



This is not an order.

INVITATION TO BID NUMBER (ITB)	<i>Return this bid to the issuing office below</i>
17042 Generator Sets	Attention – Rich Wooten, Contracting Officer Alaska Energy Authority (AEA) or (Authority) 813 West Northern Lights Blvd. Anchorage, AK 99503-2495 rwooten@aidea.org , Ph. 907-771-3019 Fax 907-771-3044

This procurement is issued according to 3AAC 109 Procurement for Alaska Energy Authority (AEA) managed grants on behalf of the Native Village of Kake.

Table of Contents

Cover Sheet	1-page
Instructions to Bidders	4-pages
Appendix A. Terms and Conditions	4-pages
Appendix B. Specifications and Drawings	20-pages
Appendix C. Bid Schedule	2-pages
Appendix D. Debarment Certification	1-Page

Invitation to Bid Schedule

Bid Issued	October 28, 2016
Pre-bid Conference	None
Bid Opening	Note the Bid opening date has been shortened due to AEA’s installation schedule. ITB shall be publically opened at, 2:00 p.m. November 18, 2016 , in the Willow Conference Room.

Important

Interested firms shall register online to receive addenda and other information at <http://www.aideaaeprocmement.org/>. Addenda and other notices will be posted and available at <http://www.aidea.org/> “Quick Links” Procurement Opportunities.

AEA may provide periodic e-mail notices regarding addenda or clarifications regarding this bid to those companies who reply.

Important - Bid Submittals

- Appendix C – Bid Schedule
- Appendix D – Debarment Certification
- The successful Bidder will be required to provide proof of insurance, naming AEA and the Native Village of Kipnuk as additional insured, including a waiver of subrogation.

Instructions to Bidders

1. Invitation to Bid (ITB) Review

Bidders shall carefully review this ITB for defects and questionable or objectionable material. Bidders' comments concerning defects and questionable or objectionable material in the ITB must be made in writing and received by the purchasing authority at least five (5) days before the bid opening date. This will allow time for an addendum if one is required. It will also help prevent the opening of a defective bid that will be rejected, and risk exposure of Bidders' prices. All correspondence will be addressed to the purchasing authority listed on the front of this ITB.

2. Bid Forms/Submittals

Bidders shall use and return the forms supplied with this invitation in submitting their bid. A photocopied bid can be submitted. **Bidders must return a signed copy of the Bid Schedule, and any/all required support documentation requested in this ITB.** The apparent low bidder may be required to provide additional documentation after bid opening and prior to award to assure compliance with all terms and conditions of the solicitation.

3. Minimum Qualifications

- a) Bidders shall meet the minimum qualifications listed in the attached specifications.
- b) A Bidder's inability to provide the requested documentation related to proof of their ability to meet the Bidder requirements may result in their bid being declared non-responsive.

4. Submitting Bids

Envelopes containing bids must be sealed, marked, and addressed as shown below. **DO NOT FAX OR EMAIL YOUR BID.** Envelopes with ITB numbers annotated on the outside will not be opened until the scheduled date and time. Hand carried bids should be delivered to the receptionist at the front desk or to the Procurement Manager for processing. Failure to correctly submit a bid may result in it being unopened or rejected and returned to the bidder.

Bidder's return Address

**Alaska Energy Authority
813 West Northern Lights Blvd
Anchorage, Alaska 99503
ATTN: Rich Wooten, Contracting Officer
ITB 17042 Generator Sets
Opening Date: 2:00 November 17, 2016**

5. Modification and Withdrawal of Bids

A bidder may, without prejudice, modify or withdraw its bid by written request provided that such request is received by the Authority prior to the bid opening date and time.

6. Late Bids

Late bids are bids received after the time and date set for receipt of the bids; and **late bids will not be accepted.**

7. Offer Period

Bids must remain valid for a period of 90-days unless otherwise specified in the Bid Schedule.

8. Firm, Unqualified and Unconditional Offer

Bidders must provide enough information with their offer to constitute a definite, firm, unqualified and unconditional offer. To be responsive an offer must constitute a definite, firm, unqualified and unconditional offer to meet all of the material terms of the ITB. Material terms are those which could affect price, quantity, quality, or delivery. Also included as material terms are those which are clearly identified in the ITB and which, for reasons of policy, must be complied with at risk of bid rejection for non-responsiveness.

9. Prices

The bidder shall state prices in the units of issue on this ITB. Prices quoted for commodities must be in U.S. funds and include applicable federal duty, brokerage fees, packaging, and transportation cost to the F.O.B. point so that upon transfer of title the commodity can be utilized without further cost. Prices quoted for services will be quoted in U.S. funds and include applicable federal duty, brokerage fee, packaging, and transportation cost so that the services can be provided without further cost. Prices quoted in bids must be exclusive of federal, state, and local taxes. If the bidder believes that certain taxes are payable by the Authority, the bidder may list such taxes separately, directly below the bid price for the affected item.

The Authority is exempt from Federal Excise Tax except the following:

- Coal - Internal Revenue Code of 1986 (IRC), Section 4121 - on the purchase of coal;
- "Gas Guzzler" - IRC, Section 4064 - on the purchase of low m.p.g. automobiles, except that police and other emergency type vehicles are not subject to the tax,
- Air Cargo - IRC, Section 4271 - on the purchase of property transportation services by air;
- Air Passenger - IRC, Section 4261 - on the purchase of passenger transportation services by air carriers.

10. Extension of Prices

In case of error in the extension of prices in the bid, the unit prices will govern; in a lot bid, the lot prices will govern.

11. Federal Excise Tax

Federal Excise Tax should not be included in the bid price(s). The Alaska Energy Authority is exempt from Federal Excise Tax.

12. Suitable Materials, Etc.

Unless otherwise specified, all materials, supplies or equipment offered by a bidder must be new per the attached specifications.

13. Supporting Information

The Authority strongly desires that bidders submit all required technical, specification, and other supporting information with their bid, so that a detailed analysis and determination can be made, by the Procurement Manager, that the product offered meets the ITB specifications and that other requirements of the ITB have been met. However, provided a bid meets the requirements for a definite, firm, and unqualified or unconditional offer, the Authority reserves the right to request supplemental information from the bidder, after the bids have been opened, to ensure that the products offered completely meet the ITB requirements. The requirement for such supplemental information will be at the reasonable discretion of the Authority and may include the requirement that a bidder will provide a sample product(s) or certification of compatibility of accessories or component parts with the specifications so that the Authority can make a first-hand examination and determination.

A bidder's failure to provide this supplemental information or the product sample(s), within the time set by the Authority, will cause the Authority to consider the offer non-responsive and reject the bid.

14. Brand and Model Offered

Bidders must clearly indicate the brand names and model numbers they intend to provide where required on the bid schedule. The bidder's failure to identify the brand and model offered - if different than what may be required by the specifications - may cause the Authority to consider the offer non-responsive and reject the bid.

