuit Curve

Field Current	Armature Current
0.0	0
33.7	406
39.3	474
44.9	541
50.5	609
56.1	677
61.8	744
67.4	812
73.0	880
78.6	947



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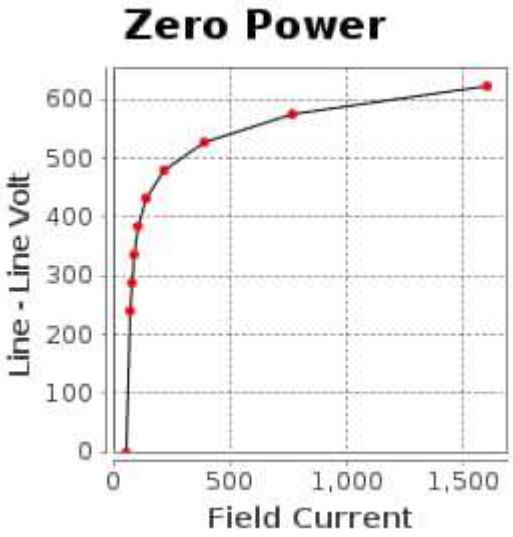
Duty: STANDBY	**Connection: -** STAR	**Application:** EPG	**Status:** Current

Version: 42423 /44804 /43655 /12016

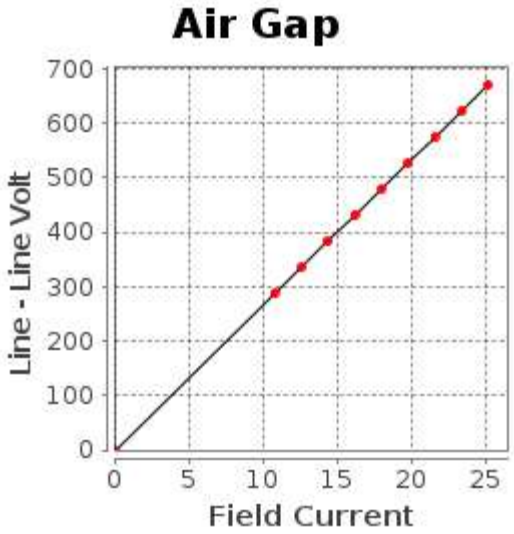
Generator Output Characteristic Curves
Zero Power Factor Curve

Field Current	Line - Line Volt
56.1	0
73.1	240
78.1	288
86.8	336
104.0	384
140.1	432
218.1	480
389.3	528
767.2	576
1,604.1	624



Air Gap Curve

Field Current	Line - Line Volt
0.0	0
10.8	288
12.6	336
14.4	384
16.2	432
18.0	480
19.8	528
21.6	576
23.4	624
25.2	672



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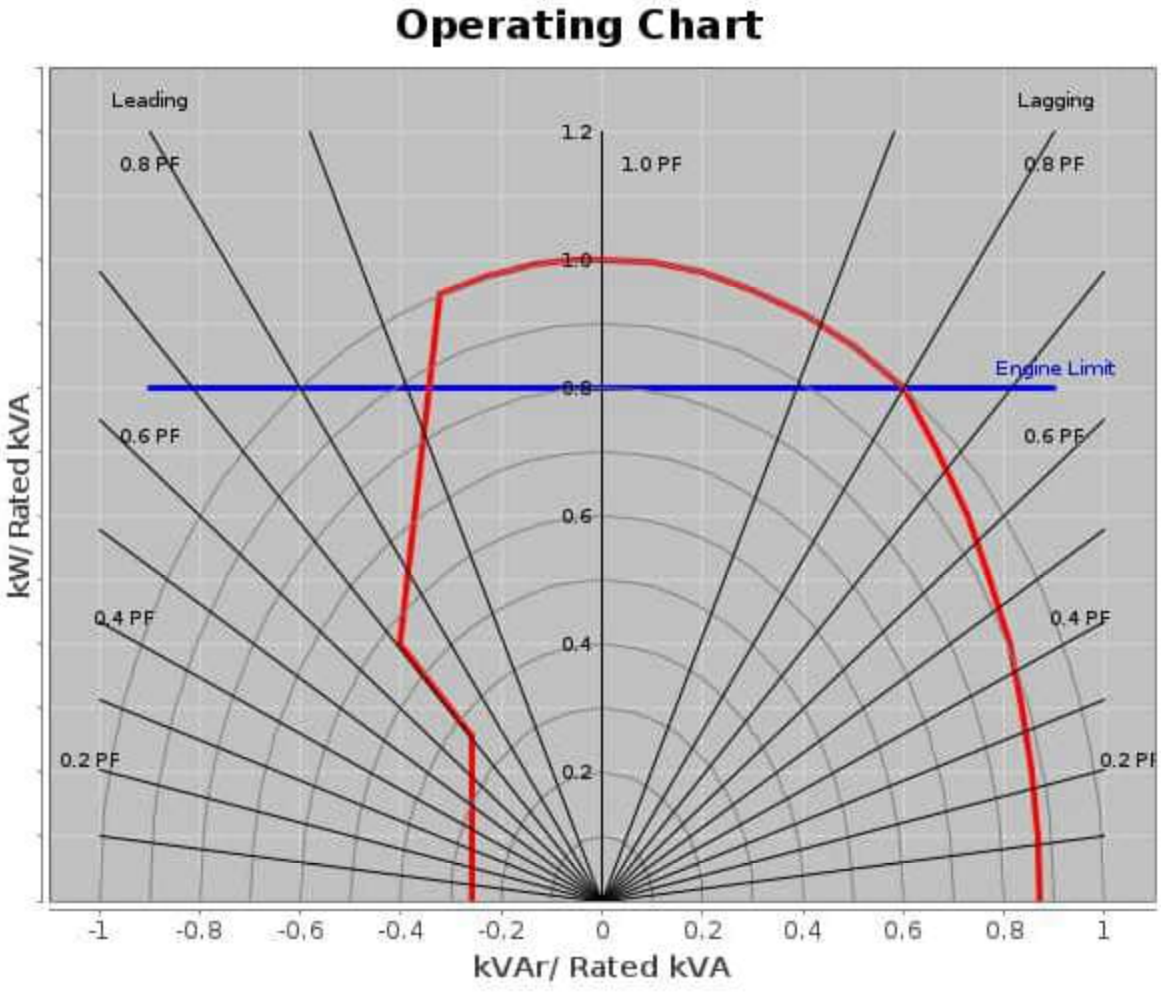
Duty: STANDBY **Connection: -** STAR **Application:** EPG **Status:** Current

Version: 42423 /44804 /43655 /12016

Reactive Capability Curve



General Information

GENERATOR INFORMATION (DM7900)

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1. Motor Starting
Motor starting curves are obtained in accordance with IEC60034, and are displayed at 0.6 power factor.

2. Voltage Dip
Prediction of the generator synchronous voltage dip can be made by consulting the plot for the voltage dip value that corresponds to the desired motor starting kVA value.

3. Definitions
A) Generator Keys
Frame: abbreviation of generator frame size
Freq: frequency in hertz.
PP/SB: prime/standby duty respectively
Volts: line - line terminal voltage
kW: rating in electrical kilo watts
Model: engine sales model

B) Generator Temperature Rise
The indicated temperature rises are the IEC/NEMA limits for standby or prime power applications. The quoted rise figures are maximum limits only and are not necessarily indicative of the actual temperature rise of a given machine winding.

C) Centre of Gravity
The specified centre of gravity is for the generator only. For single bearing, and two bearing close coupled generators, the center of gravity is measured from the generator/engine flywheel-housing interface and from the centreline of the rotor Shaft.

For two bearing, standalone generators, the center of gravity is measured from the end of the rotor shaft and from the centerline of the rotor shaft.

D) Generator Current Decrement Curves
The generator current decrement curve indicates the generator armature current arising from a symmetrical three-phase fault at the generator terminals. Generators equipped with AREP or PMG excitation systems will sustain 300% of rated armature current for 10 seconds.

E) Generator Efficiency Curves
The efficiency curve is displayed for the generator only under the given conditions of rating, voltage, frequency and power factor. This is not the overall generating set efficiency curve.

PERFORMANCE DATA[DM8153]

August 23, 2024

Performance Number: DM8153 **Change Level: 06**

SALES MODEL:	C15	**COMBUSTION:**	DIRECT INJECTION
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,800
MACHINE SALES MODEL:		**HERTZ:**	60
ENGINE POWER (BHP):	689	**FAN POWER (HP):**	32.6
GEN POWER WITH FAN (EKW):	450.0	**ASPIRATION:**	TA
COMPRESSION RATIO:	16.1	**AFTERCOOLER TYPE:**	ATAAC
RATING LEVEL:	STANDBY	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
PUMP QUANTITY:	1	**INLET MANIFOLD AIR TEMP (F):**	120
FUEL TYPE:	DIESEL	**JACKET WATER TEMP (F):**	192.2
MANIFOLD TYPE:	DRY	**TURBO CONFIGURATION:**	SINGLE
GOVERNOR TYPE:	ELEC	**TURBO QUANTITY:**	1
CAMSHAFT TYPE:	STANDARD	**TURBOCHARGER MODEL:**	GTA5518BS-56T-1.58
IGNITION TYPE:	CI	**CERTIFICATION YEAR:**	2006
INJECTOR TYPE:	EUI	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	2,025.0
REF EXH STACK DIAMETER (IN):	6		
MAX OPERATING ALTITUDE (FT):	4,921		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

General Performance Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)	ELEC SPEC FUEL CONSUMPTN (ESFC)	ISO ELEC SPEC FUEL CONSUMPTN (ESFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR	LB/EKW-HR	LB/EKW-HR
450.0	100	689	327	0.353	0.350	34.3	34.0	0.541	0.531
405.0	90	619	294	0.360	0.357	31.5	31.2	0.551	0.541
360.0	80	551	262	0.372	0.369	28.9	28.7	0.570	0.559
337.5	75	518	246	0.379	0.375	27.7	27.4	0.582	0.571
315.0	70	485	230	0.385	0.381	26.3	26.1	0.593	0.582
270.0	60	420	199	0.398	0.394	23.6	23.3	0.619	0.607
225.0	50	356	169	0.410	0.406	20.6	20.4	0.650	0.638
180.0	40	294	139	0.413	0.409	17.1	16.9	0.673	0.661
135.0	30	231	110	0.415	0.411	13.5	13.4	0.710	0.696
112.5	25	199	95	0.418	0.414	11.7	11.6	0.741	0.727
90.0	20	167	79	0.428	0.423	10.1	10.0	0.794	0.779
45.0	10	101	48	0.490	0.486	7.0	6.9	1.102	1.081

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
450.0	100	689	72.4	117.6	1,229.7	52.3	916.3	76	410.5
405.0	90	619	67.4	116.3	1,198.5	47.5	897.6	71	390.4
360.0	80	551	62.9	114.0	1,169.5	44.2	878.7	66	375.2
337.5	75	518	60.5	112.9	1,154.9	42.4	871.7	64	366.8
315.0	70	485	57.7	111.7	1,139.7	40.2	866.6	61	356.7
270.0	60	420	51.3	109.2	1,109.0	35.3	856.2	54	332.4
225.0	50	356	43.7	106.5	1,077.1	29.7	841.8	46	302.3
180.0	40	294	31.9	98.6	1,023.0	22.3	818.6	34	250.8
135.0	30	231	20.2	91.1	948.5	15.3	781.9	22	198.0
112.5	25	199	14.9	88.1	903.1	12.1	758.2	16	173.3
90.0	20	167	10.6	86.3	848.1	9.6	724.1	12	152.2
45.0	10	101	4.9	86.4	698.9	6.4	607.3	6	121.3

General Performance Data (Continued)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN

450.0	100	689	1,479.3	3,929.1	6,431.8	6,674.9	1,404.0	1,282.8
405.0	90	619	1,409.3	3,680.8	6,112.4	6,335.6	1,333.4	1,221.3
360.0	80	551	1,359.8	3,491.1	5,888.0	6,093.2	1,282.5	1,178.3
337.5	75	518	1,331.0	3,391.2	5,757.9	5,954.0	1,252.3	1,152.2
315.0	70	485	1,294.9	3,276.3	5,595.3	5,782.0	1,214.6	1,119.0
270.0	60	420	1,206.9	3,014.8	5,201.8	5,368.8	1,126.4	1,040.2
225.0	50	356	1,096.7	2,707.4	4,712.6	4,858.8	1,022.8	946.5
180.0	40	294	918.2	2,230.2	3,933.9	4,055.0	857.8	795.2
135.0	30	231	739.1	1,742.1	3,155.4	3,251.1	689.9	640.4
112.5	25	199	657.6	1,511.7	2,801.8	2,885.1	610.3	566.8
90.0	20	167	590.5	1,310.0	2,511.3	2,582.7	544.1	506.3
45.0	10	101	502.2	997.0	2,130.7	2,180.2	459.4	431.9

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
450.0	100	689	10,047	4,000	28,699	16,066	3,976	7,546	29,228	74,650	79,521
405.0	90	619	9,392	4,012	26,513	14,705	3,644	6,712	26,261	68,425	72,890
360.0	80	551	8,860	3,878	24,764	13,617	3,352	6,157	23,385	62,937	67,044
337.5	75	518	8,595	3,764	23,911	13,114	3,205	5,855	21,975	60,174	64,101
315.0	70	485	8,320	3,625	22,997	12,597	3,050	5,490	20,573	57,267	61,004
270.0	60	420	7,749	3,399	20,952	11,439	2,728	4,648	17,820	51,226	54,569
225.0	50	356	7,144	3,275	18,528	10,036	2,388	3,694	15,111	44,826	47,751
180.0	40	294	6,396	3,324	15,013	7,961	1,979	2,398	12,455	37,161	39,586
135.0	30	231	5,621	3,047	11,473	5,864	1,564	1,351	9,795	29,370	31,287
112.5	25	199	5,235	2,727	9,844	4,909	1,361	956	8,451	25,546	27,213
90.0	20	167	4,813	2,417	8,356	4,013	1,167	663	7,088	21,908	23,338
45.0	10	101	3,781	2,106	5,716	2,297	809	299	4,287	15,197	16,189

Altitude Derate Data

STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	689	689	689	689	689	689	689	689	689	689	689	689	689
1,000	689	689	689	689	689	689	689	689	689	689	689	689	689
2,000	689	689	689	689	689	689	689	689	689	689	689	689	689
3,000	689	689	689	689	689	689	689	689	689	687	676	664	689
4,000	689	689	689	689	689	689	689	685	673	661	650	639	689
5,000	689	689	689	689	689	683	671	659	647	636	625	615	689
6,000	689	689	689	682	669	657	645	633	622	611	601	591	686
7,000	689	682	668	655	643	631	620	609	598	588	578	568	664
8,000	668	655	642	630	618	606	595	585	574	564	555	546	642
9,000	642	629	617	605	593	582	572	562	552	542	533	524	621
10,000	616	604	592	581	570	559	549	539	530	520	512	503	600
11,000	591	579	568	557	547	536	527	517	508	499	491	483	580
12,000	567	556	545	534	524	515	505	496	488	479	471	463	560
13,000	544	533	522	512	503	493	484	476	467	459	452	444	541
14,000	521	511	501	491	482	473	464	456	448	440	433	426	523
15,000	499	489	480	470	462	453	445	437	429	422	415	408	504

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K6280	PP5610	2729743	GS282	-	FSE00001	
0K6280	PP5610	2864922	GS282	-	FTE00001	

Performance Parameter Reference

Parameters Reference:DM9600-15

PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600
APPLICATION:
Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.
PERFORMANCE PARAMETER TOLERANCE FACTORS:
Power +/- 3%
Torque +/- 3%
Exhaust stack temperature +/- 8%
Inlet airflow +/- 5%
Intake manifold pressure-gage +/- 10%
Exhaust flow +/- 6%
Specific fuel consumption +/- 3%
Specific fuel consumption (C7-C18) +/- 4%
Fuel rate +/- 5%
Specific DEF consumption +/- 3%
DEF rate +/- 5%
Heat rejection +/- 5%
Heat rejection exhaust only +/- 10%
Heat rejection CEM only +/- 10%
Heat Rejection values based on using treated water.
Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

PERFORMANCE DATA[DM8153]

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.
On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed.
These values do not apply to C280/3600. For these models, see the tolerances listed below.
C280/3600 HEAT REJECTION TOLERANCE FACTORS:
Heat rejection +/- 10%
Heat rejection to Atmosphere +/- 50%
Heat rejection to Lube Oil +/- 20%
Heat rejection to Aftercooler +/- 5%
TEST CELL TRANSDUCER TOLERANCE FACTORS:
Torque +/- 0.5%
Speed +/- 0.2%
Fuel flow +/- 1.0%
Temperature +/- 2.0 C degrees
Intake manifold pressure +/- 0.1 kPa
OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE
AIR AND FUEL CONDITIONS.
REFERENCE ATMOSPHERIC INLET AIR
FOR 3500 ENGINES AND SMALLER
SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.
FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.
MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE
Location for air temperature measurement air cleaner inlet at stabilized operating conditions.
REFERENCE EXHAUST STACK DIAMETER
The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.
REFERENCE FUEL
DIESEL
Reference fuel is #2 distillate diesel with a 35API gravity;
A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is
850 G/Liter (7.0936 Lbs/Gal).
GAS
Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.
ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS
EXTERNAL AUXILIARY LOAD
Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.
ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.
Standard temperature values versus altitude could be seen on TM2001.
When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.
Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.
Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.
REGULATIONS AND PRODUCT COMPLIANCE