15. Annotated Literature

If product literature is requested bidders must annotate their product literature to identify for the Authority the location of the supporting information for each product specification set out in this ITB. A bidder's failure to comply with this clause, within the time set by the Authority, will cause the Authority to consider the offer non-responsive and reject the bid.

16. Subcontractor(S)

Within five (5) working days of notice, the apparent low bidder must submit a list of the subcontractors that will be used in the performance of the contract. The list must include the name of each subcontractor and the location of the place of business for each subcontractor.

17. Tax-Exempt Financing

No public offering or private placement of securities relating to the contracts issued as a result of this ITB may be made. If a bid contemplates the securitization of the Authority's payments, the Authority will reject the offer as non-responsive.

18. Notice of Intent to Award

After the responses to this ITB have been opened, a tabulation of the bids will be prepared. This tabulation, called a Notice of Intent, serves two purposes. It lists the name of each company or person that offered a bid and the price bid. It also serves as notice of the Authority's intent to award a contract(s) to the bidder(s) indicated. A copy of the Notice of Intent will be sent to each company or person who responded to the ITB. Bidders, identified as the apparent low responsive bidders, are instructed not to proceed until a Purchase Order, Contract Award, Lease, or other form of notice is given by the Procurement Manager. A company or person who proceeds prior to receiving a Purchase Order, Contract Award, Lease, or other form of notice from the Procurement Manager does so without a contract and at his or her own risk.

19. Filing a Protest

A bidder may protest the award of a contract or the proposed award of a contract for supplies, services, or professional services. The protest must be filed in writing and include the following information: (1) the name, address, and telephone number of the protester; (2) the signature of the protester or the protester's representative; (3) identification of the contracting agency and the solicitation or contract at issue; (4) a detailed statement of the legal and factual grounds of the protest, including copies of relevant documents; and (5) the form of relief requested. Protests will be treated in accordance with AEA Regulations 3 AAC 109.570. A Protest based on alleged improprieties or ambiguities in a solicitation must be filed at least 10 days before the bid date of the bid or proposal, unless a later bid protest due date is specifically allowed in the solicitation. A Protest based upon alleged improprieties in an award of a contract or a proposed award of a contract must be filed within 10 days after a notice.

20. Order Documents

Except as specifically allowed under this ITB, an ordering agency will not sign any vendor contract. The Authority is not bound by a vendor contract signed by a person who is not specifically authorized to sign for the Authority under this ITB. The Authority's Contract Award is the only order document that may be used to place orders against the contract(s) resulting from this ITB.

21. Consolidation of Awards

Due to high administrative costs associated with processing of purchase orders, a single low bid of \$50 or less may, at the discretion of the Authority be awarded to the next low bidder receiving other awards for consolidation purposes. This paragraph is not subject to the protest terms enumerated in "INSTRUCTIONS TO BIDDERS", "FILING A PROTEST" above.

22. Bid Preparation Costs

The Authority is not liable for any costs incurred by the bidder in bid preparation.

23. Bid Security

The bid bond and other security bonds are waived in their entirety for this invitation to bid.

24. Contact

The administration of this contract is the responsibility of Rich Wooten, Contracting Officer, at the Authority.

Appendix A - Terms and Conditions

1. **Compliance**

In the performance of a contract, the Vendor must comply with all applicable federal, state, and borough regulations, codes, and laws; and be liable for all required insurance, licenses, permits and bonds; and pay all applicable federal, state, and borough taxes.

2. **Suitable Materials, Etc.**

Unless otherwise specified, all materials, supplies or equipment offered by a bidder shall be new, unused, and of the latest edition, version, model or crop and of recent manufacture.

3. **No Assignment or Delegation**

The Vendor may not assign or delegate this contract, or any part of it, or have any right to any money to be paid under it, except with the written consent of the Contracting Officer. Conditioned assignments will be rejected.

4. **Force Majeure**

(Impossibility to perform) The Vendor is not liable for the consequences of any failure to perform, or default in performing, any of its obligations under this Agreement, if that failure or default is caused by any unforeseeable Force Majeure, beyond the control of, and without the fault or negligence of, the Vendor. For the purposes of this Agreement, Force Majeure will mean war (whether declared or not); revolution; invasion; insurrection; riot; civil commotion; sabotage; military or usurped power; lightning; explosion; fire; storm; drought; flood; earthquake; epidemic; quarantine; strikes; acts or restraints of governmental authorities affecting the project or directly or indirectly prohibiting or restricting the furnishing or use of materials or labor required; inability to secure materials, machinery, equipment or labor because of priority, allocation or other regulations of any governmental authorities.

5. **Contract Extension**

The Authority and the successful Vendor agree: (1) that any holding over of the contract excluding any exercised renewal options will be considered as a month-to-month extension, and all other terms and conditions shall remain in full force and effect; and (2) to provide written notice to the other party of the intent to cancel such month-to-month extension at least thirty (30) days before the desired date of cancellation.

6. **Default**

In case of default by the Vendor, for any reason whatsoever, the Authority may procure the goods or services from another source and hold the Vendor responsible for any resulting excess cost and may seek other remedies under law or equity.

7. **Disputes**

Any dispute arising out of this agreement shall be resolved under the laws of Alaska. Any appeal of an administrative order or any original action to enforce any provision of this agreement or to obtain any relief from or remedy in connection with this agreement may be brought only in the superior court for the State of Alaska.

8. **Severability**

If any provision of the contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions will not be affected; and, the rights and obligations of the parties will be construed and enforced as if the contract did not contain the particular provision held to be invalid.

9. Continuing Obligation of Vendor

Notwithstanding the expiration date of a contract resulting from this ITB, the Vendor is obligated to fulfill its responsibilities until warranty, guarantee, maintenance and parts availability requirements have completely expired.

10. Human Trafficking

By signature on their bid, the bidder certifies that the bidder is not established and headquartered or incorporated and headquartered in a country recognized as Tier 3 in the most recent United States Department of State's Trafficking in Persons Report. The most recent United States Department of State's Trafficking in Persons Report are located at the following website: <http://www.state.gov/g/tip/>; and failure to comply with this requirement will cause the state to reject the bid as non-responsive, or cancel the contract.

11. Payment for State Purchases

Payment for agreements under \$500,000 for the undisputed purchase of goods or services provided to a state agency will be made within 30 days of the receipt of a proper billing or the delivery of the goods or services to the location(s) specified in the agreement, whichever is later. A late payment is subject to 1.5% interest per month on the unpaid balance. Interest will not be paid if there is a dispute or if there is an agreement that establishes a lower interest rate or precludes the charging of interest.

12. Shipping Damage

The Authority will not accept or pay for damaged goods. The Vendor must file all claims against the carrier(s) for damages incurred to items in transit from the point of origin to the F.O.B. point. The Authority will provide the Vendor with written notice when damaged goods are received. The Authority will deduct the cost of the damaged goods from the invoice prior to payment. The Vendor must file all claims against the carrier(s) for reimbursement of the loss.

13. Indemnification

The Vendor shall indemnify, hold harmless, and defend the contracting agency from and against any claim of, or liability for error, omission or negligent act of the Vendor under this agreement. The Vendor shall not be required to indemnify the contracting agency for a claim of, or liability for, the independent negligence of the contracting agency. If there is a claim of, or liability for, the joint negligent error or omission of the Vendor and the independent negligence of the Contracting agency, the indemnification and hold harmless obligation shall be apportioned on a comparative fault basis. "Vendor" and "Contracting agency", as used within this and the following article, include the employees, agents and other Vendors who are directly responsible, respectively, to each. The term "independent negligence" is negligence other than in the Contracting agency's selection, administration, monitoring, or controlling of the Vendor and in approving or accepting the Vendor's work.

14. Insurance

Without limiting Vendor's indemnification, it is agreed that Vendor shall purchase at its own expense and maintain in force at all times during the performance of services under this agreement the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the Vendor's policy contains higher limits, the Authority shall be entitled to coverage to the extent of such higher limits. Certificates of Insurance must be furnished to the contracting officer prior to beginning work and must provide for a notice of cancellation, non-renewal, or material change of conditions in accordance with policy provisions. Failure to furnish satisfactory evidence of insurance or lapse of the policy is a material breach of this contract and shall be grounds for termination of the Vendor's services. All insurance policies shall comply with, and be issued by insurers licensed to transact the business of insurance under AS 21.

Proof of insurance is required for the following:

Workers' Compensation Insurance: The Vendor shall provide and maintain, for all employees engaged in work under this contract, coverage as required by AS 23.30.045, and; where applicable, any other statutory obligations including but not limited to Federal U.S.L. & H. and Jones Act requirements. The policy must waive subrogation against the Authority.

Commercial General Liability Insurance: covering all business premises and operations used by the Vendor in the performance of services under this agreement with minimum coverage limits of \$300,000 combined single limit per occurrence.

Commercial Automobile Liability Insurance: covering all vehicles used by the Vendor in the performance of services under this agreement with minimum coverage limits of \$300,000 combined single limit per occurrence.

Failure to supply satisfactory proof of insurance within the time required will cause the Authority to declare the bidder non-responsible and to reject the bid.

15. Insurance Certificate

Shall name the Authority and the grantee as certificate holders and reference the contract number.

16. Delivery Confirmation

Bidders must obtain confirmation from manufacturers that the items offered are scheduled for production in sufficient time to meet the scheduled delivery dates.

17. Billing Instructions

Invoices will be addressed Alaska Energy Authority (AEA) 813 West Northern Lights Boulevard, Anchorage, AK 99503-2495; or emailed to aeapayables@aidea.org. Vendor will reference the contract number on all invoices and correspondence. It is customary for AEA to make payment within 30-days of receipt of the merchandise or service, and the Vendor's invoice. Direct all billing questions to the Contracting Officer.

18. Alterations

The Contracting Office must approve in writing any Vendor alterations to the specifications prior to the changes. The Authority will not pay for alterations that are not pre-approved in advance and in writing by the Contracting Officer.

19. Liquidated Damages

Liquidated damages shall not apply to this procurement.

20. Packaging

The cost of all packaging must be included in the price bid. All packaging must be new and suitable for shipment and short-term warehouse storage.

21. Workmanship & Materials

All work shall be performed in a thorough and competent manner and in accordance with current industry practices. The Vendor is responsible for the quality of the finished item. The Authority will reject any item that does not meet the specifications and return them to the Vendor. Vendors shall accept all rejected items at the Vendor's risk and expense.

22. Contract Cancellation

The Authority reserves the right to cancel any contract awarded as a result of this solicitation if; 1) the Vendor fails to properly perform the duties set out herein, 2) due to budget/funding issues,

or 3) at its convenience upon 60 calendar days written notice to the Vendor. In the event of cancellation at its convenience, the Authority will pay for any disassembly and shipping charges necessary to remove the machine and return it to the nearest in State dealer.

23. Brand and Model Offered

Unless otherwise specified, when brand names and model numbers identify the type and quality of the goods desired, bidders must clearly indicate the brand names and model numbers they intend to provide. The bidder's failure to identify the brand and model offered will cause the Authority to consider the offer non-responsive and reject the bid.

24. Order Documents

Except as specifically allowed under this ITB, an ordering agency will not sign any vendor contract. The Authority is not bound by a vendor contract signed by a person who is not specifically authorized to sign for the Authority under this ITB. The Authority Contract Award is the only order document that may be used to place orders against the contract(s) resulting from this ITB.

25. Compliance with ADA

Services or activities furnished to the general-public on behalf of the Authority must be fully accessible. This is intended to ensure that agencies are in accordance with 28 CFR Part 35 Section 35.130 and that services, programs or activities furnished to the public through a contract do not subject qualified individuals with a disability to discrimination based on the disability.

The Authority complies with Title II of the Americans with Disabilities Act of 1990. Individuals with disabilities who may need auxiliary aids, services, and/or special modifications to participate in this procurement should contact Enterprise Technology Services at one of the following numbers to make any necessary arrangements.

Telephone: 907-465-5758

Fax: 907-465-3450

TDD: 907465-5745

KAKE POWER SYSTEM UPGRADE

Invitation to Bid for Purchase of Caterpillar 3456 Engine-Generator Sets (Genset)

ITB 17042

Specifications

Section 16201

Section 16202

Drawing M1

Prepared By:

Gray Stassel Engineering, Inc.

October 2016



PART 1 - GENERAL

1.1 SCOPE

- A. The Work included herein shall consist of furnishing diesel engines as specified herein, quantity as indicated in the Bid Schedule.
- B. The purpose of this solicitation is to procure used, low hour diesel engine(s). The diesel engine(s) will be used in a prime power, 1800 rpm, genset application. Engines shall be delivered complete, tested, and ready for installation.
- C. Furnish engines in compliance with Paragraph 1.2 A, Regulatory Compliance.

1.2 REGULATORY COMPLIANCE

- A. The Environmental Protection Agency (EPA) has issued regulations governing the use of diesel engines for controlling and maintaining emissions and performance standards. In order to comply with EPA emissions requirements and also be compatible with the intended service applications, the used diesel engines furnished under this solicitation must have a block manufacture date on or before April 1st, 2006.
- B. The following provisions of 40 CFR 60 New Source Performance Standards (NSPS) apply to this specification:
 - 1. Deadlines for installing prior model year engines do not apply to engines that have been removed from one existing location and reinstalled at another location - 40 CFR 60.4208(i).
 - 2. Converting a nonroad or other non-stationary engine to stationary use does not change the date of manufacture - 40 CFR 60.4219
 - 3. The capital cost of a used engine does not affect the date of manufacture or change the engine Tier requirement – as long as engine is not
 - 1) Modified - 40 CFR 60.4219, or
 - 2) Reconstructed - 40 CFR 63.2

1.3 QUALITY ASSURANCE

- A. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practices. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable.
- B. Equipment and components furnished under these specifications shall be in accordance with the requirements of applicable UL, NEC, IEEE, NEMA, and ANSI standards.