PERFORMANCE DATA[DM8153]

TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.
Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.
EMISSION CYCLE LIMITS:
Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.
WET & DRY EXHAUST/EMISSIONS DESCRIPTION:
Wet - Total exhaust flow or concentration of total exhaust flow
Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded
EMISSIONS DEFINITIONS:
Emissions : DM1176
EMISSION CYCLE DEFINITIONS
1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets
test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.
HEAT REJECTION DEFINITIONS:
Diesel Circuit Type and HHV Balance : DM9500
HIGH DISPLACEMENT (HD) DEFINITIONS:
3500: EM1500
RATING DEFINITIONS:
Agriculture : TM6008
Fire Pump : TM6009
Generator Set : TM6035
Generator (Gas) : TM6041
Industrial Diesel : TM6010
Industrial (Gas) : TM6040
Irrigation : TM5749
Locomotive : TM6037
Marine Auxiliary : TM6036
Marine Prop (Except 3600) : TM5747
Marine Prop (3600 only) : TM5748
MSHA : TM6042
Oil Field (Petroleum) : TM6011
Off-Highway Truck : TM6039
On-Highway Truck : TM6038
SOUND DEFINITIONS:
Sound Power : DM8702
Sound Pressure : TM7080
Date Released : 03/12/24

AIR INTAKE SYSTEM		
THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.		
MAXIMUM ALLOWABLE INTAKE RESTRICTION WITH CLEAN ELEMENT	15	IN-H20
MAXIMUM PRESSURE DROP FROM COMPRESSOR OUTLET TO MANIFOLD INLET (OR MIXER INLET FOR EGR)	4.4	IN-HG
COOLING SYSTEM		
MAXIMUM ALLOWABLE JACKET WATER OUTLET TEMPERATURE	219	DEG F
REGULATOR LOCATION FOR JW (HT) CIRCUIT	OUTLET	
MAXIMUM UNINTERRUPTED FILL RATE	5.0	G/MIN
ENGINE SPEC SYSTEM		
CYLINDER ARRANGEMENT	INLINE	
NUMBER OF CYLINDERS	6	
CYLINDER BORE DIAMETER	5.4	IN
PISTON STROKE	6.7	IN
TOTAL CYLINDER DISPLACEMENT	928	CU IN
STANDARD CRANKSHAFT ROTATION FROM FLYWHEEL END	CCW	
STANDARD CYLINDER FIRING ORDER	1-5-3-6-2-4	
NUMBER 1 CYLINDER LOCATION	FRONT	
STROKES/COMBUSTION CYCLE	4	
EXHAUST SYSTEM		
THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.		
MAXIMUM ALLOWABLE SYSTEM BACK PRESSURE	40	IN-H20
FUEL SYSTEM		
MAXIMUM FUEL FLOW FROM TRANSFER PUMP TO ENGINE	111.0	G/HR
MAXIMUM ALLOWABLE FUEL SUPPLY LINE RESTRICTION	8.0	IN-HG
MAXIMUM ALLOWABLE FUEL TEMPERATURE AT TRANSFER PUMP INLET	174	DEG F
MAXIMUM FUEL FLOW TO RETURN LINE FROM ENGINE	103.0	G/HR
MAXIMUM ALLOWABLE FUEL RETURN LINE RESTRICTION	14.8	IN-HG
NORMAL FUEL PRESSURE IN A CLEAN SYSTEM	101.5	PSI
MAXIMUM TRANSFER PUMP PRIMING LIFT WITHOUT PRIMING PUMP	12.1	FT
MAXIMUM FUEL TEMPERATURE AT ENGINE OUTLET	225	DEG F
MAXIMUM ALLOWABLE FUEL TEMPERATURE AT TRANSFER PUMP OUTLET	174	DEG F
LUBE SYSTEM		
CRANKCASE VENTILATION TYPE	TO_ATMOSPHERE	
STARTING SYSTEM		
LOWEST AMBIENT START TEMPERATURE WITHOUT AIDS	32	DEG F

PACKAGE DATA [C15DEQA] *AUGUST 23, 2024*

Feature Code:	C15DEQA	**Rating Type:**	STANDBY	**Sales model Package:**	D450GC
Engine Sales Model:	C15	**Engine Arrangement Number:**	4230922	**Hertz:**	60
EKW W/F:	450.0	**Noise Reduction:**	0 dBA	**Back Pressure:**	0.0 inH2O

Engine Package Information

Engine Package Data

Package Cooling Information

Open Cooling Data

% Load	Airflow Rate scfm			Ambient Capability Sea Level (Deg F)			Ambient Capability 300 m (Deg F)			Ambient Capability 600 m (Deg F)			Ambient Capability 900 m (Deg F)		
	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O
100.0	26450	24896	23590	149	147	145	145	143	141	141	140	138	138	136	134
75.0	26450	24896	23590	156	154	154	152	150	150	149	147	147	145	143	143
50.0	26450	24896	23590	165	163	161	161	159	158	158	156	154	154	152	150
25.0	26450	24896	23590	174	172	170	170	168	167	167	165	163	163	161	159

SA Level 2 Canopy Cooling Data

% Load	Airflow Rate scfm	Ambient Capability Sea Level (Deg F)	Ambient Capability 300 m (Deg F)	Ambient Capability 600 m (Deg F)	Ambient Capability 900 m (Deg F)
100.0	17692	129	125	122	118
75.0	17692	147	143	140	136
50.0	17692	163	159	156	152
25.0	17692	181	177	174	170

Package Sound Information

Sound Comments :

Open Sound Data

Distance: 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
450.0	100.0	102.6	99.6	100.3	96.0	94.5	95.7	91.6	99.9
337.5	75.0	102.2	97.4	100.0	95.7	94.2	94.8	91.3	99.4
225.0	50.0	101.4	96.1	99.3	95.5	94.3	94.6	91.0	97.0
112.5	25.0	100.4	95.5	98.4	95.2	94.6	94.9	90.6	92.9

Distance: 23.0 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
450.0	100.0	92.6	89.6	90.3	86.0	84.5	85.7	81.6	89.9
337.5	75.0	92.2	87.4	90.0	85.7	84.2	84.8	81.3	89.4
225.0	50.0	91.4	86.1	89.3	85.5	84.3	84.6	81.0	87.0
112.5	25.0	90.4	85.5	88.4	85.2	84.6	84.9	80.6	82.9

Distance: 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
450.0	100.0	86.6	83.6	84.3	80.0	78.5	79.7	75.6	83.9
337.5	75.0	86.2	81.4	84.0	79.7	78.2	78.8	75.3	83.4
225.0	50.0	85.4	80.1	83.3	79.5	78.3	78.6	75.0	81.0
112.5	25.0	84.4	79.5	82.4	79.2	78.6	78.9	74.6	76.9

SA Level 2 Canopy Sound Data

Distance: 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
450.0	100.0	81.7	88.5	85.7	76.6	73.5	67.8	64.4	72.8
337.5	75.0	80.7	86.2	84.9	76.6	72.8	66.5	63.1	70.3
225.0	50.0	80.0	84.7	84.5	76.4	72.5	65.7	61.9	66.1
112.5	25.0	79.6	83.8	84.5	76.0	72.5	65.2	60.7	60.1

Distance: 23.0 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
450.0	100.0	72.1	79.8	78.4	66.4	63.6	58.3	54.1	60.5
337.5	75.0	71.2	78.1	78.4	65.9	62.4	56.4	52.2	57.9
225.0	50.0	70.4	76.8	77.7	65.5	61.6	55.2	50.9	54.1
112.5	25.0	69.9	76.2	76.3	65.2	61.5	54.6	49.9	49.0

Distance: 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
450.0	100.0	66.1	73.8	72.4	60.4	57.6	52.3	48.1	54.5
337.5	75.0	65.2	72.1	72.4	59.9	56.4	50.4	46.2	51.9
225.0	50.0	64.4	70.8	71.7	59.5	55.6	49.2	44.9	48.1
112.5	25.0	63.9	70.2	70.3	59.2	55.5	48.6	43.9	43.0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2024 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

or Importer) **32**	**Effective Date:** **08/08/2023** **Expiration Date:** **12/31/2024**	**Byron J. Bunker, Division Director** **Compliance Division**	**Issue Date:** **08/08/2023** **Revision Date:** **N/A**

nufacturer	**Mobile/Stationary Indicator:** Stationary **Emissions Power Category:** 450<=kW<=560 **Fuel Type:** Diesel **After Treatment Devices:** No After Treatment Devices Installed **Non-after Treatment Devices:** Electronic Control, Engine Design Modification

the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in 60 and produced in the stated model year.

ose new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

acturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a n 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 ecified in 40 CFR Part 60.

offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-50365-01C (Revision 15)

Expiration Date: 7/31/2026

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2021, 2018, 2015, 2012

The following model designations, options, and accessories are included in this certification. Reference report number VMA-50365-01 as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Caterpillar; Diesel Gensets

Series C4.4LC, C4.4, C6.6, C7.1, C9, C13, C15, C18

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_p=1.5. The equipment is qualified by comparative analysis and successful seismic shake table testing at the nationally recognized University of California Berkeley Pacific Earthquake Engineering Research Center and CERL (US Army Corp. of Engineers) Laboratory under the review of the ISO Accredited Product Certification Agency, the VMC Group.

Certified Seismic Design Levels			
Certified IBC	**Importance $I_p \leq 1.5$** Soil Classes A-E Risk Categories I-IV Design Categories A-F	z/h ≤ 1.0	z/h = 0.0
		$S_{DS} \leq 0.753$ g	$S_{DS} \leq 2.260$ g

Certified Seismic Installation Methods[8]	
Rigid Mounting From Unit Base To Rigid Structure	Rigid Mounting From Unit Base To Fuel Tank
External Isolation Mounting From Unit Base To Rigid Structure	

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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Series	Max Rating [kW]	EPA Rating	Length [in]	Width [in]	Height [in]	Max. Off Tank Weight [lbs]	Max. On Tank Weight [lbs]	S_{DS} at z/h=0.0	S_{DS} at z/h=1.0	Certified Installation Methods
C4.4LC	60	Tier 3	98	43	78	2,293	4,979	2.49	0.83	Rigid
C4.4	100		136	44	92	3,961	8,516			
C6.6	175		198		96	5,080	12,752			
C7.1	200					5,338	13,010			
C9	300		219	81	114	8,364	19,850	2.26	0.75	Rigid and Externally Spring Isolated
C13	400		286		124	11,036	30,864			
C15	450		251		127	11,393	28,504			
	500	Tier 2				11,923	29,034			
C18	600		286		124	12,179	32,031			
	500	Tier 4F	247	90	111	13,720	21,687			
	750	Tier 2	275	91	106	15,585	N/A			Rigid
						N/A	28,209		1.29	

Group	Type	SDS (z/h=0)	SDS (z/h=1)	A_{Flex-H}	A_{Rig-H}	A_{Flex-V}	A_{Rig-V}	F_p/W_p
Seismic	AC156	2.26	0.75	2.26	0.9	1.51	0.6	0.54

Notes:
1. Weights include genset, enclosure (where applicable), tank and fuel (where applicable)
2. For a detailed list of weights, certified installation methods, and certified seismic design levels please refer to the certification report referenced on the first page of this certificate.

This certification includes the open generator set and the enclosed generator set when installed with or without the sub-base tank. This certification also includes the sub-base tank as a stand-alone accessory. The generator set and included options shall be a catalogue design and factory supplied. The generator set and applicable options shall be installed and attached to the building structure per the manufacturer supplied seismic installation instructions. For a list of certified configurations and options please directly contact the manufacturer. This certification excludes all non-factory supplied accessories, including but not limited to mufflers, isolation/restraint devices, remote control panels, remote radiators, pumps and other electrical/mechanical components.

IBC CERTIFIED VMC GROUP

VMA-50365-01C (Revision 15)
Issue Date: Friday, May 6, 2016
Revision Date: Friday, April 28, 2023
Expiration Date: Friday, July 31, 2026

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes & Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The tested units were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.

2. The following building codes are addressed under this certification:
   IBC 2021 referencing ASCE7-16 and ICC-ES AC-156
   IBC 2018 referencing ASCE7-16 and ICC-ES AC-156
   IBC 2015 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2012 referencing ASCE7-10 and ICC-ES AC-156

3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for ensuring the proper installation of all anchors and mounting hardware.

4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, the VMC Group, and meets the seismic design levels claimed by this certificate.

5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification makes no statements of compliance in regards to NEMA, IP, UL, CSA, or other relevant standards after a seismic event. For compliance to other relevant standards, please contact the manufacturer.

6. This certificate applies to units manufactured at:
   1720 West Kingsbury Street, Seguin, TX 78155
   Rodovia Luiz de Queiorz-KM 157 CEP 13420-900, Piracicaba/SP-Brazil

7. This certification follows the VMC Group's ISO-17065 Scheme.

8. The certified seismic installation methods states are a summary for all series this certificate covers, for more detailed information on the certified seismic installation methods, see the certified product tables.

John P. Giuliano, PE
President, VMC Group

VMA-50365-01C (Revision 15)
Issue Date: Friday, May 6, 2016
Revision Date: Friday, April 28, 2023
Expiration Date: Friday, July 31, 2026

Effective with sales to the first user on or after August 1, 2016

ATERPILLAR LIMITED WARRANTY

Petroleum, Locomotive, and Agriculture Engine Products and Electric Power Generation Products

Worldwide

s ("Caterpillar") warrants new and
rebuild electric power generation
products of other manufacturers
be free from defects in material

old for use in on-highway vehicle or
s manufactured by or for Caterpillar;
ed in locomotive applications; 3000
d ACERT™ (C6.6, C7, C7.1, C9,
2) engines used in industrial, mobile
or Cat® batteries; or Electric Power
ssembled in India. These products
es.

g:

es in a petroleum applications
ms (excluding petroleum fire
in a Locomotive application, or
PS) systems, the warranty period
ry to the first user.

fire pump and mobile agriculture
is 24 months after date of delivery

igurable and custom switchgear
er switch products, the warranty
f delivery to the first user.

CG260 series power generation
4 months/16,000 hours, whichever
to first user.

oducts other than CG132, CG170
ntinuous applications the warranty
y applications the warranty period
ergency standby applications the
0 hours. All terms begin after date

power generation products the
, but not to exceed 24 months
c power generation product from

arranty period is 12 months after

Caterpillar Responsibilities

If a defect in material or workmanship is found during the warranty period, Caterpillar will, during normal working hours and at a place of business of a Cat dealer or other source approved by Caterpillar:

- Provide (at Caterpillar's choice) new, Remanufactured, or Caterpillar approved repaired parts or assembled components needed to correct the defect.

Note: New, remanufactured, or Caterpillar approved repaired parts or assembled components provided under the terms of this warranty are warranted for the remainder of the warranty period applicable to the product in which installed as if such parts were original components of that product. Items replaced under this warranty become the property of Caterpillar.

- Replace lubricating oil, filters, coolant, and other service items made unusable by the defect.
- Provide reasonable and customary labor needed to correct the defect, including labor to disconnect the product from and reconnect the product to its attached equipment, mounting, and support systems, if required.

For new 3114, 3116, and 3126 engines and, new and Caterpillar rebuild electric power generation products (which includes the following: any new products of other manufacturers packaged and sold by Caterpillar)

- Provide travel labor, up to four hours round trip, if in the opinion of Caterpillar, the product cannot reasonably be transported to a place of business of a Cat dealer or other source approved by Caterpillar (travel labor in excess of four hours round trip, and any meals, mileage, lodging, etc. is the user's responsibility).

For all other products:

- Provide reasonable travel expenses for authorized mechanics, including meals, mileage, and lodging, when Caterpillar chooses to make the repair on-site.

User Responsibilities

The user is responsible for:

- Providing proof of the delivery date to the first user.
- Labor costs, except as stated under "Caterpillar Responsibilities," including costs beyond those required to disconnect the product from and reconnect the product to its attached equipment, mounting, and support systems.
- Travel or transporting costs, except as stated under "Caterpillar Responsibilities."
- Premium or overtime labor costs.
- Parts shipping charges in excess of those that are usual and customary.
- Local taxes, if applicable.
- Costs to investigate complaints, unless the problem is caused by a defect in Caterpillar material or workmanship.
- Giving timely notice of a warrantable failure and promptly making the product available for repair.
- Performance of the required maintenance (including use of proper fuel, oil, lubricants, and coolant) and items replaced due to normal wear and tear.
- Allowing Caterpillar access to all electronically stored data.

Limitations

Caterpillar is not responsible for:

- Failures resulting from any use or installation that Caterpillar judges improper.
- Failures resulting from attachments, accessory items, and parts not sold or approved by Caterpillar.
- Failures resulting from abuse, neglect, and/or improper repair.
- Failures resulting from user's delay in making the product available after being notified of a potential product problem.
- Failures resulting from unauthorized repairs or adjustments, and unauthorized fuel setting changes.
- Damage to parts, fixtures, housings, attachments, and accessory items that are not part of the engine, Cat Selective Catalytic Reduction System or electric power generation product (including any products of other manufacturers packaged and sold by Caterpillar).
- Repair of components sold by Caterpillar that is warranted directly to the user by their respective manufacturer. Depending on type of application, certain exclusions may apply. Consult your Cat dealer for more information.