1.4 CONTRACTOR QUALIFICATIONS

The specified engines shall be provided by a qualified contractor who is regularly engaged in the business of furnishing heavy duty diesel engines for use in prime power applications.

- A. Bidders must have staff with extensive experience in furnishing and maintaining heavy duty diesel engines. A list of three prior projects that key staff have worked on may be requested by the Owner after the bid opening and prior to award in order to verify Bidder qualifications. The list must include date, description of work, and a reference contact for each project.
- B. Bidders must maintain a competent service organization that is available for warranty service calls. A description of the organization including resumes of key personnel may be requested by the Owner after the bid opening and prior to award in order to verify Bidder qualifications.

1.5 CONTRACTOR'S WARRANTIES

- A. A warranty is not required for these low-hour used engines.

1.6 SUBMITTALS

- A. The Contractor shall furnish reports in accordance with Paragraph 2.4, Engine Inspection And Reporting, for the following:
 - 1. Initial data prior to disassembly.
 - 2. Inspection results and corrective action plan.
 - 3. Reassembly report and documentation.
- B. The Contractor shall furnish final test reports in accordance with Paragraph 3.1, Factory Tests.
- C. The Contractor shall provide each submittal in accordance with Specification 16202.

1.7 OPERATION AND MAINTENANCE MANUALS.

- A. Provide one (1) complete bound set of operation and maintenance (O&M) manuals. Provide all available factory service publications including parts manuals, service manuals, component technical manuals, etc.
- B. The operation and maintenance manuals shall be in addition to any instructions or parts list packed with or attached to the equipment when delivered, or any information submitted for review.
- C. All information in the O&M manuals shall be original or reproductions of original publications with revisions to indicate "as-delivered" conditions.

1.8 FINAL PAYMENT

- A. Shipment of equipment will not be considered complete until all required manuals and data have been received as specified.
- B. Final payment will not be made until all equipment is received at the F.O.B. point in satisfactory condition and all O&M Manuals and other required data are received in the form and quantity specified.

PART 2 - PRODUCTS

2.1 CONFIGURATION AND MANUFACTURER DATE

- A. All engines furnished under this solicitation shall be model year 2006 or earlier and shall have a date of manufacture on or before April 1, 2006. The engine shall not have more than 1,000 hours total run time and shall not have been rebuilt.

2.2 ENGINE MANUFACTURER AND MODEL

- A. Engine - Caterpillar 3456, no substitutes.

2.3 ENGINE CONFIGURATION

- A. The furnished diesel engine shall include all items listed by the OEM as a complete operational engine except do not include charging alternator, fan and radiator, or electronic control panel. Factory installed components shall be removed in their entirety and appropriate blanks/covers installed, as required.
- B. Engines shall be configured 764 HP (691 Prime) at 1800 RPM, Low BSFC Strategy, as specified herein
- C. The engine shall be capable of satisfactory performance on No. 1 Arctic Grade Fuel or No. 2 Domestic Burner Oil
- D. All engines shall have 24 VDC starting and control systems.
- E. All engines shall be furnished with an appropriate SAE Flywheel and Flywheel Housing for connection to the generator furnished under Specification 16202.
- F. Engines with serial number from 9BZ1-399 (Military spec engines) shall have had new drive gears installed in accordance with CAT Special Instruction REHS2083-04, Installation Procedure for the New Drive Gears for the 3456 Engine.

2.4 ENGINE INSPECTION AND REPORTING

- A. Prior to disassembly the contractor shall submit the following data for each engine indexed by serial number:
 - 1. Current CAT Electronic Technician (ET) Product Status Report including at a minimum, serial number, total operating hours and fuel, logged and active diagnostic codes, logged and active event codes, configuration, lifetime information for engine speed, load factor and exhaust temperature, and monitoring system data with state and trip point of engine protection safeties
 - 2. Copies of maintenance records.
 - 3. Digital photographs from multiple views.
 - 4. Digital photographs of split oil filters and description of element condition.
 - 5. Results of engine oil tests. Oil samples shall be pulled from each engine in current state and shall be tested by an independent laboratory specializing in oil testing.

- B. Each engine shall be partially disassembled to allow inspection of critical wear items in accordance with Paragraph 2.5, Disassembly and Inspection. Prior to reassembly the contractor shall submit the following data for each engine indexed by serial number:
 - 1. Digital photographs from multiple angles including removed items.
 - 2. Written results of inspection in accordance with Paragraph 2.5, Disassembly and Inspection, documenting compliance with OEM specifications or indicating any areas of deficiency.
 - 3. Corrective action plan for any deficiencies found during inspection. The corrective action plan shall include a list of replacement parts to be installed.
- C. The contractor shall not begin reassembly of engines until the results of the inspections and the corrective action plan have been approved by the Owner.
- D. Upon completion of reassembly in accordance with Paragraph 2.6, Reassembly, the contractor shall submit the following data for each engine indexed by serial number:
 - 1. Digital photographs of completed assembly from multiple angles.
 - 2. Written results of reassembly in accordance with Paragraph 2.6, Reassembly, documenting compliance with OEM specifications.
 - 3. Documentation of ECU settings.
 - 4. Cylinder leak down pressure test records.

2.5 DISASSEMBLY AND INSPECTION

- A. The contractor shall provide a minimum of 48 hours' notice to the Owner prior to disassembly and shall make provision for the Owner to inspect the disassembled engines.
- B. The contractor shall remove the cylinder head and inspect the cylinder bores, piston crowns, head, and valves for corrosion, excessive carbon build up, and other deficiencies.
- C. The contractor shall remove the oil pan and inspect the crankshaft and all rod and main bearings.
- D. The contractor shall remove the water pump.
- E. The contractor shall remove the harmonic balancer.
- F. The contractor shall remove the front and rear main seals and inspect the end bearings.
- G. The contractor shall measure the turbocharger shaft tolerances. Any turbocharger that is not in compliance with OEM specifications shall be replaced.