(Continued on reverse side…)

onent of the products. Claims under this warranty should be submitted to a
her source approved by Caterpillar. For further information concerning either
lar as the issuer of this warranty, write Caterpillar Inc., 100 N. E. Adams St.,

ed Warranty are subject to, and shall not apply in contravention of, the laws,
, orders, or statutes of the United States, or of any other applicable jurisdiction,
to Caterpillar.

ustralia, Fiji, Nauru, New Caledonia, New Zealand, Papua New Guinea, the
g is applicable:

ESS WARRANTY NOR ANY OTHER WARRANTY BY CATERPILLAR,
LE TO ANY ITEM CATERPILLAR SELLS THAT IS WARRANTED DIRECTLY
ER.

IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED,
MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE,
RELATED COMPONENTS WARRANTIES FOR NEW ENGINES, WHERE
HIS WARRANTY ARE LIMITED TO THE PROVISION OF MATERIAL AND

E FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

BILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART
EMPLOYEES, AGENTS OR REPRESENTATIVES IN RESPECT OF THE
ODS OR THE PROVISION OF SERVICES RELATING TO THE GOODS.

ENNA CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE
TIRETY.

electric power generation products, operating in the USA, its territories and
limitations on how long an implied warranty may last nor allow the exclusion
al damages. Therefore, the previously expressed exclusion may not apply to
gal rights and you may also have other rights, which vary by jurisdiction. To
r or other authorized repair facility, call (800) 447-4986. If you have questions
ns, call or write:

gine Division, P. O. Box 610, Mossville, IL 61552-0610, Attention: Customer
4986. Outside the USA and Canada: Contact your Cat dealer.

Fiji, Nauru, New Caledonia, New Zealand, Papua New Guinea, the Solomon
able:

D WARRANTIES AND CONDITIONS IMPLIED BY STATUTE AND OTHER
TIONS THAT BY ANY APPLICABLE LAW CANNOT BE EXCLUDED,
ATORY RIGHTS"). ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS
HERWISE), ARE EXCLUDED. WITHOUT LIMITING THE FOREGOING
WHERE A PRODUCT IS SUPPLIED FOR BUSINESS PURPOSES, THE
HE CONSUMER GUARANTEES ACT 1993 (NZ) WILL NOT APPLY.

NY OTHER CONDITION OR WARRANTY BY CATERPILLAR, EXPRESS
E MANDATORY RIGHTS), IS APPLICABLE TO ANY ITEM CATERPILLAR
TLY TO THE USER BY ITS MANUFACTURER.

CATERPILLAR LIABLE IN CONNECTION WITH SERVICES OR GOODS,
UNDER THE MANDATORY RIGHTS, THAT LIABILITY SHALL BE LIMITED
N THE CASE OF SERVICES, THE SUPPLY OF THE SERVICES AGAIN OR
ING THE SERVICES SUPPLIED AGAIN AND (b) IN THE CASE OF GOODS,
THE GOODS, THE SUPPLY OF EQUIVALENT GOODS, THE PAYMENT OF
PLACEMENT OR THE ACQUISITION OF EQUIVALENT GOODS.

CATERPILLAR EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN RESPECT OF THE MANUFACTURE OR SUPPLY OF GOODS OR THE PROVISION OF SERVICES RELATING TO THE GOODS.

CATERPILLAR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES UNLESS IMPOSED UNDER MANDATORY RIGHTS.

IF OTHERWISE APPLICABLE, THE VIENNA CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS IS EXCLUDED IN ITS ENTIRETY.

C) For products supplied in Australia:

IF THE PRODUCTS TO WHICH THIS WARRANTY APPLIES ARE:

I. PRODUCTS OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION; OR

II. PRODUCTS THAT COST AUD 40,000 OR LESS,

WHERE THOSE PRODUCTS WERE NOT ACQUIRED FOR THE PURPOSE OF RE-SUPPLY OR FOR THE PURPOSE OF USING THEM UP OR TRANSFORMING THEM IN THE COURSE OF PRODUCTION OR MANUFACTURE OR IN THE COURSE OF REPAIRING OTHER GOODS OR FIXTURES, THEN THIS SECTION C APPLIES.

THE FOLLOWING MANDATORY TEXT IS INCLUDED PURSUANT TO THE AUSTRALIAN CONSUMER LAW AND INCLUDES REFERENCES TO RIGHTS THE USER MAY HAVE AGAINST THE DIRECT SUPPLIER OF THE PRODUCTS: 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 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. THE INCLUSION OF THIS TEXT DOES NOT CONSTITUTE ANY REPRESENTATION OR ACCEPTANCE BY CATERPILLAR OF LIABILITY TO THE USER OR ANY OTHER PERSON IN ADDITION TO THAT WHICH CATERPILLAR MAY HAVE UNDER THE AUSTRALIAN CONSUMER LAW.

TO THE EXTENT THE PRODUCTS FALL WITHIN THIS SECTION C BUT ARE NOT OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION, CATERPILLAR LIMITS ITS LIABILITY TO THE EXTENT IT IS PERMITTED TO DO SO UNDER THE AUSTRALIAN CONSUMER LAW TO, AT ITS OPTION, THE REPAIR OR REPLACEMENT OF THE PRODUCTS, THE SUPPLY OF EQUIVALENT PRODUCTS, OR THE PAYMENT OF THE COST OF SUCH REPAIR OR REPLACEMENT OR THE ACQUISITION OF EQUIVALENT PRODUCTS.

THE WARRANTY SET OUT IN THIS DOCUMENT IS GIVEN BY CATERPILLAR INC. OR ANY OF ITS SUBSIDIARIES, 100 N. E. ADAMS ST, PEORIA, IL USA 61629, TELEPHONE 1 309 675 1000, THE USER IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH MAKING A CLAIM UNDER THE WARRANTY SET OUT IN THIS DOCUMENT, EXCEPT AS EXPRESSLY STATED OTHERWISE IN THIS DOCUMENT, AND THE USER IS REFERRED TO THE BALANCE OF THE DOCUMENT TERMS CONCERNING CLAIM PROCEDURES, CATERPILLAR RESPONSIBILITIES AND USER RESPONSIBILITIES.

TO THE EXTENT PERMISSIBLE BY LAW, THE TERMS SET OUT IN THE REMAINDER OF THIS WARRANTY DOCUMENT (INCLUDING SECTION B) CONTINUE TO APPLY TO PRODUCTS TO WHICH THIS SECTION C APPLIES.

CATERPILLAR®

Quinn Power Systems

Project # / Name:		**Genset ID#**	
Startup Level:		**Genset Serial#**	
Customer:			
Contact Name		**Contact Number**	

Pre-Startup Checklist

This document is provided to assist in the startup of your Caterpillar Equipment. Each checklist item below is to be completed prior to commencement of startup activities. This information will also help to insure against the probability of incurring additional expense.

It is mandatory this document be completed and returned to QPS via the original e-mail sender; indicating the current equipment status, expected completion dates of incomplete items and the requested startup date. Please send photos of noted items as verification of completion. (**Note:** all incomplete items are required to be completed before startup personnel arrive on site).

A minimum of **three/four week notice** is recommended to schedule resources for startup. This does not guarantee availability of startup personnel. Your project manager will coordinate all startup activities with you.

Requested Start-up Date:		**Form Completed by:**	
Start-up Address:	**City:**	**State:**	**Zip Code:**
Site Contact:	**Contact Cell Number:**	**Contact Company:**	
Alternate Site Contact:	**Alternate Contact Cell Number:**	**Contact Company:**	
Security Clearance Required: If yes details need to be provided below in the comments section.	**Noise restrictions: If yes details need to be provided below in the comments section.(provide start/end time)**	**Site Safety Orientation Required:**	**PPE Requirements: If yes please list PPE requirements below in the comments section.**
☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Comments			

If Quinn Technician arrives on site and the conditions are not found to be in the stated conditions of completion, Quinn Power Systems reserves the right to charge for additional compensation outside the agreed upon contract documents. If the Customer requests, requires, or authorizes Quinn Power Systems to perform any services in addition to the agreed upon Scope of Work the Customer shall pay Quinn Power Systems for such Additional Services at current Quinn Power Systems field service rates. The Customer shall also reimburse Quinn Power Systems for all mileage and travel expenses, subcontractors, dealer technicians, material and equipment incurred in the performance of additional work.

CATERPILLAR®

Quinn Power Systems

EQUIPMENT	STATUS	EXPECTED COMPLETION DATE
Items to be completed before requesting startup scheduling:		
1. Air quality permits obtained / Permit to operate (AQMD, Ventura, SJVAPCD, etc.). **Please submit a PDF copy**		
2. Generator and additional supplied (shipped loose) equipment is set in place (anchored) or mounted. [* Avoid top entry on outdoor rated equipment] **Send Photo**		
3. Coordination Study, if necessary has been completed and addressed prior to startup.	☐Yes ☐No ☐N/A	
4. All Utility and Generator connections terminated and available? **Send Photo**	☐Yes ☐No ☐N/A	
5. All source and feeder cables are installed, terminated and tested per all drawings and codes. **Send Photo**	☐ Yes ☐No ☐N/A	
Items to be completed before startup activities commence (if not applicable list as N/A):		
6. Exhaust systems complete and fully installed (rain cap, rain shield, gaskets, DPF/Silencer, radiator flow, blankets etc.) [*Ensure all exhaust connections include a gasket] **Send Photo**	☐ Yes ☐No ☐ N/A	
7. Louvers, radiator ducting and/or exhaust fans connected, powered and or unobstructed. **Send Photo**	☐ Yes ☐No ☐N/A	
8. Engine batteries and racks installed on each generator. **Send Photo**	☐ Yes ☐No ☐N/A	
9. Confirm AC shore power available at Generator (Battery charger/Space Heater/etc.). **Send Photo**	☐ Yes ☐No ☐N/A	
10. Confirm acceptable fluid levels. (Coolant, Oil, Urea, Etc.) [* Advise of any deficiencies prior to tech arrival]	☐Yes ☐No ☐N/A	
11. Complete installation/support of shipped loose fuel vent extensions. **Send Photo**	☐Yes ☐No ☐N/A	
12. Fuel tank, Day tank and or Gas piping installation complete.	☐Yes ☐No ☐N/A	
13. Fuel delivery complete including coordination with inspector/fire marshal, please ensure this is complete or scheduled no later than the morning of the 1st Quinn tech visit. [*For Diesel Gensets, it is recommended to have at least 90% of capacity to test alarms/floats (Diesel #2 Ultra low Sulfur fuel)]	☐Yes ☐No ☐N/A	
14. Field wiring complete from generator to (ATS, MTS, Quick connect, Loadbank, DPF, Remote E-stop buttons, etc.) **Send Photo**	☐ Yes ☐No ☐N/A	
15. Communication cabling installed for remote access, BMS, Remote annunciators, etc. **Send Photo**	☐Yes ☐No ☐N/A	
16. Building load available for NFPA 110 testing (2 hr. building load). [* If no building load, confirm approval of 4hr Load Bank test and note a building transfer test, at a later date, will incur additional cost]	☐Yes ☐No ☐N/A	
17. End User has been notified of Start-up and understands that interruptions to the downstream service may occur during building transfer.	☐Yes ☐No ☐N/A	

Name: _____ Date: _____

Title: _____

PARTS AND SERVICE STATEMENT

QUINN POWER SYSTEMS was organized on August 1, 2003 by the QUINN Company and is the only factory-authorized Caterpillar and Olympian Engine Distributor serving Los Angeles, Orange, and Inyo-Kern Counties in Southern California

QUINN POWER SYSTEMS is the successor to POWER SYSTEMS Associates, that was established in 1972 from the former Industrial Division of Shepherd Machinery Company. QUINN Company, serving Central California, was founded in 1919 and is the oldest Caterpillar dealer in California. We are Caterpillar's parts, service and sales representative.

QUINN POWER SYSTEMS offers genuine Caterpillar / Olympian parts and factory-trained mechanics. These are available on a 24-hour basis through our main office:

QUINN POWER SYSTEMS

PARTS AND SERVICE LOCATIONS

SELMA
Quinn Power Systems
10273 S. Golden State Blvd.
Selma, CA 93662-9410
P.O. Box 12625
Fresno, CA 93778-2625
(559) 891-6764

CORCORAN
Quinn Power Systems
510 Pickerell
Corcoran, CA 93212-1925
P.O. Box 578
Corcoran, CA 93212-0578
(559) 992-2193

CITY OF INDUSTRY
Quinn Power Systems
3500 Shepherd Street
City of Industry
562-463-6049

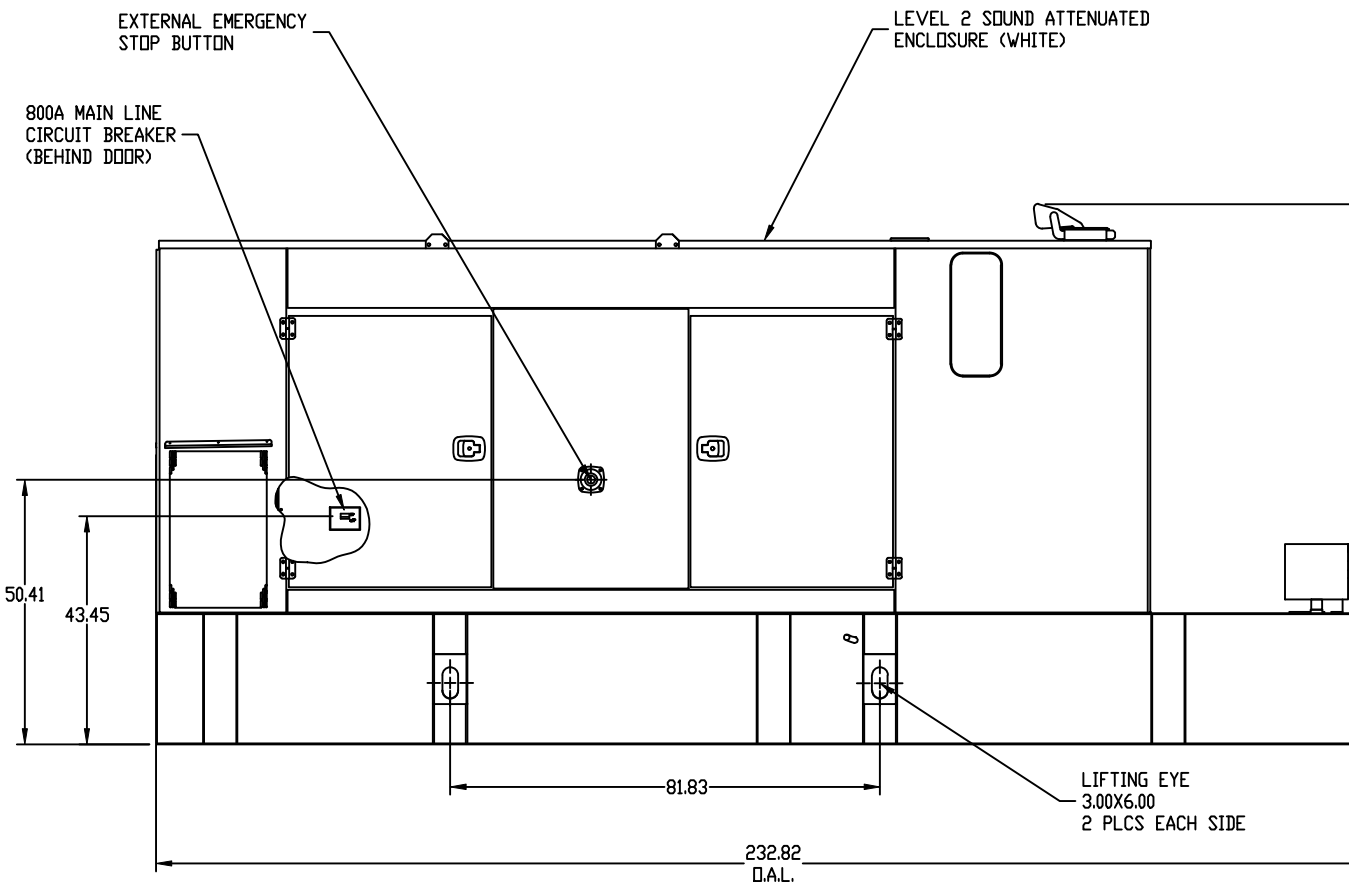
BAKERSFIELD
Quinn Power Systems
2200 Pegasus Dr.
Bakersfield, CA 93308-6801
Ph: (661)- 393-5800

OXNARD
Quinn Power Systems
801 Del Norte Blvd.
Oxnard, CA 93030-2692
P.O. Box 5227
Oxnard, CA 93031-5227
(805) 485-2171