2.6 REASSEMBLY

- A. All parts that utilize torque to yield hardware shall be reinstalled with new hardware. All gasketed/sealed parts that are removed shall be reinstalled with new gaskets, O-rings, or seals.
- B. The contractor shall NOT install new piston rings or cylinder kits.
- C. The contractor shall install new valve stem seals and injector seals and shall adjust valve clearance and injector clearance to OEM specifications.
- D. The contractor shall re-install the cylinder head with a new head gasket and valve cover gasket.
- E. The contractor shall adjust the camshaft gear lash and the injector timing to OEM specifications.
- F. The contractor shall re-install the oil pan with a new gasket. Note that if the oil pan is not a 500 hour (deep) sump the oil pan shall be replaced with a 500 hour pan.
- G. The contractor shall install new front and rear main seals.
- H. The contractor shall install a new harmonic balancer.
- I. The contractor shall install a new water pump.
- J. Upon completion of reassembly the contractor shall perform a cylinder leak down pressure test.
- K. The contractor shall flash the ECU to the strategy previously specified and shall verify that all safety shut downs are enabled.

2.7 Painting: The engine shall be painted the engine manufacturer's standard color: CAT Yellow. Do not paint name plates, coolant connections, electrical terminals, sensors, switches, fuel hoses, governor linkages, shutter linkages, exhaust manifold or flywheel mating surfaces. Seal or cap all air, fuel, coolant, etc. openings during painting.

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. The Contractor shall perform factory tests and inspection on each diesel engine prior to shipment. Provide certified copies of all test data and results. Supply sufficient notice to the Owner prior to performing tests. The Owner reserves the right to witness all tests. Test procedures shall conform to ASME, IEEE, and ANSI standards, and NEMA standard practices section on testing, as appropriate and applicable.
- B. The Contractor shall provide all required mechanical and electrical equipment including but not limited to fuel supply, radiator, exhaust, air cooler, dynamometer (or electric load bank), and voltage regulator.
- C. The Contractor shall provide all required measuring and indicating devices. All devices shall be certified correct or correction data furnished for the device

- D. Perform customary commercial factory tests on each engine including, but not limited to, the following:
1. Perform hydrostatic test on water jackets to ensure that water seals and water jackets are watertight. Test report shall indicate pressure at which test was made and the results.
 2. Dynamometer testing shall take place at the contractor's facility. Third party dynamometer testing is not allowed. Note that for engines being furnished as part of a complete genset package, in lieu of testing with a dynamometer the engine shall be load tested using an electric load bank. See Specification 16202. Place engine in continuous operation without stoppage for a period of not less than eight hours. Operate not less than one hour at each load point (1/2, 3/4, and full load) and 1 hour at 110 percent of rated load. If stoppage becomes necessary during this period, repeat the 8-hour run. Also record the following data at the start, at 15-minute intervals, and at the end of each load run: RPM, horsepower, fuel consumption, air intake manifold temperature, manifold (boost) pressure, exhaust temperature, jacket water temperature, lube oil temperature and pressure, and crankcase vacuum.
 3. Oil samples shall be taken of the engine oil at the conclusion of the test and the oil test results shall be submitted to the Owner for review. After completion of testing the oil filters shall be inspected for contamination.
 4. Tests shall indicate satisfactory operation and attainment of guarantees and specified performance. Submit a written report that documents all test results.
 5. Submit CAT ET Product Status Report, as indicated in Paragraph 2.4 indicating status of engine upon completion of testing and shutdown.
 6. Contractor shall not ship equipment without approval by the Owner of the shop test and CAT ET reports.

3.2 SHIPPING

- A. After testing, and immediately prior to shutdown for shipping perform the following steps:
1. Operate the engine three to five minutes with oil, which has 3% to 4% VCI (volatile corrosion inhibitor) oil per engine crankcase volume. The oil does not have to be removed from the engine.
 2. Remove any dirt from the air cleaner, check all seals and gaskets and repair if any leaks. Put lubricant on all points given in the lubrication chart of the engine operation guide.
 3. Turn the engine at cranking speed with governor control in full off position and use a sprayer to add a mixture of 50% VCI oil and 50% 30-weight oil into the air intake or turbocharger inlet.
 4. Continue spraying the mixture of 50% VCI oil and 50% 30-weight engine oil into the air intake or turbocharger inlet to ensure the cylinders and exhaust ports are coated with the oily mixture.

5. Clean the outside of the engine and inspect and ensure that the engine is covered by good quality paint. Correct any deficiencies.
 6. Spray a thin amount of 50% VCI oil and 50% 30-weight engine oil on the flywheel, ring gear teeth, and starter pinion. Install the covers to keep the vapors in.
 7. Put a heavy layer of multipurpose grease on all outside parts that move, i.e. threaded rod, ball joints, linkage, etc.
 8. Flush the cooling system with 50/50 ethylene glycol mix, Shell Rotella ELC, no substitutes. Install covers over the connections.
 9. Install a positive mechanical seal consisting of a fitting plate and gasket on exhaust opening. Then install all covers and/or tape on openings, air intake, exhaust openings, flywheel housing, etc. Ensure all covers are air tight and weatherproof. Use waterproof, weather resistant type tape. Do not install tape in such a manner as will damage paint when the tape is removed. Install a mechanical protective device over any protruding items, which may be vulnerable to breakage during transportation.
- B. After preparing the equipment for shipping, package in accordance with Specification 16202 paragraph 3.2 B.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. The Work included herein shall consist of furnishing generators, skids, and accessories and assembling them with used low-hour engines into complete engine-generator packages. Note that the used engines are specified under Specification 16201.
- B. Each unit shall be harmonically balanced and shall be delivered complete and ready for installation.
- C. Provide all accessories as specified for all engine/generator units plus any additional components listed.

1.2 QUALITY ASSURANCE

- A. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practices. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.
- B. Equipment and components furnished under these specifications shall be in accordance with the requirements of applicable UL, NEC, IEEE, NEMA, and ANSI standards.
- C. A torsional compatibility analysis shall be provided for the specified engine-generator combination.

1.3 CONTRACTOR QUALIFICATIONS

The entire system shall be designed, coordinated, and supplied by a qualified contractor who is regularly engaged in the business of providing diesel engine driven generator equipment.

- A. Bidders must have staff with extensive experience in packaging diesel engine driven electrical generators. A list of five successful installations that key staff has worked on may be requested by the Owner after the bid opening and prior to award in order to verify Bidder qualifications. The list must include installation date, description of installation, and a reference contact for each installation.
- B. Bidders must maintain a competent service organization that is available for field service calls. A description of the organization including resumes of key personnel may be requested by the Owner after the bid opening and prior to award in order to verify Bidder qualifications.
- C. Bidders must have a fabrication facility with adequate space and appropriate equipment as required to perform the work. The Owner may inspect the bidders shop after the bid opening and prior to award in order to verify Vendor qualifications.