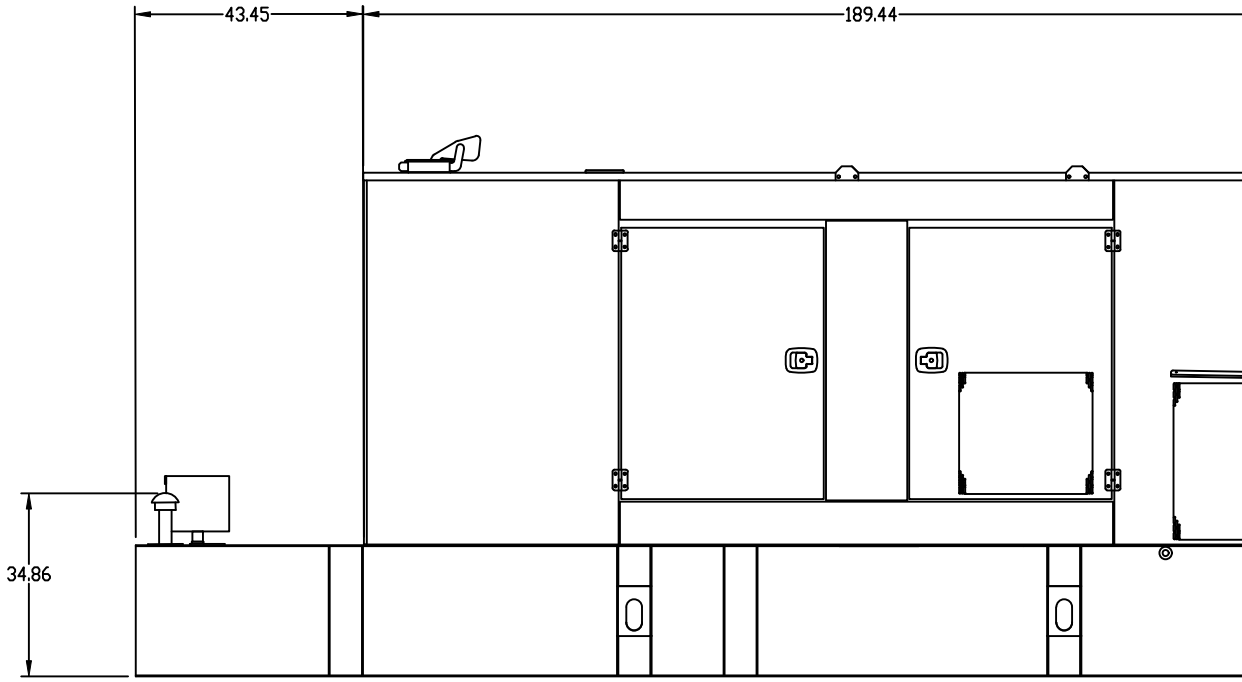
RIVERSIDE
Quinn Power Systems
656 E La Cadena Drive
Riverside, CA
(951) 683-5960

SALINAS
Quinn Power Systems
1300 Abbott Street
Salinas, CA 93901-4507
P.O. Box 1908
Salinas, CA 93902-1908
(831) 758-8461

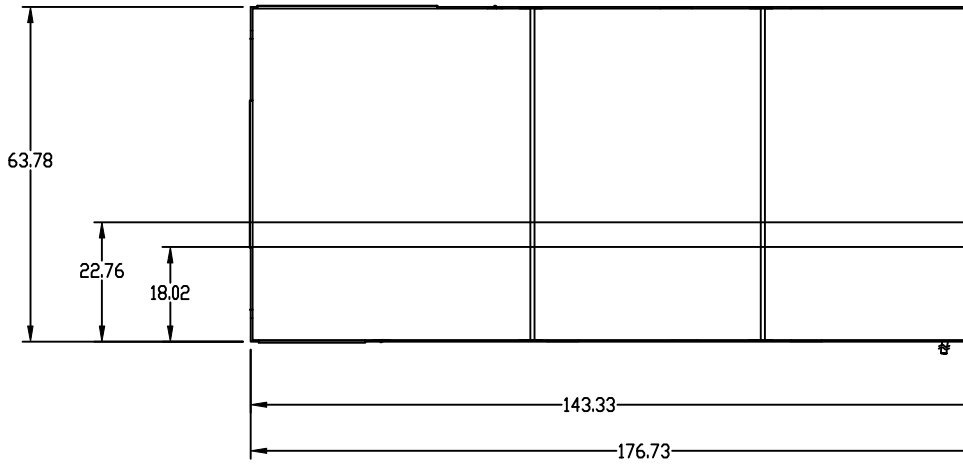
SANTA MARIA
Quinn Power Systems
1655 N. Carlotti Drive
Santa Maria, CA 93454-1503
(805) 925-8611



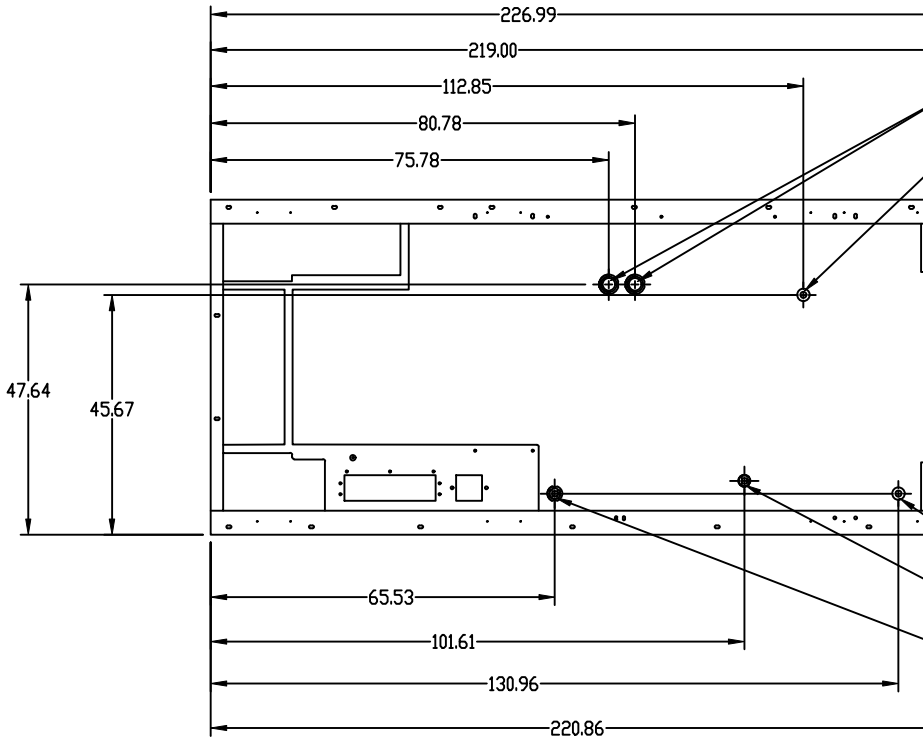
RIGHT SIDE VIEW



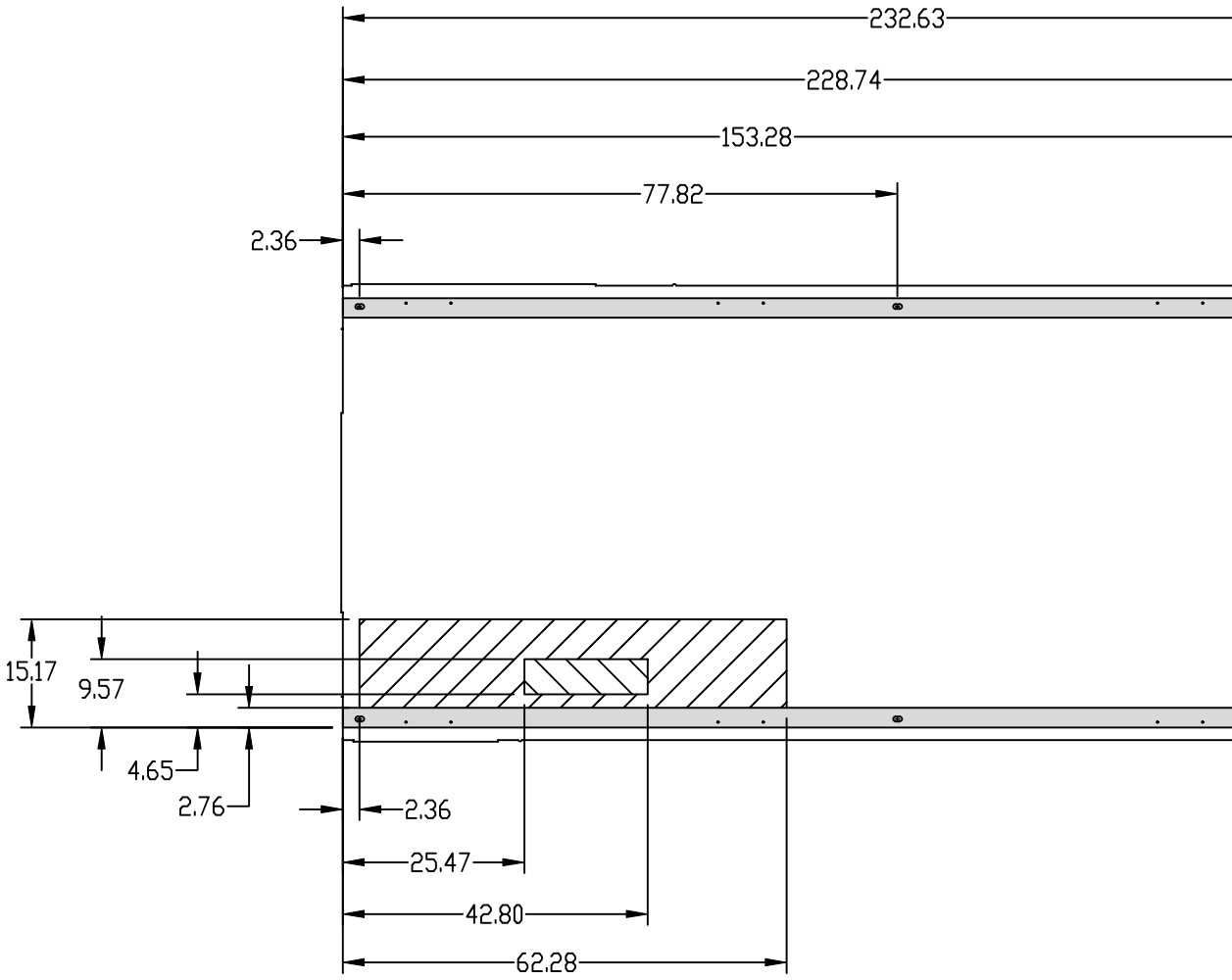
LEFT SIDE VIEW



TOP VIEW



TOP/RIGHT SIDE VIEW OF TANK BAS



FOOTPRINT – STUB UP AND MOUNTI

SIGNAL NAMES

CIRCUIT_ID	COLOR	DESCRIPTION
10	WH	AVR_SUPPLY_X2_(SHUNT)
101	RD	UNFUSED_BTRY_(+)
105	WH	(+24V_DC)_ECM_SUPPLY
108	WH	(+24V_DC_)_PANEL_SUPPLY
123	WH	FUSED_BTRY_+
14	WH	AVR_SUPPLY_X1_(PMG)
148	WH	(+24_VDC)_LIGHTING_SUPPLY
15	WH	AVR_SUPPLY_X2_(PMG)
16	WH	AVR_SUPPLY_Z1_(PMG)
200	GN-YL	GROUND
208	WH	BATTERY_(-)
229	WH	CLEAN_GROUND
344	WH	EMERGENCY_STOP
345	WH	EMERGENCY_STOP
346	WH	EMERGENCY_STOP
347	WH	EMERGENCY_STOP
348	WH	EMERGENCY_STOP
5+	WH	GENERATOR_EXCITATION_(+)
6-	WH	GENERATOR_EXCITATION_(-)
879	WH	REMOTE_START_INPUT
892	BK	CAT_DATA_LINK_(-)
893	WH	CAT_DATA_LINK_(+)
9	WH	AVR_SUPPLY_X1_(SHUNT)
951	WH	MODBUS_A
952	BK	MODBUS_B
953	CU	MODBUS_COM
954	WH	DSENET_A
955	BK	DSENET_B
956	CU	DSENET_SCREEN
SCR	CU	SCREEN
A309	WH	DIGITAL_INPUT_(GENSET_RUNNING)
A666	WH	ENCLOSURE_LIGHTING
A774	WH	EMERGENCY_STOP
A775	WH	EMERGENCY_STOP
AC101	WH	FUSED_BTRY_CHARGER_(L)
AC102	WH	BTRY_CHARGER_(L)
AC103	WH	ALT_HEATER_BREAKER
AC104	WH	ALT_HEATER_BREAKER
AC199	WH	BTRY_CHARGER_(N)
AC703	WH	ALT_HEATER_RELAY_(11)
AC719	WH	ALT_HEATER_RELAY_(12)
AC720	WH	ALT_HEATER_TERM
E486	WH	SENSING_VOLTAGE-PHASE_A
E487	WH	SENSING_VOLTAGE-PHASE_B
E488	WH	SENSING_VOLTAGE-PHASE_C
E494	WH	CT_SENSING-PHASE_A
E495	WH	CT_SENSING-PHASE_B
E496	WH	CT_SENSING-PHASE_C
E498	WH	CT_SENSING-COMMON
E600	WH	GROUND_FAULT_RELAY
E601	WH	GROUND_FAULT_RELAY
F409	WH	SENSING_VOLTAGE-NEUTRAL
F430	WH	DIGITAL_INPUT_(D)
F434	WH	GEN_PHASE_A
F435	WH	GEN_PHASE_B
F436	WH	GEN_PHASE_C
N756	WH	HORN_OUTPUT
P733	WH	ANALOG_I/P_SIGNAL_(FUEL_LEVEL)
P854	WH	BREAKER_SHUNT_TRIP
R958	WH	DIGITAL_OUTPUT_(SHUNT_TRIP)
R959	WH	DIGITAL_OUTPUT_(ENCLOSURE_LIGHTS)
X861	WH	STARTER_MAG_SWITCH
Y797	YL	J1939_DATALINK_(CAN_+)
Y798	BK	J1939_DATALINK_(CAN_-)
Y799	CU	J1939_DATALINK_(CAN_SHLD)
Y983	WH	DIGITAL_INPUT_(LOW_COOLANT_LEVEL)
Y984	WH	DIGITAL_INPUT_(FUEL_LEAK)
Y985	WH	DIGITAL_INPUT__(ENCLOSURE_LIGHTS)

WIRE NAME DEFINITION

XXXX-XX# XX-XX

- WIRE GAUGE
- WIRE COLOUR
- WIRE NUMBER
- HARNESS IDENT
- CIRCUIT IDENT

COLOUR ABBREVIATIONS

ABBREVIATION	DESCRIPTION
RD	RED
WH	WHITE
OR	ORANGE
YL	YELLOW
PK	PINK
BK	BLACK
GY	GREY
PU	PURPLE
BR	BROWN
GN	GREEN
BU	BLUE
CU	COPPER
GN-YL	GREEN-YELLOW

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
AC	ALTERNATING CURRENT
AVR	AUTOMATIC VOLTAGE REGULATOR
BATT	BATTERY
CR	CONTROL RELAY
DC	DIRECT CURRENT
ECM	ENGINE CONTROL MODULE
ECR	ENGINE CRANK RELAY
ELR	ENCLOSURE LIGHTS RELAY
E-STOP	EMERGENCY STOP
FLS	FUEL LEVEL SENDER
GFR	GENERAL FAULT RELAY
GND	GROUND
GRR	GENERATOR RUNNING RELAY
LCL	LOW COOLANT LEVEL
MCB	MINIATURE CIRCUIT BREAKER
PMG	PERMANENT MAGNET GENERATOR
STR	SHUNT TRIP RELAY
TERM	PANEL TERMINAL
VFC	VOLT FREE CONTACT

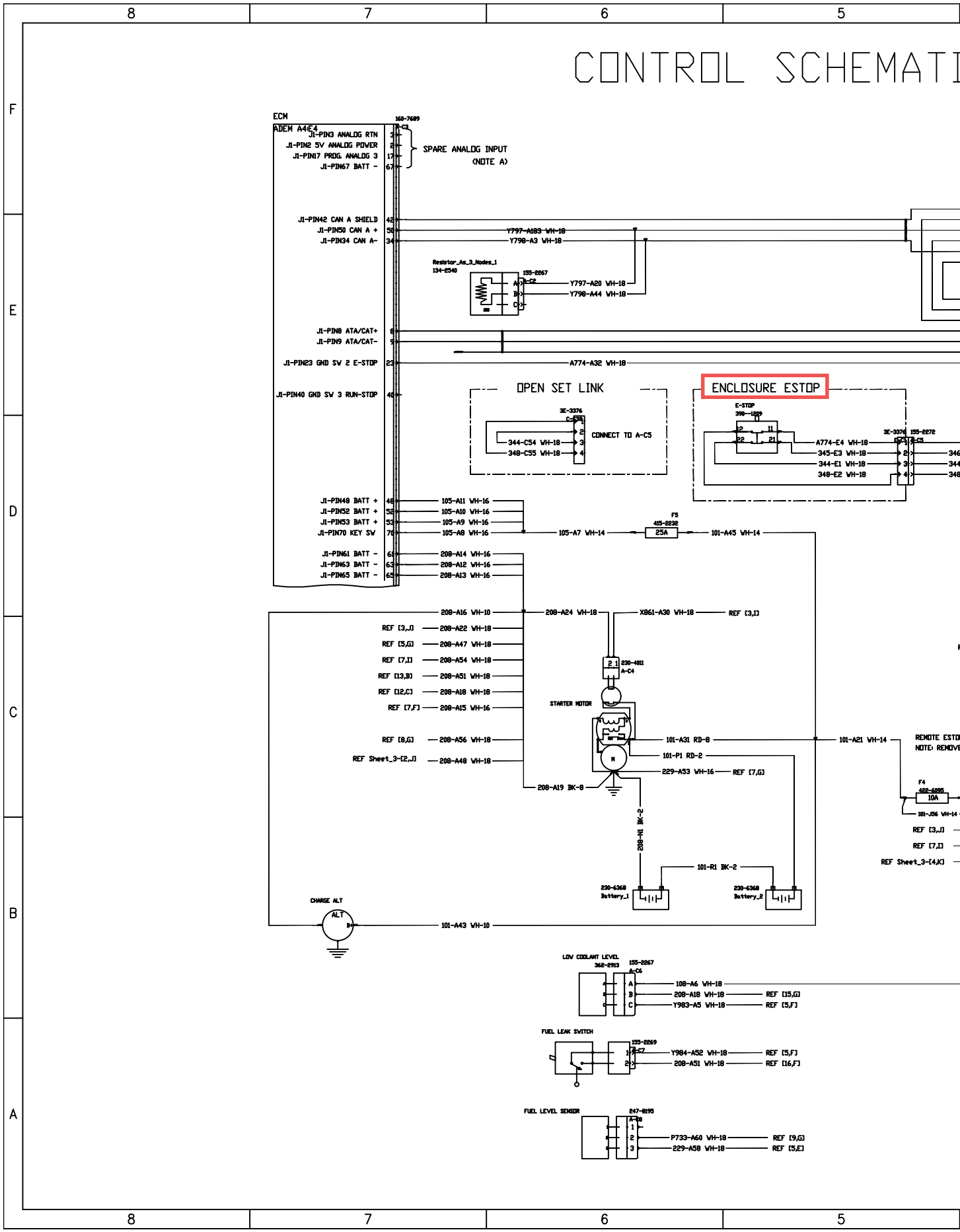
SYMBO

T

NOTE A: FACTORY WIRING NOT PROVIDED AS STANDARD. REFER TO MANUFAC

NOTE B: CONTACT OPEN IN DE-ENERGIZED STATE OR FAULT CONDITION.

NOTE C: RESISTOR TO BE REMOVED IF ADDITIONAL EXPANSION MODULES ARE


CONTROL SCHEMATI
ECM
ADEM A4:E4
J1-PIN3 ANALOG RTN
J1-PIN2 5V ANALOG POWER
J1-PIN17 PROG. ANALOG 3
J1-PIN67 BATT -
SPARE ANALOG INPUT
(NOTE A)
J1-PIN42 CAN A SHIELD
J1-PIN50 CAN A +
J1-PIN34 CAN A-
Y797-A183 WH-18
Y798-A3 WH-18
Y797-A20 WH-18
Y798-A44 WH-18
J1-PIN8 ATA/CAT+
J1-PIN9 ATA/CAT-
J1-PIN23 GND SW 2 E-STOP
A774-A32 WH-18
J1-PIN40 GND SW 3 RUN-STOP
OPEN SET LINK
CONNECT TO A-C5
344-C54 WH-18
348-C55 WH-18
ENCLOSURE ESTOP
A774-E4 WH-18
345-E3 WH-18
344-E1 WH-18
348-E2 WH-18
J1-PIN48 BATT +
J1-PIN52 BATT +
J1-PIN53 BATT +
J1-PIN70 KEY SW
105-A11 WH-16
105-A10 WH-16
105-A9 WH-16
105-A8 WH-16
105-A7 WH-14
25A
101-A45 WH-14
J1-PIN61 BATT -
J1-PIN63 BATT -
J1-PIN65 BATT -
208-A14 WH-16
208-A12 WH-16
208-A13 WH-16
208-A16 WH-10
208-A24 WH-18
X861-A30 WH-18
REF [3,J]
208-A22 WH-18
REF [5,G]
208-A47 WH-18
REF [7,I]
208-A54 WH-18
REF [13,B]
208-A51 WH-18
REF [12,C]
208-A18 WH-18
REF [7,F]
208-A15 WH-16
REF [8,G]
208-A56 WH-18
REF Sheet_3-[2,J]
208-A48 WH-18
STARTER MOTOR
101-A31 RD-8
101-P1 RD-2
229-A53 WH-16
REF [7,G]
208-A19 BK-8
208-N1 BK-2
101-R1 BK-2
101-A21 WH-14
REMOTE ESTO
NOTE: REMOVE
F4
10A
101-J56 WH-14
REF [3,J]
REF [7,I]
REF Sheet_3-[4,K]
CHARGE ALT
ALT
101-A43 WH-10
LOW COOLANT LEVEL
108-A6 WH-18
208-A18 WH-18
REF [15,G]
Y983-A5 WH-18
REF [5,F]
FUEL LEAK SWITCH
Y984-A52 WH-18
REF [5,F]
208-A51 WH-18
REF [16,F]
FUEL LEVEL SENSOR
P733-A60 WH-18
REF [9,G]
229-A58 WH-18
REF [5,E]

POWER S

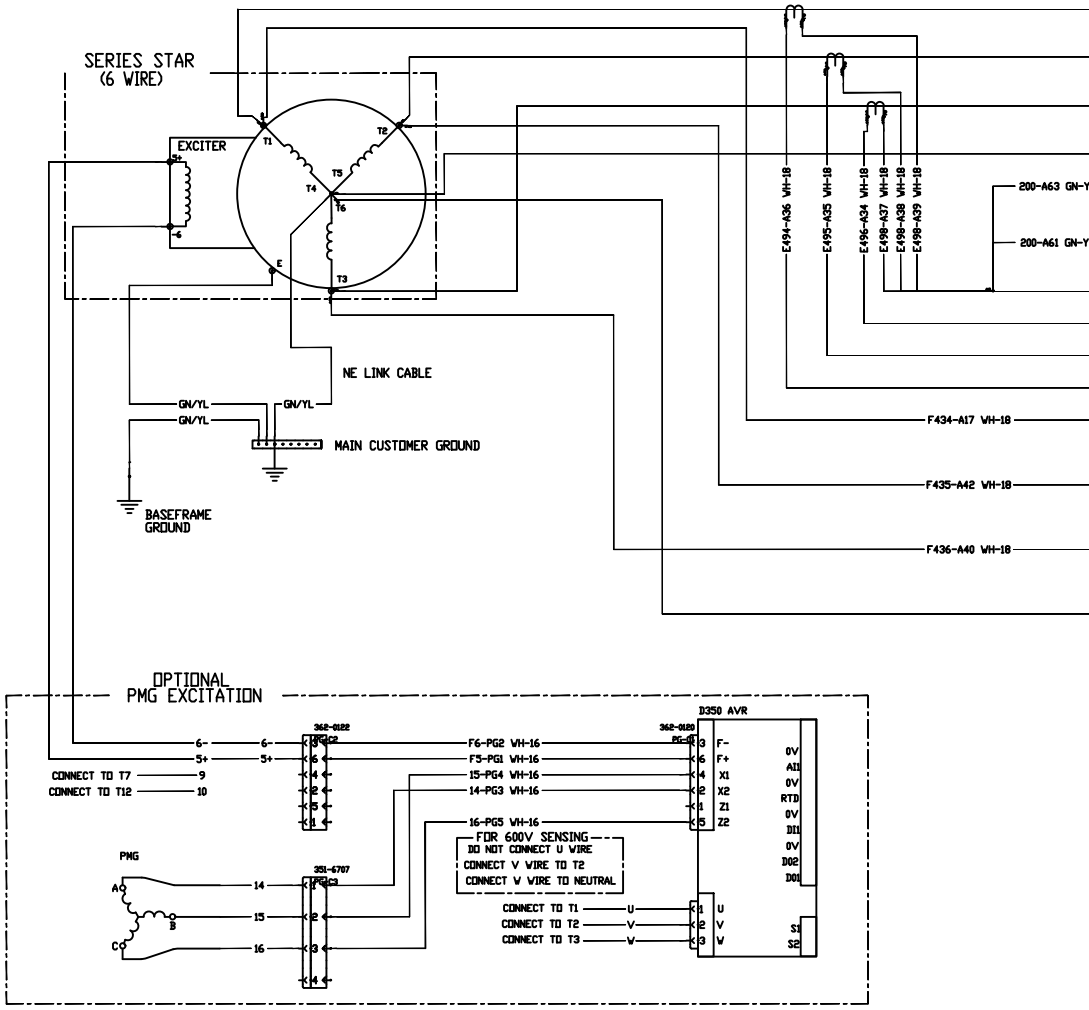
800A HARNESS

CONNECT TO ALTERNATOR

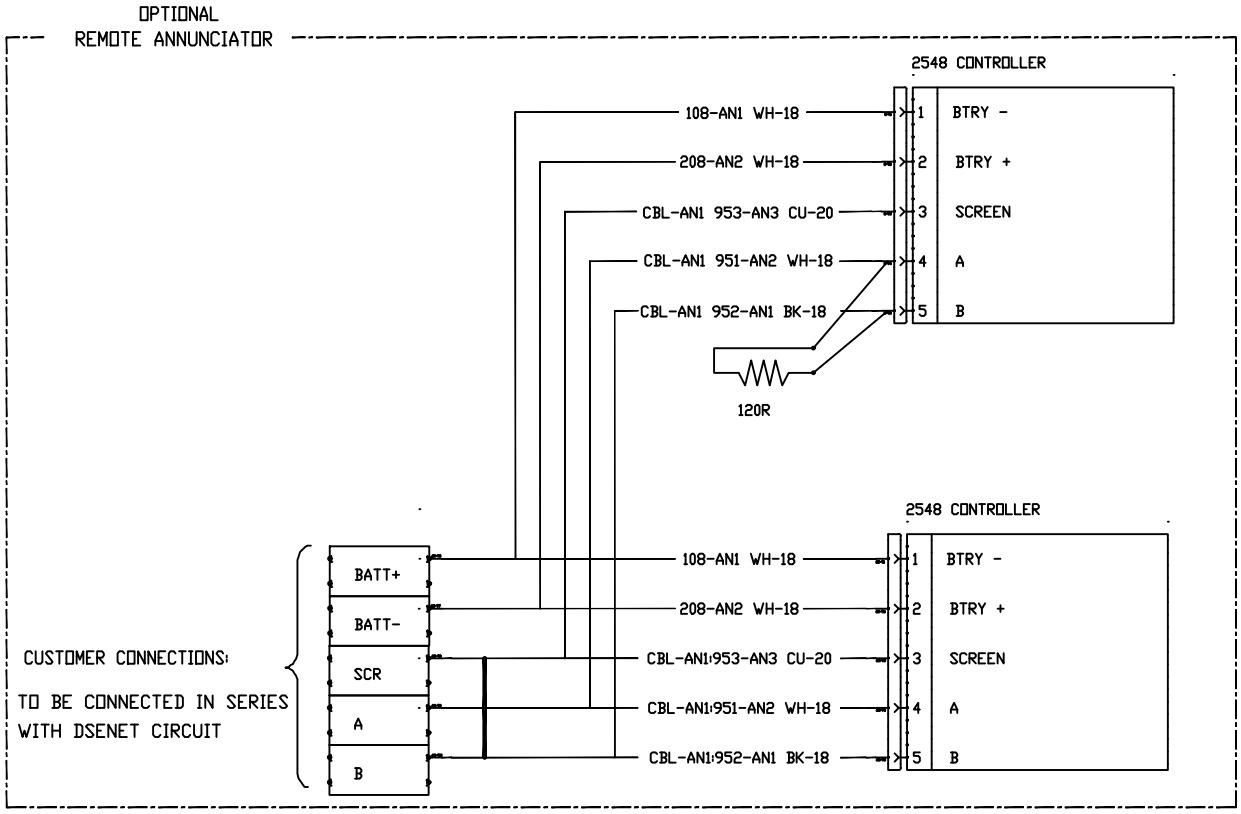
- L1-UC1 BK-0
- L1-UE1 BK-0
- L2-VC1 BK-0
- L2-VE1 BK-0
- L3-WC1 BK-0
- L3-WE1 BK-0
- N-NC1 BK-0
- N-NE1 BK-0

CONNECT TO BREAKER

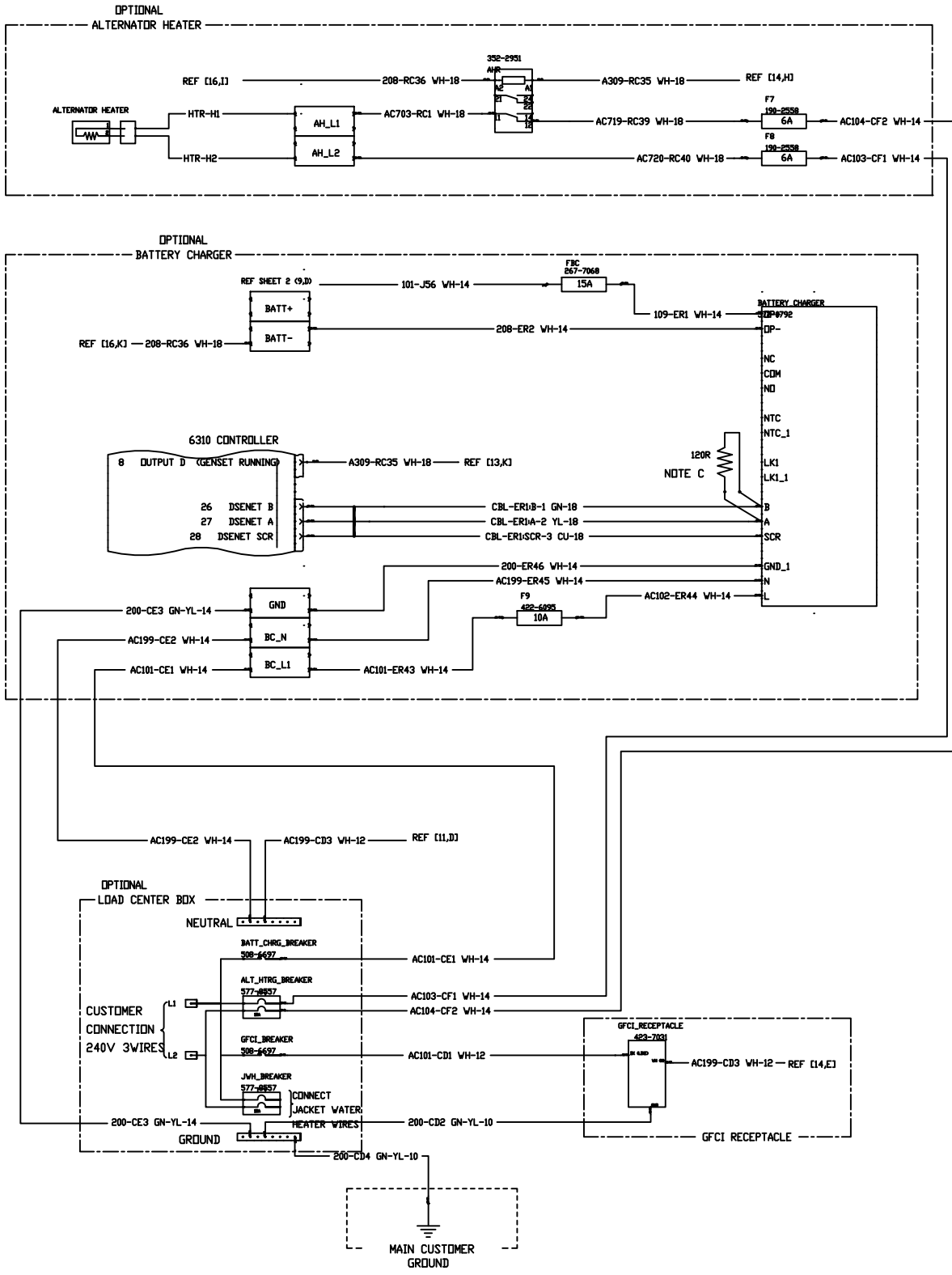
*Note: The 800A Harness replaces this area.