1.4 MANUFACTURER'S WARRANTIES

- A. Note that the engine warranty requirements are described under Specification 16201.
- B. The Contractor shall warrant the work for a period of not less than one-year after energization of the equipment or 18 months after delivery to the F.O.B. point, whichever comes first. In the event of equipment or component failure during the warranty period, the Contractor shall replace such defective equipment or components and bear all associated costs. Costs shall include material, parts, and labor. The Contractor will be allowed to charge for travel within Alaska and per diem expenses related to warranty service at actual cost plus 10%. The Contractor shall pursue manufacturer's warranties to the extent necessary to obtain replacement equipment and provide proof of action taken upon request. Assist Owner as directed in determining cause of failure.
- C. The warranty shall state in clear terms exactly what warranty coverage the seller provides, for each unit and attachments. This shall include the terms, length of coverage, reporting responsibilities, how the warranty applies to accessory equipment, restrictions, locations of local facilities for handling warranty and other repairs (including contact names), and any other available information pertaining to warranty.
- D. Provide a nametag on each piece of equipment that clearly identifies the party responsible for the warranty. Nametag shall include the name, address, and phone number, and shop order or Contractor's serial number.

1.5 SUBMITTALS

- A. Within 14 days after Notice to Proceed, the Contractor shall furnish the following:
 - 1. Electrical performance data and dimensional drawings for generators.
 - 2. Manufacturer's literature for all accessories.
 - 3. Engine-generator combination torsional compatibility analysis.
- B. Specific Submittal Requirements.
 - 1. The Contractor shall provide each submittal in a single electronic file in Adobe Acrobat PDF format. The file shall be e-mailed if size allows. If the file is too large for e-mail, it shall either be mailed to the Owner on a CD, or it shall be made available for download on an FTP website. If made available on a website, all website, user name, and passwords shall be provided to the Owner by email. All submittal data and drawings shall be included in the single file directly from the Contractor. No additional files or other documents will be acceptable to be obtained, downloaded, or merged in a document to provide the complete submittal file.
 - 2. The single PDF file shall be organized in a manner that would allow printing the file where the printed document could then be inserted into a binder. All single pages shall be provided with a blank page following such that when printed, the first page of each chapter, tab, or manual will

always print on the front of a sheet of paper if the document is printed on two sides of a sheet of paper. At a minimum the submittal PDF file shall be organized as follows:

- a. Provide a cover sheet with the name and address of the Owner; the project name and contract number; the Contractor's complete name, address, and telephone number; the Contractor's job number; the date of submission; the name of the manufacture, if different from the Contractor; and the Contractor's stamp of approval.
- b. Provide a table of contents. The bookmarked tabs shall match the Table of Contents.
- c. The PDF file shall be organized into chapters or tabs that separate the different components of the equipment into logical groupings, i.e. engines, generators, engine mounted accessories, loose ship accessories, etc. At the beginning of each section, provide a page with the section number.
- d. The PDF file shall be provided with book marks that will allow easy navigation within the PDF file. Each chapter shall have its own book mark and the chapter shall be broken down into subsections based on each different items provided in that chapter, or tab. Each item in the chapter shall be bookmarked such that each item can be navigated to from the bookmark.

1.6 **Not used this specification.**

1.7 **FINAL PAYMENT**

- A. Final payment will not be made until all equipment is received at the F.O.B. point in satisfactory condition.

PART 2 - PRODUCTS

2.1 **CONFIGURATION AND MANUFACTURERS**

- A. All units shall be complete skid mounted engine-generators configured as specified herein. Furnish with all accessories as indicated.
- B. Provide generator rated minimum 450 ekW prime (500 ekW standby) at 105°C rise, Newage/Stamford HCI534E or Kato equal, no other substitutes.
- C. Engines shall be furnished in accordance with Specification 16201.

2.2 **ENGINE ACCESSORIES**

- A. In final assembly engines shall be configured without a charging alternator, fan, radiator, accessory reduction gear drive, or any other accessories not specifically required by these specifications.
- B. Engine Control: All engine control functions shall be performed by a Woodward easYgen provided by others and installed in the remote switchgear. The easYgen will perform all start/stop, speed, paralleling, and load sharing control functions in

addition to all engine function monitoring and safety shut downs. Engine manufacturer's electronic control panels shall not be provided as part of this package.

- C. Isochronous Governor: The engine speed shall be 1800 RPM over the entire load range. The frequency at any constant load, including no load, shall remain within +/- 0.5% isochronous control for rated frequency operation. Provide an Engine Control Unit (ECU) for interface with the Woodward easYgen. The easYgen shall control the engine speed through the ECU.
- D. Fuel System: The engine shall have manufacturer's engine mounted fuel filters with replaceable elements. Fuel supply and return lines shall be routed to the front of generator skid for field connection to the plant piping. See attached drawing M1 for detailed configuration.
- E. Lubrication: Threaded spin-on type, full flow lubricating oil filters shall be provided. The lube oil drain line shall be routed to the front of generator skid for field connection to the plant piping. See attached drawing M1 for detailed configuration.
- F. Fuel and Oil Hoses: All hoses for fuel, lube oil, vents, etc., shall be Aeroquip type FC300, Eaton Weatherhead H569, or equal. Minimum hose size shall be 13/32" (#8) except hoses for field connection shall be 5/8" (#12) minimum. Provide with re-useable JIC swivel type fittings. Push-on or barb type hose connections will not be allowed. Route hoses to avoid wear points and to ensure access to normal service points on the engine. Securely support hoses from engine and skid.
- G. Glycol Hoses: All hoses for glycol shall be 1/2" wire reinforced corrugated silicone heater hose, Parker 6621, no substitutes. Terminate on barbed fittings with stainless steel T-bolt hose clamps. Route hoses to avoid wear points and to ensure access to normal service points on the engine. Securely support hoses from engine and skid.
- H. Wire Loom: All wiring for control and instrumentation shall be routed in plastic loom. Provide tee fittings for all branch connections. Route loom to avoid wear points and to ensure access to normal service points on the engine. Securely support loom from engine and skid.
- I. Protective Guards: All moving parts and hot surfaces shall be provided with protective guards in accordance with U.L Standard 2200.
- J. Air Cleaners: The engine shall be provided with a dry-type, non-metallic, disposable air cleaner, Donaldson DuraLite ECB #B120376 or approved equal. See attached drawing M1 for detailed installation. The photo shows a similar installation on a different make and model engine.
- K. Air Cleaner Indicator: Provide visual air restriction indicator, 20" water column limit, manual reset, Donaldson X002251, no substitutes. Install in air intake tube near air cleaner as indicated on attached drawing M1.



- L. Engine Crankcase Ventilation: The engine crankcase venting will be field installed by others.
- M. Starting: The engine shall be equipped with a 24 VDC electric starting system. The starting system shall be of sufficient capacity to crank the engine at a speed which will allow full diesel starting. Note that the starter auxiliary relay shall be Owner furnished and is not part of this Contract.
- N. Sensors and Safety Controls: The engine shall be equipped with the following:
1. Oil Temperature Sensor. Murphy ES2T-300-1/2, no substitutes.
 2. Oil Level Switch. See Note 2.
 3. Magnetic Pickup Speed Sensor.
 4. Oil Pressure Sensor. Murphy ES2P-100, no substitutes.
 5. Jacket Water Temperature Sensor. Murphy ES2T-300-1/2, no substitutes.
 6. Exhaust Gas Temperature. High temperature (650°C) 2 wire 100 ohm RTD with 2' high temperature lead wire, plug, and jack. Compression fitting with 1/4" MPT adapter. Eustis RGB7B203B02WT with NS7 adapter, no substitutes. Install in threaded tap in turbo discharge elbow.
 7. Intake Air Temperature Sensor. 4-20mA, 20-240°F, 1/2" MPT. Noshok 800-20/240-1-1-8-8-025-6, no substitutes. Note that this will be field installed by others in the charge air tubing remote from the engine. Leave a minimum 18" service loop on the conductors in the vicinity of the air inlet and tywrap the sensor to the engine in a secure location.
 8. Air Filter Vacuum Sensor. 4-20mA, -30"Hg to 0 PSIG, 1/4" MPT. Noshok 100-30V-1-1-2-7, no substitutes. Install in air intake tube near air cleaner as indicated on attached drawing M1.
- Note 1. The above listed sensors shall be independent from engine gauges and all other devices and sensors. Where standard factory furnished sensors for the above listed functions are required for operation of the ECU, provide additional duplicate sensors as specified. All sensors shall be installed on the engine. All lead wires from the sensors shall be clearly labeled and routed in wire loom to the location specified under Paragraph 2.6 with a minimum 10' long loop for final connection by others.
- Note 2. Owner will furnish a custom oil level site gauge with high/low level switches. Provide minimum #8 hoses for connection to oil level indicator. Carefully route upper vent hose to avoid any low point traps and connect directly into crankcase. Route lower hose to a connection directly on the oil pan. Do not tee lower hose into oil drain line.
- O. Safety Controls: The automatic switchgear provided by others shall be equipped with automatic safety controls which will shut down the engine in the event of high jacket water temperature (primary), high lubricating oil temperature, low lubricating oil pressure, high or low lubricating oil level, high air filter restriction, and engine overspeed based on engine mounted sensors. Note that a single low water shut down switch will be installed on the external cooling system.

2.3 EXHAUST SYSTEM

- A. Exhaust silencer and piping will be furnished by others.
- B. A flexible, continuous, 18 inch long stainless steel exhaust flex connector with welded connections shall be furnished for each engine, Alaska Rubber or equal. Provide an appropriate engine mating connection at one end and an 8" diameter ASA 125 lb. flange at the opposite end. Slotted cuff connections are not acceptable. Provide gasket, bolts, v-clamp, or any other components required for connection to the engine. Provide a 90° elbow where required for the flex to be installed vertically. Note that if the exhaust temperature sensor cannot be installed directly in the outlet connection, a 1/4" FPT stainless steel thread-o-let shall be welded into the flex between the engine connection and the corrugated hose.

2.4 ACCESSORIES.

Provide the following accessories for each generating unit (unless otherwise indicated):

- A. Drip pan, 14-gauge galvanized sheet metal, liquid tight joints, 30"x60"x2", one per each unit.
- B. Two 15 ft. long 2/0 AWG arctic flex battery cables plus one 12-inch long jumper per each unit. All cables shall include compression type terminal ends shipped loose. One battery cable shall be red for the positive lead and the other shall be black for the negative lead. The jumper shall be black.

2.5 COOLING SYSTEM

- A. Engine cooling shall be by remote radiators (provided by others) with coolant circulation driven by the engine coolant pump.
- B. Thermostat: Remove the standard thermostat and housing and install a marine thermostat housing with a 195°F marine thermostat. Remove the marine manifold connection on the housing and install an expansion plug. Install 4-bolt flange with 3" 90° weld elbow and 3" weld end king nipple. Rotate elbow so king nipple is oriented 45° to the right of the engine centerline. See sheet M1 for detail.
- C. Water Pump: Remove the standard water pump cover and install a marine water pump cover. Install 4-bolt flange with 3" 90° weld elbow and 3" weld end king nipple. Rotate elbow so king nipple is oriented 45° down from the engine centerline. See sheet M1 for detail.
- D. Glycol Filter: Provide screw-on canister style filter element with 3/8" NPT connections on head, Wix #24019 head with #24069 element. Mount head on steel bracket fixed to front or side of engine. Connect to engine with 1/2" silicone heater hose with 3/8" NPT quarter turn gauge cock isolation valves. Connect inlet to thermostat housing and connect outlet to water pump inlet. On thermostat housing connection provide 3/8" NPT tee fitting with plug for field connection of pre-heat line by others

2.6 WIRING INTERFACE WITH REMOTE SWITCHGEAR

- A. The engine start and run systems will be 24 VDC. All remote indication will be 24VDC, 4-20mA, or as otherwise indicated. All switches used for remote indication shall be rated for operation at 24 VDC.
- B. ECU Connection: The engine shall be furnished with manufacturer's standard wiring harness with 40 pin customer connection. ECU wiring beyond the 40 pin connector will be field installed by others.
- C. Control Power: To provide 24VDC power to the remote control system, a 30A circuit breaker with switch shall be mounted on the engine in the vicinity of the starter, Cooper 187-030-F-00 or equal.
- D. Monitoring Panel: A mechanical gauge panel is not required. An electronic multi-function monitoring panel will be furnished by others and installed in a wiring terminal box. The wiring terminal box will be furnished by others and will be field installed by others adjacent to the generator but isolated from the unit. Furnish wiring harnesses on the genset for field connection to the wiring terminal box as described below.
- E. General: Provide wiring for engine and generator control and monitoring bundled as described below for field connection by others to terminal box.
 - 1. All wiring for field connection shall be routed in plastic wire loom and shall be securely support in accordance with the specifications
 - 2. The wiring shall be bundled into two separate looms, one for engine control and monitoring and one for generator (voltage regulator) control and monitoring.
 - 3. The wiring shall be routed to the location indicated on the attached drawing M1 and shall be furnished with a minimum 10' long service loop for final field termination by others in the terminal box.
 - 4. Where tag numbers are indicated label or tag each wire or pair with the associated number at each end and every 5' maximum.
- F. Engine Harness: Provide wiring for installed engine devices as listed below. Bundle these wires in the engine wiring loom.
 - 1. 24VDC Positive – #8 AWG, color Red, tag 1. Connect to furnished 30A circuit breaker near starter.
 - 2. 24VDC Negative – #8 AWG, color Black, tag 2. Connect to negative at starter.
 - 3. Starter Motor Solenoid Positive – #12 AWG, color Orange, tag SM. Connect to solenoid.
 - 4. Starter Motor Solenoid Negative – #12 AWG, color Black. Do NOT run in loom. Connect jumper from solenoid directly to negative at starter.
 - 5. Oil Temperature – Shielded pair, tag 8 and 9.
 - 6. Oil Level Switch – Shielded pair, tag 10 and 11. Note: Because oil level switch is Owner furnished leave a minimum 6' long service loop of wire in the vicinity where the upper site gauge hose will connect to the engine block.