ADDITIONAL


OPTIONAL
REMOTE ANNUNCIATOR
2548 CONTROLLER
108-AN1 WH-18
208-AN2 WH-18
CBL-AN1 953-AN3 CU-20
CBL-AN1 951-AN2 WH-18
CBL-AN1 952-AN1 BK-18
1 BTRY -
2 BTRY +
3 SCREEN
4 A
5 B
120R
2548 CONTROLLER
108-AN1 WH-18
208-AN2 WH-18
CBL-AN1:953-AN3 CU-20
CBL-AN1:951-AN2 WH-18
CBL-AN1:952-AN1 BK-18
1 BTRY -
2 BTRY +
3 SCREEN
4 A
5 B
BATT+
BATT-
SCR
A
B
CUSTOMER CONNECTIONS:
TO BE CONNECTED IN SERIES
WITH DSENET CIRCUIT

ADDITIONAL O

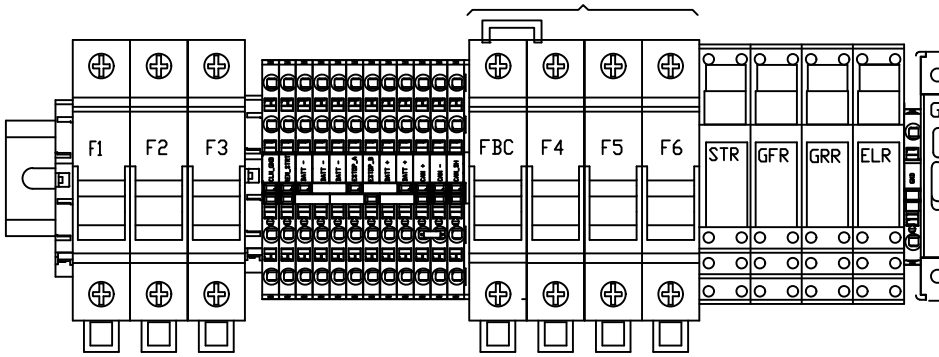


ADDITIONAL INFORMATION - COMPONE

MAIN CUSTOMER RAIL (OPTIONS INCLUDED)

FUSE ID	CURRENT RATING	WIRE ID	DESCRIPTION
F4	10A	101, 108	PANEL SUPPLY
F5	25A	101, 105	ECM POWER
F6	2A	148, 101	ENCLOSURE LIGHTS
FBC	15A	101, 109	BATTERY CHARGER

DC FUSES



AC FUSES

FUSE ID	CURRENT RATING	WIRE ID	DESCRIPTION
F1	5A	F434, F486	L1 SENSING AC
F2	5A	F435, F487	L2 SENSING AC
F3	2A	F436, F488	L3 SENSING AC

CUSTOMER TERMINALS

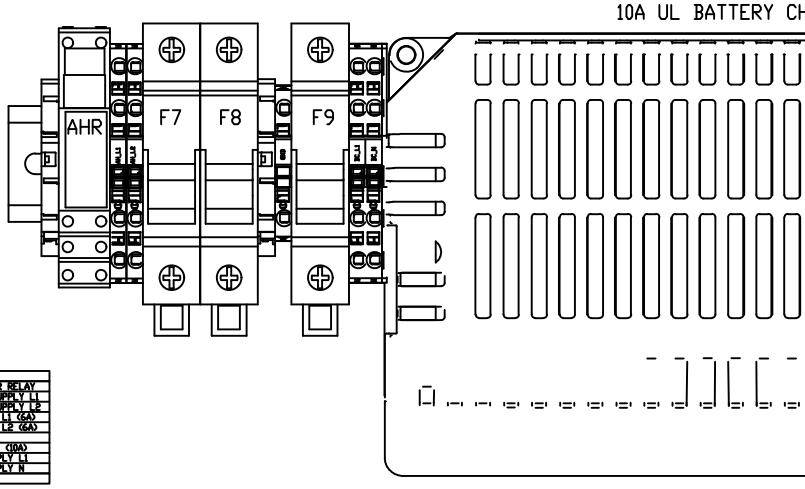
TERMINAL ID	WIRE ID	DESCRIPTION
CLN GND	0295	CLEAN GROUND FOR ANALOG INPUTS
ECM STRT	0179	REMOTE START INPUT
BATT -	208	BATTERY NEGATIVE
BATT -	208	BATTERY NEGATIVE
BATT -	208	BATTERY NEGATIVE
ESTOP A	047	ECM ESTOP INPUT
ESTOP B	044	GENSET CONTROLLER ESTOP INPUT
BATT +	108	BATTERY POSITIVE (10A FUSED)
BATT +	108	BATTERY POSITIVE (10A FUSED)
CAN +	7797	CAN + COMMS
CAN -	7798	CAN - COMMS
CAN SH	7799	CAN SH COMMS

RELAY VFC CONNECTIONS

RAIL	CURRENT RATING	DESCRIPTION
STR	8A	SHUNT TRIP RELAY
GFR	8A	GENERAL FAULT RELAY
GRR	8A	GENSET RUNNING RELAY
ELR	8A	ENCLOSURE LIGHTS RELAY

SHORE POWER RAIL (OPTIONS INCLUDED)

10A UL BATTERY CH



COMPONENT	DESCRIPTION
AHR	ALTERNATOR SPACE HEATER RELAY
AH_L1	ALTERNATOR HEATER AC SUPPLY L1
AH_L2	ALTERNATOR HEATER AC SUPPLY L2
F7	ALTERNATOR HEATER FUSE L1 (6A)
F8	ALTERNATOR HEATER FUSE L2 (6A)
GND	SHORE POWER GROUND
F9	BATTERY CHARGER FUSE L1 (10A)
BC_L1	BATTERY CHARGER AC SUPPLY L1
BC_N	BATTERY CHARGER AC SUPPLY N

Casitas

TRANSFER SWITCH SUBMITTAL

REVISION 00

Cindy Poore
ASCO Power Technologies
1660 Scenic Ave
Costa Mesa, CA 92626
714 267 4921
Cindy.Poore@ASCOPower.com

September 17, 2024

ASCO Power Technologies™

Casitas.

Reference Quote: K4-24-661029-1-2
Sales Order: 3307522

TRANSFER SWITCH DETAILS

ATS NAME	QTY	AMPS / POLES (VOLTS)	BYPASS	TRANSITION TYPE	CATALOG NUMBER	ACCESSORIES	OUTLINE DRAWING	WIRING DIAGRAM	BOM NUMBER
	1	0800 / 3 (480V)	N/A	OPEN	H03ATSA30800NGXM	11BE,18RX,31Z,44G,125A	1001394-009	1001657	1586772

Transfer Switch Withstand and Closing Ratings

		300, 4000 & 7000 Series																			
ATS NAME	FRAME SIZE	SWITCH RATING AMPS		CURRENT LIMITING FUSES				SPECIFIC BREAKER			TIME BASED				Short Time Ratings[3] (sec)							
															480V Max.				600V Max.			
		Transfer Switches	Bypass Switches	480V Max.	600V Max.	MAX SIZE, A	CLASS	240V Max.	480V Max.	600V Max.	Time(Sec)	240V Max.	480V Max.	600V Max.	.13	.2	.3	.5	.1	.13	.3	.5
-	H	800 - 1200	800 - 1200	200kA	200kA	1600[4]	L	65kA	150kA	65kA	0.05	50kA	50kA	50kA	36kA			-	36kA			-

NOTES:
1) All WCR values indicated are tested in accordance with the requirements of UL 1008, 7th Edition.
2) Application requirements may permit higher WCR for certain switch sizes.
3) Short Time ratings are provided for applications involving circuit breakers that utilize trip delay settings for system selective coordination
4) Max fuse rating is 1200A on front connected H frame switches
5) The Withstand Rating at 480V is 50kA when coordinated with any breaker capable of clearing a fault current in 0.05 sec or less (time-based rating), 65kA when coordinated with specific breakers (Series Rating) and 200kA when coordinated with Class L current limiting fuses. See ASCO Pub. 1128 for suitable breakers and additional information. IMPORTANT: FOR SERIES RATING BREAKERS MUST BE COORDINATED.
6) For dimensions and additional information, see ASCO Outline Drawing 1001394-009 (NEMA 3R Secure Enclosure).

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Transfer Switch Details

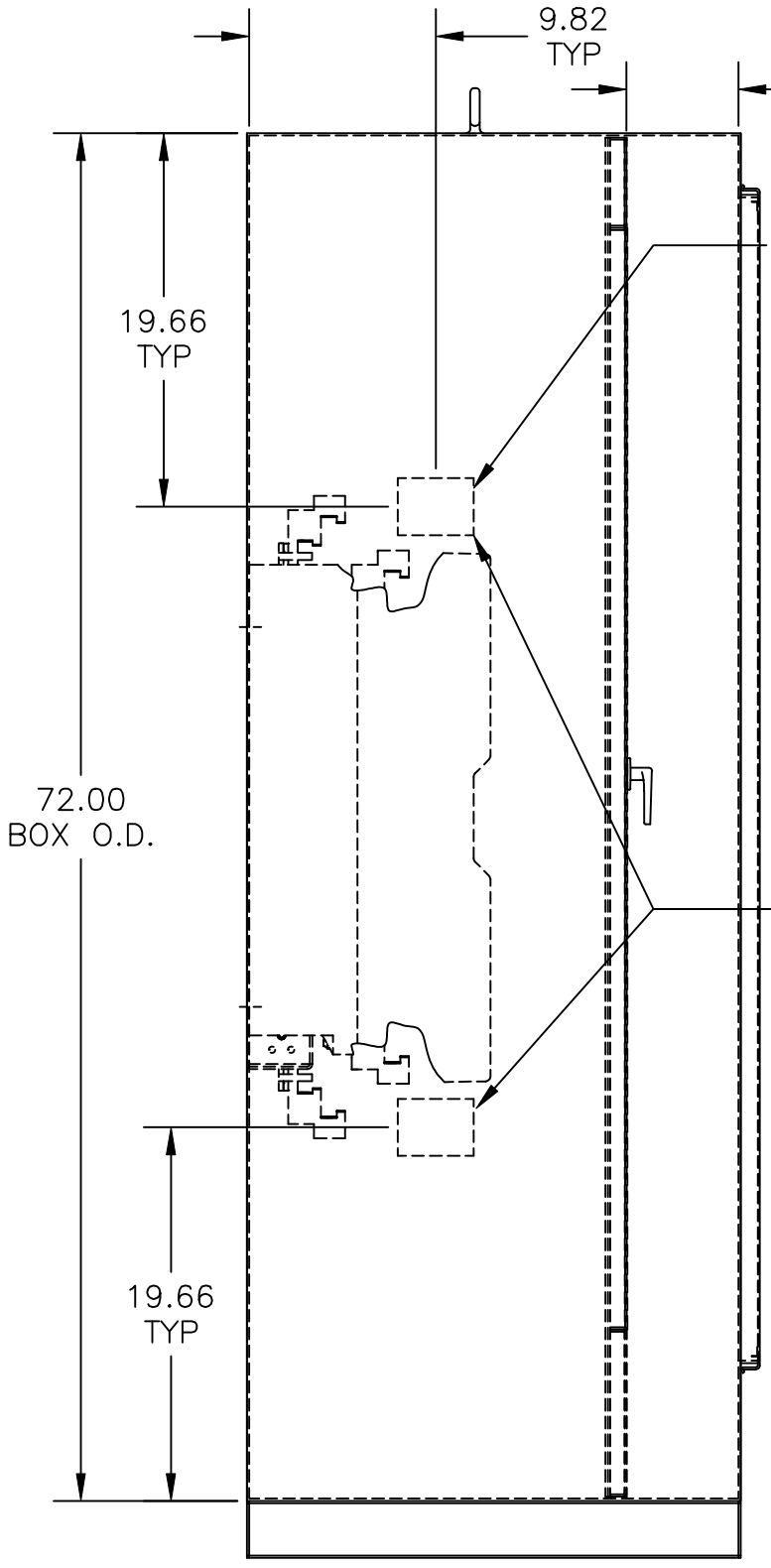
#1	ATS	AMPS: 0800	QTY: 1

Product	:	Series 300	Catalog Number	:	H03ATSA30800NGXM
Service Voltage / Hz	:	480V/60Hz	Optional Accessories	:	11BE,18RX,44G 125A Activate 31Z
Bypass Isolation	:	Not Applicable	Product Description	:	300 Series, Automatic Open Transition Transfer Switch
No. of Switched Poles: 3	:	3	Neutral Configuration	:	Solid [A]
Withstand Rating: Frame = H, Switch Rating = 0800, Series = 300	:	See WCR Table Below	No. of Cables & Lug Size	:	4, 1/0 AWG to 600 MCM
Enclosure	:	3R(M)-UL Type 3R secure double door enclosure (See Disclaimer 3)	Service	:	Three Phase, 4-wire
Extended Warranty	:	Not Included	Markings	:	

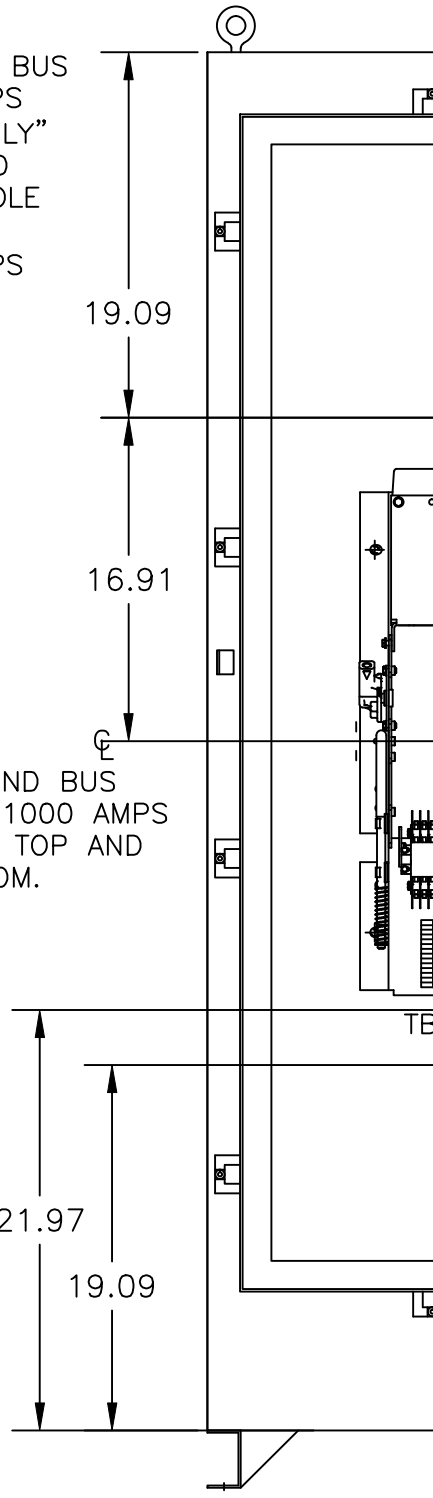
#	ACCESSORY DESCRIPTIONS	
	Accessory Code	Description
1	11BE	Adds the following features to the Group G controller: (1) Serial RS-485 Modbus Communications (2) Multi-Schedule Engine Exerciser (3) a 300 Entry Event Log and (4) a common alarm output function. When applied on 3-phase systems it also enables: (1) 3-Phase Emergency Source VLL sensing (2) Phase Rotation Monitoring (3) Emergency Source VLL Unbalance Monitoring.
2	18RX	REX (Relay Expansion Module) with Normal and Emergency available output contacts (18B & 18G)
3	31Z	Load disconnect contacts, with TD which operate before/after transfer
4	44G	Strip heater w/ thermostat, wired to load terminals: 208-600 volts
5	125A	Seismic

8 | 7

SEISMIC OUTLINE FOR ASCO® 300 SERIES



LEFT SIDE



WITHOUT

THREE PHASE WIRIN

THIS WIRING APPLIES TO 300 SERIES TRANSFER SWITCHES THAT UTILIZE THE "H" FRAME POWER TRANSFER SWITCH RATED 800–1200 AMPERES.

THE GROUP G CONTROLLER PROVIDES EITHER AUTOMATIC (D3ATS) OR NON–AUTOMATIC [MANUAL (H3NTS) OPERATION BASED ON ITS FACTORY SETTING ACCORDING TO THE CUSTOMER ORDER REQUIREMENTS.

THE TYPE OF TRANSFER SWITCH PROVIDED CAN BE DETERMINED FROM THE PRODUCT IDENTIFICA MARKINGS LOCATED ON BOTH THE POWER TRANSFER SWITCH AND THE COVER OF THE GROUP CONTROLLER.

ALL OPERATIONAL SETTINGS AND SEQUENCES OF THE GROUP G CONTROLLER AND ITS RELATED OPTIONAL ACCESSORIES (1UP, 18RX, 23G) ARE PROVIDED IN THE USER'S GUIDE, ASCO GROUP G CONTROLLER FOR AUTOMATIC & NON–AUTOMATIC TRANSFER SWITCHES, PART NUMBER 381333–400.

INFORMATION FOR INSTALLATION AND TESTING OF THE TRANSFER SWITCH IS PROVIDED IN THE INSTALLATION MANUAL, ASCO 3ATS & 3NTS, H–DESIGN 800–1200 A TRANSFER SWITCHES, PART NUMBER 381333–405.

ENGINE CONTROL CONTACTS

FEATURE 7 & FEATURE 8:
ONE SET OF FORM C CONTACTS "NR" (FEAT. 7 N/C, FEAT. 8 N/O) THAT CHANGE POSITION ON EXPIRATION OF THE FEATURE 1C, OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES TIME DELAY RESET ON EXPIRATION OF THE FEATURE 2E ENGINE COOLDOWN TIME DELAY.
AN AUXILIARY CONTACT THAT IS CLOSED WHEN THE TRANSFER SWITCH IS CONNECTED TO THE EMERGENCY SOURCE, IS CONNECTED ACROSS THE N/C CONTACT (FEATURE 7).

AN ADDITIONAL SET OF ENGINE STARTING CONTACTS ARE AVAILABLE ON THE GROUP G CONTROL WHEN THE FEATURE SETTING OF THE CONTROLLER OUTPUT CONTACTS "OP1" IS SET TO OPERAT "NR2".

ADDITIONAL, OPTIONAL ENGINE STARTING CONTACTS "NR2" ARE AVAILABLE WHEN OPTIONAL ACCE 18RX (RELAY EXPANSION MODULE) IS INCLUDED IN THE TRANSFER SWITCH ASSEMBLY. OUTPUT CONTACTS "OP2" AND/OR "OP3" PROVIDE THE ENGINE STARTING FUNCTION WHEN THE FEATURE SETTING OF EACH IS SET TO OPERATE AS "NR2".

CONTACTS ARE RATED 5 AMPS RESISTIVE AT 30 VDC MAXIMUM, 100 mA AT 5 VDC MINIMUM.

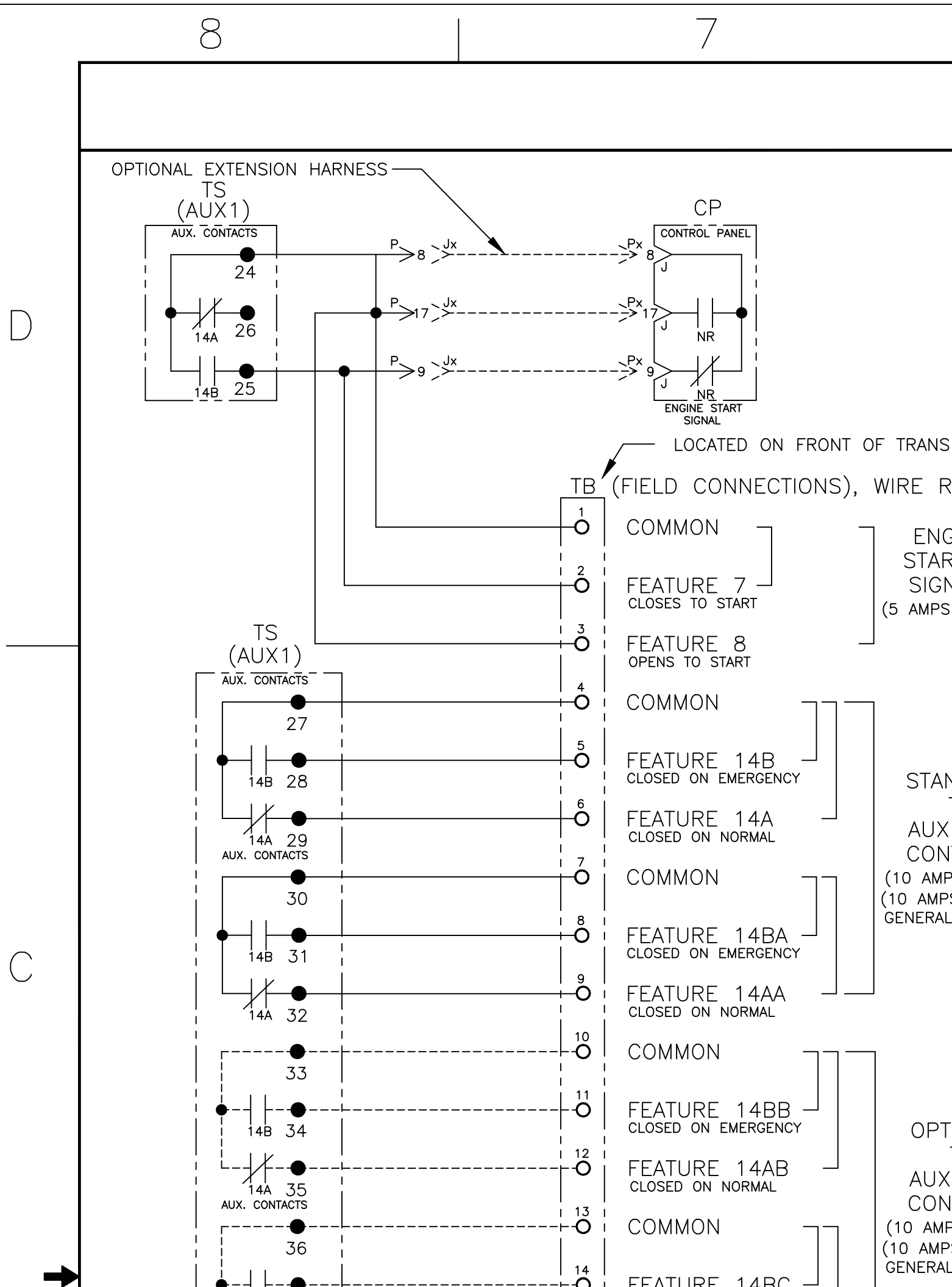
REFER TO USER'S GUIDE, ASCO GROUP G CONTROLLER FOR AUTOMATIC & NON–AUTOMATIC TRANSFER SWITCHES, PART NUMBER 381333–400 FOR SETTING INFORMATION.

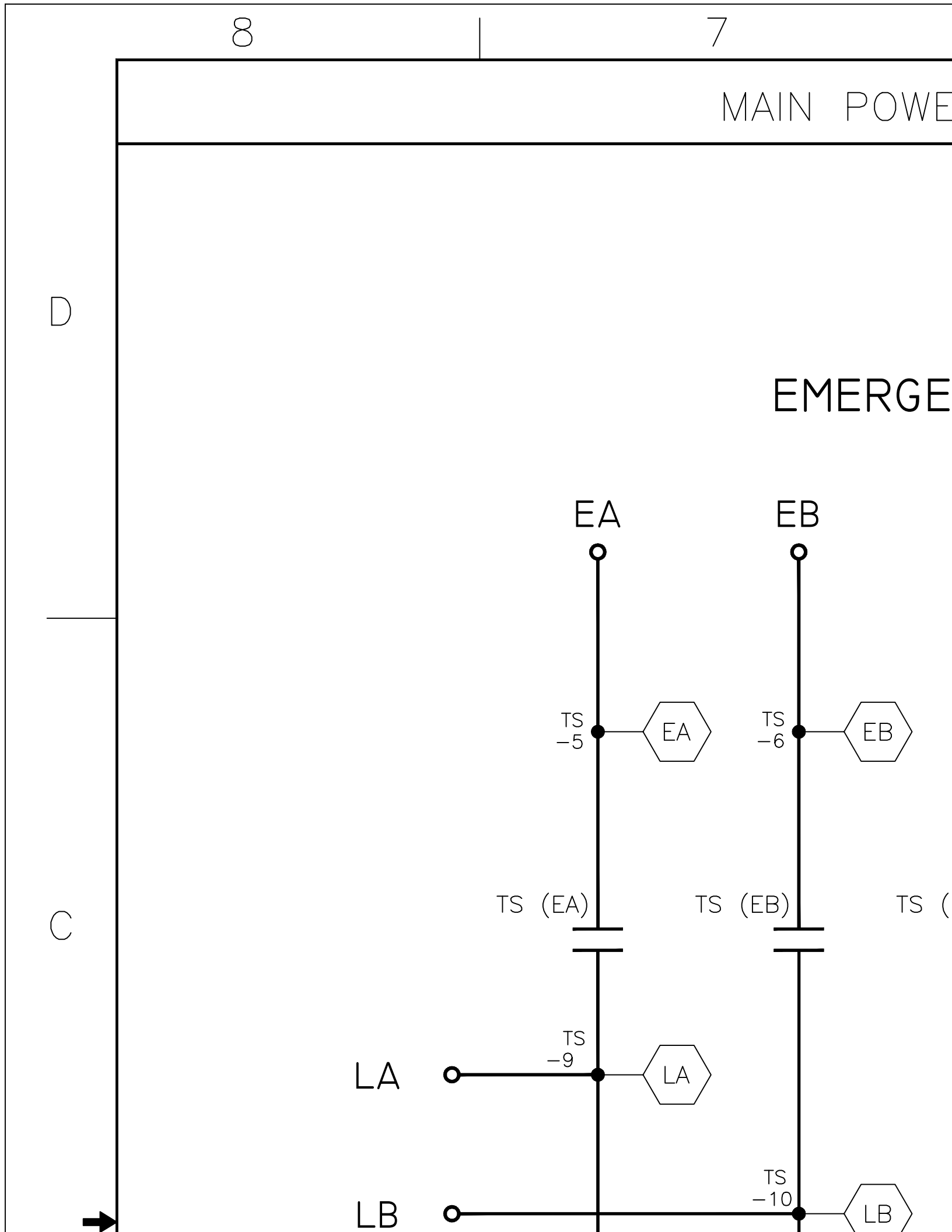
LOAD DISCONNECT FEATURE

FEATURE 31: INCLUDES SUB–FEATURES 31F, 31G, 31M, 31N
A SET OF FORM C CONTACTS ARE PROVIDED ON THE GROUP G CONTROLLER AS "OP1". WHEN FEATURE SETTING OF "OP1" IS SET TO OPERATE THE CONTACTS AS "FEATURE 31", THE TIME D SETTINGS OF THE SUB–FEATURES ARE AVAILABLE.

"OP1" CAN BE SET TO OPERATE TO PROVIDE THE FOLLOWING FUNCTIONS USING THE TIME DELA SETTINGS ASSOCIATED WITH EACH SUB–FEATURE;

31F NORMAL TO EMERGENCY PRE–TRANSFER SIGNAL


8
7
D
C
OPTIONAL EXTENSION HARNESS
TS
(AUX1)
AUX. CONTACTS
24
14A
26
14B
25
P
8
Jx
17
9
Px
CP
CONTROL PANEL
J
NR
ENGINE START
SIGNAL
LOCATED ON FRONT OF TRANS
TB (FIELD CONNECTIONS), WIRE R
1
COMMON
2
FEATURE 7
CLOSES TO START
3
FEATURE 8
OPENS TO START
ENG
STAR
SIGN
(5 AMPS
TS
(AUX1)
AUX. CONTACTS
27
14B
28
14A
29
AUX. CONTACTS
4
COMMON
5
FEATURE 14B
CLOSED ON EMERGENCY
6
FEATURE 14A
CLOSED ON NORMAL
STAN
AUX
CON
(10 AMP
(10 AMPS
GENERAL
30
31
32
7
COMMON
8
FEATURE 14BA
CLOSED ON EMERGENCY
9
FEATURE 14AA
CLOSED ON NORMAL
33
34
35
AUX. CONTACTS
10
COMMON
11
FEATURE 14BB
CLOSED ON EMERGENCY
12
FEATURE 14AB
CLOSED ON NORMAL
OPT
AUX
CON
(10 AMP
(10 AMPS
GENERAL
36
13
COMMON
14
FEATURE 14BC


8
7
MAIN POWE
D
EMERGE
EA
EB
TS
−5
EA
TS
−6
EB
TS (EA)
TS (EB)
TS (
C
TS
−9
LA
LA
TS
−10
LB
LB

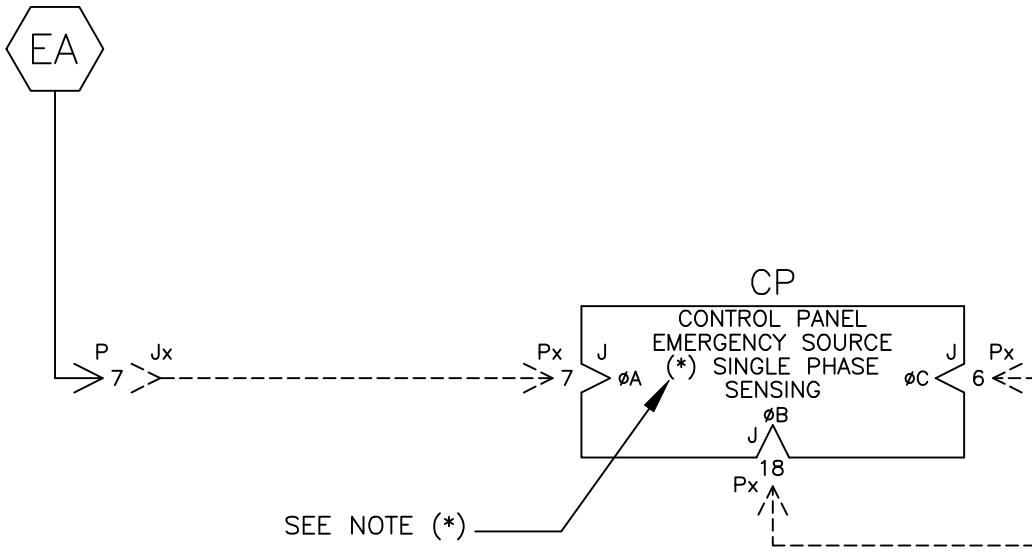
8 | 7

D

C

EMERGENCY SO

EMERGI

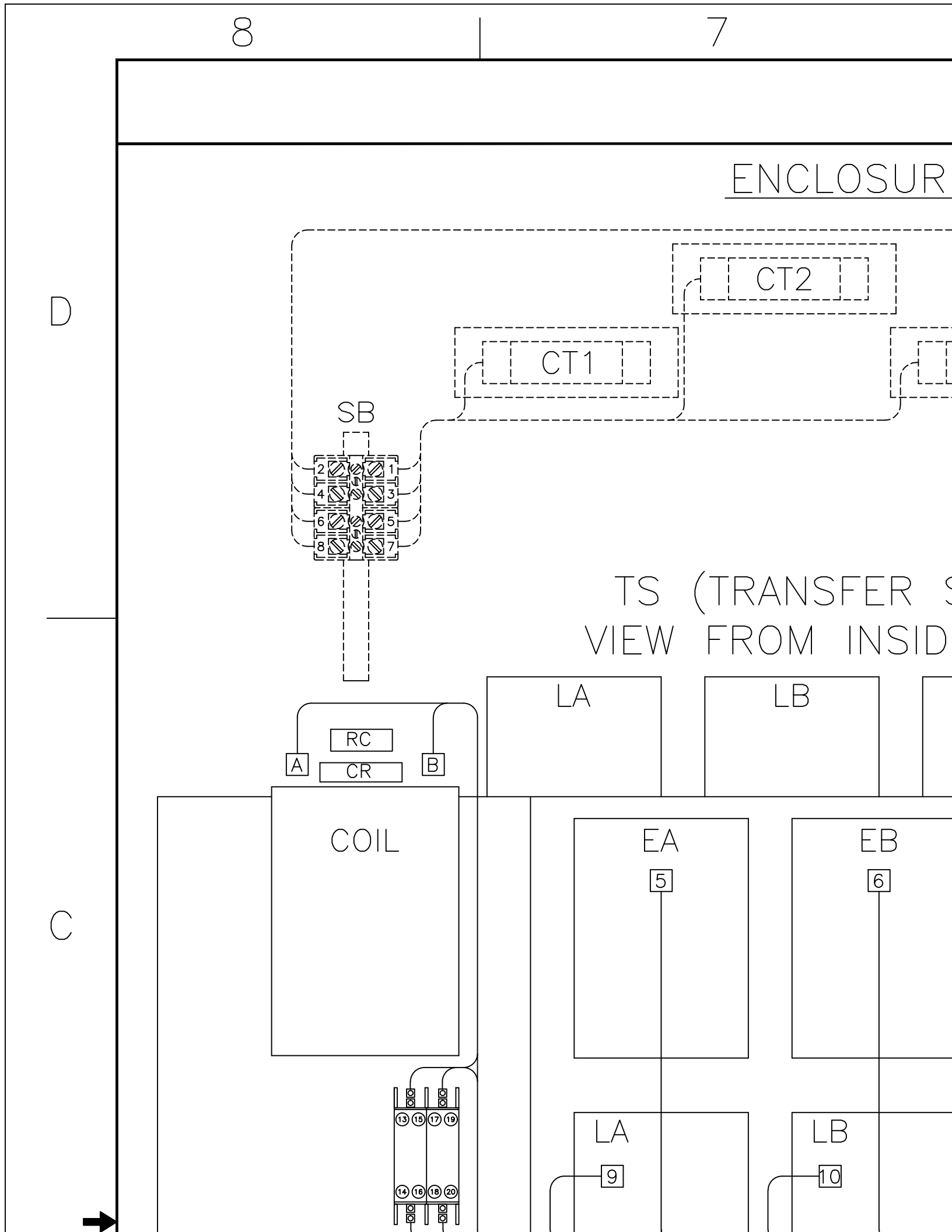


LOAD TERMIN

LOA

NORMAL SOU

NORM


8
7
D
C
ENCLOSUR
CT2
CT1
SB
2
1
4
3
6
5
8
7
TS (TRANSFER S
VIEW FROM INSID
LA
LB
RC
A
CR
B
COIL
EA
5
EB
6
13
15
17
19
14
16
18
20
LA
9
LB
10

8 | 7

D

C

◇1 ← HARNESS LOCATOR | BOX CHECKED IF HARNESS IS MODIFIED ☒

WIRE No.	HARNESS 713082 (P) MAIN TS	CLR	AWG
1	P−1,TS−18		16
2	P−2,TS−A		
3	P−3,TS−14		
4	P−4,TS−3		
4	TS−3,TS−15		
5	P−5,TS−B		
6	P−6,TS−7		
6	TS−7,TS−19		
7	P−7,TS−5		
7	TS−5,TS−17		
8	P−8,TS−24		
8	TS−24,TB−1		
9	P−9,TS−25		
9	TS−25,TB−2		
10	P−10,TS−21		
11	P−11,TS−2		
12	P−12,TS−1		
12	TS−1,TS−13		
13	P−13,TS−22		
14	P−14,TS−23		
15	P−15,TS−16		
16	P−16,TS−20		
17	P−17,TB−3		
18	P−18,TS−6		
19	P−19,TS−9		
20	P−20,TS−10		
21	P−21,TS−11		
22	P−22,TS−4		
23	P−23,TS−8		
24	P−24,TS−12		
25	TS−27,TB−4		
26	TS−28,TB−5		
27	TS−29,TB−6		
	ADD WIRES		
31	TS−30,TB−7		
32	TS−31,TB−8		
33	TS−32,TB−9		

◇2 ← HARNESS LOCATOR

WIRE No.	HARNESS 309320−00 (Px,Jx OPTIONAL 8" EXTENSION
1	Px−1,Jx−1
2	Px−2,Jx−2
3	Px−3,Jx−3
4	Px−4,Jx−4
5	Px−5,Jx−5
6	Px−6,Jx−6
7	Px−7,Jx−7
8	Px−8,Jx−8
9	Px−9,Jx−9
10	Px−10,Jx−10
11	Px−11,Jx−11
12	Px−12,Jx−12
13	Px−13,Jx−13
14	Px−14,Jx−14
15	Px−15,Jx−15
16	Px−16,Jx−16
17	Px−17,Jx−17
18	Px−18,Jx−18
19	Px−19,Jx−19
20	Px−20,Jx−20
21	Px−21,Jx−21
22	Px−22,Jx−22
23	Px−23,Jx−23
24	Px−24,Jx−24
	REMOVE WIRES
	ADD WIRES

EQUIPMENT STORAGE REQUIREMENTS

Equipment provided by Schneider-Electric and/or ASCO Power Technologies that is stored for a short-term duration (i.e., days to weeks) or long-term duration (i.e., months to years), must be kept in a cool, dry, temperature-controlled environment. Storage of equipment in open warehouses, locations without proper temperature and humidity control, and/or outdoor storage is not acceptable without the utilization of heating elements, thermostats, humidistats, and protection from weather and dirt. Failure to comply may result in moisture ingress and/or condensation to form resulting in rusting and or corrosion, component and/or equipment failure and replacement, and/or nullification of any manufacturer warranty.

For **General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less**, refer to ANSI NEMA PB 2.1-2013

Copies of the following documents should be included on the submittals, depending on the units that are on the proposal:

For ASCO Power Technology's **Switchgear and Switchboards**, refer to Instruction Bulletin **381333-393**.
For Schneider-Electric/Square D's **Power Zone 4 (PZ4) Switchgear**, refer to Instruction Bulletin **80298-002-09**.
For Schneider-Electric/Square D's **Power Zone 4 (PZ4) NEMA 3R Walk-In Switchgear**, refer to Instruction Bulletin **80298-156-02**.
For Schneider-Electric/Square D's **Quality, Efficient, Delivery" (QED2) Switchboard**, refer to Instruction Bulletin **80043-055-14**.
For Schneider-Electric/Square D's **Masterclad Metal-Clad Indoor Switchgear**, refer to Instruction Bulletin **6055-30.**

Limited Warranty

Series 150, 200, 300 and 4000 Power Transfer Switches

This Warranty is given ONLY to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General

ASCO Power Technologies, LP products and systems are in our opinion the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances we offer with our products the following Limited Guardian Warranty Against Defects in Material and Workmanship.

Please read your Guardian Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

Limited Warranty Against Defects in Material and Workmanship:

Product Description	Series	Catalog Code
Automatic Transfer Switch	150, 200	1ATS, 2ATS
	300	3ATS, 3ADTS
	4000	4ATS, 4ADTS, 4ACTS
Non-Automatic Transfer Switch (Electrically Operated)	300	3NTS, 3NDTS
ASCO Lighting Control Panels	4000	4NTS, 4NDTS, 4NCTS
Manual Transfer Switch	300	3MTS, 3MTQ, 3MUQ, 3MPQ, 3MGQ, 3MGDQ, 3MTDQ
Service Entrance Transfer Switch (SEATS)	300	3AUS, 3ADUS, 3APS, 3ARS, 3MUS
Power Transfer Load Center (PTLC)	300	300L
Quick Connect Panels	300	3QCN, 3QCU, 3QCD
Electrically Operated Bypass Switch	4000	4ATE, 4NTE, 4ADTE, 4NDTE

Limited Warranty

ASCO warrants that the ATS will be free from defects in material and workmanship and will conform to ASCO's standard specifications for the ATS for a period of twenty four (24) months from date of product shipment from ASCO (the "Warranty Period"). This Limited Warranty does not extend to subsequent owners of the structure during the Warranty period.

Terms of Warranty

The foregoing Limited Warranty is conditioned upon user's compliance with the following:

1. The ASCO Power Transfer Switch is installed in accordance with ASCO specifications and state and local codes and standards by an electrician licensed in the state of installation.

2. The ASCO Power Transfer Switch is maintained in accordance with ASCO instructions and used under normal conditions for the purposes intended by ASCO.

All warranty field-related repairs, replacements or adjustments must be made by ASCO Services Inc. or its duly authorized representative.

Optional Available Extended Warranty

Optional extended warranty coverage may be purchased from ASCO for a specified fee at the time of the original sale. If purchased, Warranty period shall be extended up to an additional thirty - six (36) months beyond the standard twenty - four (24) months to provide up to five (5) year coverage applicable to the above referenced products, except for 3AUS, 3APS, and 3ARS products where the warranty period for the circuit breaker shall be limited to 24 months from date of shipment from ASCO. The length of optional extended coverage shall be reflected on the ASCO invoice and/or order acknowledgement document.

ASCO Power Technologies™

Warranty Extends To First Purchaser for Use, Non-Transferable

This Warranty is extended to the first person, firm, association, or corporation for whom the ASCO product specified herein is originally installed for use (the "user") in the fifty United States or Canada. This Warranty is not transferable or assignable without the prior written permission of ASCO.

Assignment of Warranties

ASCO assigns to user any warranties which are made by manufacturers and suppliers of components of, or accessories to, the ASCO product and which are assignable, but ASCO makes no representations as to the effectiveness or extent of such warranties, assumes no responsibility for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such components or accessories.

Drawings, Descriptions

ASCO warrants for the period and on the terms of the Warranty set forth herein that the ASCO product will conform to the descriptions contained in the certified drawings, if any, applicable thereto, to ASCO's final invoices, and to applicable ASCO product brochures and manuals current as of the date of product shipment ("descriptions"). ASCO does not control the use of any ASCO product. Accordingly, it is understood that the descriptions are not Warranties of performance and not Warranties of fitness for a particular purpose.

Warranty Claims Procedure

Within a reasonable time, but in no case to exceed thirty (30) days, after user's discovery of a defect, user shall contact ascopowerwarranty@ascopower.com. Subject to the limitations specified herein, an ASCO Services field service representative will repair the non-conforming ASCO product warranted hereunder, without charge for parts, labor, or travel expenses. Warranty coverage will apply only after ASCO's inspection discloses the claimed defect and shows no signs of treatment or use that would void the coverage of this Warranty . All defective products and component parts replaced under this Warranty become the property of ASCO.

Warranty Performance of Component Manufacturers

It is ASCO's practice, consistent with its desire to remedy Warranty defects in the most prompt and effective manner possible, to cooperate with and utilize the services of component manufacturers and their authorized representatives in the performance of work to correct defects in the product components. Accordingly, ASCO may utilize third parties in the performance of Warranty work, including repair or replacement hereunder, where, in ASCO's opinion, such work can be performed in less time, with less expense, or in closer proximity to the ASCO product.

Items Not Covered By Warranty

This Warranty does not cover damage or defect caused by misuse, improper application, wrong or inadequate electrical current or connection, negligence, inappropriate on site operating conditions, repair by non-ASCO designated personnel, accident in transit, tampering, alterations, a change in location or operating use, exposure to the elements, water, or other corrosive liquids or gases, acts of God, theft or installation contrary to ASCO's recommendations or specifications, or in any event if the ASCO serial number has been altered, defaced, or removed.

This Warranty does not cover shipping costs, installation costs, external circuit breaker resetting or maintenance or service items and further, except as may be provided herein, does not include labor costs or transportation charges arising from the replacement of the ASCO product or any part thereof or charges to remove or reinstall same at any premises of user.

Repair or replacement of a defective product or part thereof does not extend the original Warranty period.

The products listed in this Warranty are not for use in the control area or any reactor connected or safety applications or within the containment area of a nuclear facility or for integration into medical devices.

Limitations

This Warranty is in lieu of and excludes all other Warranties, express or implied, including merchantability and fitness for a particular purpose.

User's sole and exclusive remedy is repair or replacement of the ASCO product as set forth herein.

If user's remedy is deemed to fail of its essential purpose by a court of competent jurisdiction, ASCO's responsibility for property loss or damage shall not exceed the net product purchase price.

In no event shall ASCO assume any liability for indirect, special, incidental, consequential or exemplary damages of any kind whatsoever, including without limitation lost profits, business interruption or loss of data, whether any claim is based upon theories of contract, negligence, strict liability, tort, or otherwise.

Miscellaneous

No salesperson, employee, or agent of ASCO is authorized to add to or vary the terms of this Warranty. Warranty terms may be modified, if at all, only in writing signed by an ASCO officer.

ASCO obligations under this Warranty are conditioned upon ASCO timely receipt of full payment of the product purchase price and any other amounts due. ASCO reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to user or others.

In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the Warranty period, the remaining terms and provisions shall continue in full force and effect.

This Warranty shall be governed by, and construed under, the laws of the State of New Jersey, without reference to the conflict of laws principles thereof.

This Warranty represents the entire agreement between ASCO and user with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings, or agreements relating to this subject.

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Flexible Power Transfer Solutions for Commercial & Industrial Applications

ASCO Power Technologies™

ASCO SERIES 300
Power Transfer Switches

ascopower.com

Life Is On Schneider Electric

ASCO SERIES 300 Automatic Transfer Switches

Power outages impact small and large facilities alike. ASCO SERIES 300 Automatic Transfer Switches offer rugged design and reliable performance to small and mid-size commercial and industrial facilities in packaged solutions that are easy to select, procure, install, and operate.

Product Details

Transfer Switch Overview

Every SERIES 300 generator transfer switch is engineered with ASCO's reliability expertise in a package that makes backup power accessible for small and mid-size facilities. Leveraging knowledge derived from a century of critical power transfer experience, each SERIES 300 is backed by the same ASCO technical support and service that solves the most demanding critical power challenges facing facilities today.

ASCO's SERIES 300 lineup offers flexible backup power solutions for businesses of every size.

SERIES 300 Automatic Switching Solutions

Automatic and Non-Automatic Transfer Switching

ASCO Transfer Switches are available in both automatic and non-automatic types. Both are electrically operated. For automatic transfer switches, the controller initiates transfer between power sources . For non-automatic transfer switches, a user initiates transfer using local or remote controls.

SERIES 300 non-automatic transfer switches offer the following features:

- Models range from 30 through 3000 amperes, up to 600V
- Controller prevents inadvertent operation under low voltage conditions
- Source acceptability lights inform operator when sources are available to accept load
- Standard in-phase monitor for transferring motor loads betweem live sources

Power Knowledge

Non-Automatic and Manual Transfer Switches for Backup Power Applications

400 Amp, Type 1 Enclosure

Transfer Switch Communications and Metering

Options to Customize Functionality and Increase Value

Product Details

5300 SERIES Annunciators

Remote Annunciation

Monitor Power Equipment Status from Anywhere

Monitoring and control transfer switches from across the room, building, or from Internet.

5310 – LED annunciator – Single ATS

5350 – LED annunciator – up to 8 ATSs

Product Details

5140 Connectivity Module

Communication

Turn Transfer Switches into Power Information Portals

5140 Connectivity Module – Makes status and power information from a single switch available to via ModBUS, SNMP, and web pages.

SERIES 300 Optional Accessories

Communications	
11BE	Feature Bundle. Programmable engine exerciser with seven independenct routines run the generator with or without loads, on a daily, weekly, bi-weekly, or monthly basis. Controlled from the user interface keypad. • Event log display shows the event number, time and date, type and reason (if applicable). • Stores up to 300 events • RS485 Communication Port enabled common alarm output contact • On three-phase systems, Accessory 11BE enables line-to-line voltage imbalance sensing and three-phase sensing capabilities for the Emergency power source as well as the Phase Rotation checking for both power sources.
18RX	Relay Expansion Module provides accessory relays and includes one Form C contact for normal source availability (18G), and one Form C contact for emergency source availability (18B) (contact rating 5 amperes @ 30 VDC or @ 125 VAC resistive) (100 ma, 4 VDC min) Additional output relay is provided the default is to indicate a common alarm.
72EE	Connectivity module provides remote monitoring and control capabilities and includes accessory 11BE feature bundle
Environment and Power	
44A	Strip heater with thermostat for cold environment to prevent internal condensation and icing. External 120-volt AC power source required.
44G	Strip heater with thermostat, wired to load terminals on 208-240, 360-380, 460-480, 550-600 volt models. Contains wiring harnesses for all transfer switch sizes.
1UP	UPS back up power runs controller and LCD display for 30 seconds without AC power
Extension Harness	
37B	Six-foot extension harness for open type units to accommodate customer mounting of controls and switch
37C	Nine-foot extension harness for open type units to accommodate customer mounting of controls and switch
Indicators	
62W	Audible alarm with silencing feature to signal transfers to emergency. (For D-frame models, may require oversize enclosure depending on accessory combination).
Customer Control Circuits	
30A	Load-shed circuit initiated by opening of a customer-supplied contact (Open Transition model only)
30B	Load-shed circuit initiated by removal of customer-supplied control voltage (Open Transition model only)
30AA	Load-shed circuit initiated by opening of a customer-supplied contact (Delayed Transition model only)
30BA	Load-shed circuit initiated by removal of customer-supplied control voltage (Delayed Transition model only)
Surge Protection	
73	Surge suppressor rated 65 kA
Metering	
23GA, 23GB	Load Current Metering card measures either single or three-phase load current. Not available with Power Meter option 135L. Use 23GA for Single-Phase, 23GB for Three-Phase.
135L	Power Meter on load side (includes shorting block and current transformers). Not available with Load Current Metering options 23GA or 23GB.

Field Conversion Kits

Kit No.	Description
935147	Advanced Function Bundle Retrofit Kit (11BE) - See above accessory 11BE description for details.
935148	REX Module with Source Availability Contacts (Acc. 18RX)
935149	UPS to allow controller to run for 30 seconds minimum without AC Power (Acc. 1UP)
935150	1/3 Phase load current sensing card only (Acc. 23GA/GB)
K613127-001	Strip Heater (125 watt) 120 volt (Acc. 44A)
K613127-002	Strip Heater (125 watt) 208-480 volt (Acc. 44G)
948551	Quad-Ethernet Module (Acc. 72EE)
K609027	Cable Pull Box (1600-2000 amperes)

SERIES 300 Manual Transfer Switching and Quick Connection Solutions

ASCO SERIES 300 Manual Transfer Switching and Quick Connection Solutions offer reliable service and application flexibility for a wide range of facilities.

Manual Transfer Switches

- Three-position, easy-to-use center-off switch
- Compact design - easy to install and maintain
- Designed to handle demands of motors and inrush currents

Power Knowledge

Differences Between Manual, Non-Automatic, & Automatic Transfer Switches

Product Details

SERIES 300 Manual Transfer Switch

Manual Transfer Switches with Quick Connects

- The ASCO SERIES 300 Manual Transfer Switch with Integrated Quick Connects provides a total temporary power connection and transfer solution
- Enables connection and control of a temporary or portable generator
- Provides a complete UL 1008-listed solution in a single unit

Product Details

SERIES 300 Manual Transfer Switch with Quick Connects

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Appendix C

CMWD Electrical Wiring Standards

Casitas Municipal Water District Electrical Wiring Color Standard

Standard Single Phase 120, 208 or 240 Volts

- *L1 – Black wire*
- *L2 – Red wire*
- *Neutral – White wire*
- *Ground – Green, or bare wire depending on the application*

Standard Three Phase 208 or 240 Volts

- *L1 – Black wire*
- *L2 – Red wire*
- *L3 – Blue wire*
- *Neutral – White wire*
- *Ground – Green, or bare wire depending on the application*

Standard Three Phase Industrial Equipment: 480 Volts or Higher Voltages

- *L1 – Brown wire*
- *L2 – Orange wire*
- *L3 – Yellow wire*
- *Neutral – Gray wire*
- *Ground – Green, or bare wire depending on the application*

24VDC Power (Analog)

- *Positive – Red wire*
- *Negative – Black wire*
- *Ground – Green*

24VDC Power PLC Power/Instrumentation)

- *Positive – Blue wire*
- *Negative – White with Blue tracer wire*
- *Ground – Green*

Preferred Standard Practice

1.) Provide fusing disconnecting means for all loop powered devices and all analog devices.

2.) Rung numbers to be added and used to provide wire numbers/TB-numbers

3.) Analog cables will have cable labels.

4.) 24VDC Digital Inputs and Outputs

5.) 24VDC Analog Inputs and Outputs

6.) Any 120VAC Digital Inputs or Outputs (Black or Red)

7.) Use Yellow to represent foreign panel voltage.