7. Magnetic Pickup – Shielded pair, tag 12 and 13.
 8. Oil Pressure – Shielded pair, tag 15 and 16.
 9. Jacket Water Temperature – Shielded pair, tag 17 and 18.
 10. Exhaust Temperature RTD – Shielded pair, tag 20 and 21.
 11. Intake Air Temperature – Shielded pair, tag 27 and 28. Note: Because sensor will be field installed leave a minimum 18” service loop on the conductors in the vicinity of the air inlet as previously described.
 12. Air Filter Restriction – Shielded pair, tag 29 and 30.
- G. Generator Voltage Regulator Harness: Provide wiring for generator voltage regulator as listed below. All wiring shall be min #14 AWG stranded. Bundle these wires in the generator wiring loom.
1. Phase A Voltage Sensing – color Brown, tag A.
 2. Phase B Voltage Sensing – color Orange, tag B.
 3. Phase C Voltage Sensing – color Yellow, tag C.
 4. Droop CT – Pair, tag X1 and X2.
 5. Field – Pair, tag F1 and F2.
 6. PMG – Three conductors, tag P1, P2, and P3.

2.7 GENERATOR/ALTERNATOR

- A. Generator shall be a single bearing, four pole, synchronous type. Generator shall be directly connected to the engine flywheel housing and driven through a flexible coupling to ensure permanent alignment. The generator shall be rated three phase, 277/480V, 60 Hz, 1800 RPM, brushless, 12 lead reconnectable, and winding pitch of 2/3 design. Windings shall be random wound and lashed at the end turns to provide superior mechanical strength.
- B. The rotating assembly shall be dynamically balanced to less than 2 mils peak to peak displacement and shall be designed to have an over speed withstand of 125% of rated speed for 3 minutes when operating at stable rated operating temperature.
- C. Cast iron end brackets with bearing bores machined for an O-Ring to retard bearing outer race rotation and fabricated steel frames shall be used. Bearings shall be pre-lubricated, double shielded, ball type, single row Conrad, C3 fit. Minimum B-10 bearing life shall be 50,000 hours for single bearing units.
- D. Generator wiring diagram shall be permanently installed on the inside of the terminal enclosure cover.
- E. The insulation system of both the rotor and stator shall be of NEMA Class H materials or better and shall be synthetic and non-hygroscopic. The stator winding shall be given multiple dips of resin, plus a final coating of epoxy for extra moisture and abrasion resistance. The rotor shall be layer wound with thermosetting 100% solids epoxy between each layer, plus a final coating of epoxy for moisture and abrasion resistance. The shaft exposed metal surfaces and rectifier assembly shall be coated with an epoxy varnish.

- F. The generator shall be equipped with a permanent magnet generator (PMG) excitation system. Both the PMG and the rotating brushless exciter shall be mounted outboard of the bearing. The system shall supply a minimum short circuit support current of 300% of the rating for 10 seconds. The rotating exciter shall use a three-phase full wave rectifier assembly with hermetically sealed silicon diodes protected against abnormal transient conditions by a multi-plate selenium surge protector. The diodes shall be designed for safety factors of 5 times voltage and 3 times current.
- G. Voltage Regulator: The voltage regulator shall be Owner furnished and is not part of this Contract. The Contractor shall perform the following:
1. Furnish one each 800:5 ratio cross current transformer (CT) for paralleling operation installed on Phase B generator lead with H1 facing towards the generator. Provide shorting type terminal blocks.
 2. If the generator is supplied with a manufacturer's voltage regulator it shall be removed prior to shipping.
- H. Nameplate: On the side of the generator housing, provide a nameplate that provides the following information. The nameplate shall be located in a clearly visible location and shall not be obscured by the terminal enclosure or located such that the nameplate is behind any part of the generator or housing.
1. Rated kW as specified.
 2. Full load amps.
 3. Rated voltage, phase, and power factor.
 4. Rated voltage and current of the field exciter.
- I. The generator shall be self-ventilated with a direct drive one-piece, cast aluminum alloy, unidirectional internal fan for high volume, low noise air delivery. Airflow shall be from opposite drive end through generator to drive end. The exciter shall be in the airflow.
- J. Each generator shall be provided with a custom terminal compartment extension. The terminal compartment shall be provided with bus bars to allow easy field termination of the phase and neutral conductors. See attached drawing M1 for configuration of the extension and bus bars. The photo shows a similar installation on a prior project. The generator neutral connection shall not be connected to the mounting skid or the generator frame. The neutral shall be isolated for field grounding by others at the switchgear or transformer.



2.8 MOUNTING SKID.

- A. The engine and generator shall be equipped with a suitable full length structural steel base frame for mounting the engine and generator. The skid shall be constructed from structural steel channel with ends beveled and plated for short term skidding and rolling of unit. Provisions shall be made so that the generator

can slide back a minimum of 12” to access the rear main seal on the engine without removing the generator end off of the skid or requiring the use of blocking to support it. See attached drawing M1 for skid design.

- B. Engine manufacturer's standard elastomer vibration isolators and fasteners shall be installed where the engine and the generator attach to the skid as indicated on drawing M1. Use Caterpillar 9W-9930 isolator assembly. Provide minimum 114mm diameter by thickness as required washers for installation in accordance with manufacturer's requirements.
- C. Each unit shall be placed on the skid at the location indicated on drawing M1. Wedge washers shall be welded in place on the skid at the locations on attached drawing M1 to provide a flat surface for field bolting to mounting pedestals.

2.9 PAINTING

Each unit shall be painted the engine manufacturer's standard color. Engine and generator shall be Cat Yellow and skid shall be Cat black.

2.10 SPARE FILTERS

In addition to the filters installed on the engines, provide the following quantities of replacement filters for each engine. Package spare filters in boxes and label each box with the engine model.

- A. Eight (8) oil filters.
- B. Four (4) fuel filters.
- C. Three (3) air filters.
- D. Four (4) glycol filters.

PART 3 – EXECUTION

3.1 FACTORY TESTS

- A. The Contractor shall perform factory tests and inspection on each diesel engine, generator, and each component of the system prior to shipment. Provide certified copies of all manufacturers' test data and results. Supply sufficient notice to the Owner prior to performing tests. The Owner reserves the right to witness all tests. Test procedures shall conform to ASME, IEEE, and ANSI standards, and NEMA standard practices section on testing, as appropriate and applicable.
- B. The Contractor shall provide all required mechanical and electrical equipment including but not limited to fuel supply, radiator, air cooler, exhaust, load bank, and voltage regulator.
- C. The Contractor shall provide all required measuring and indicating devices. All devices shall be certified correct or correction data furnished for the device.
- D. Engine Tests: Shop test each engine-generator in accordance with Specification 16201 - 3.1 A, except instead of a dynamometer use an electric load bank.

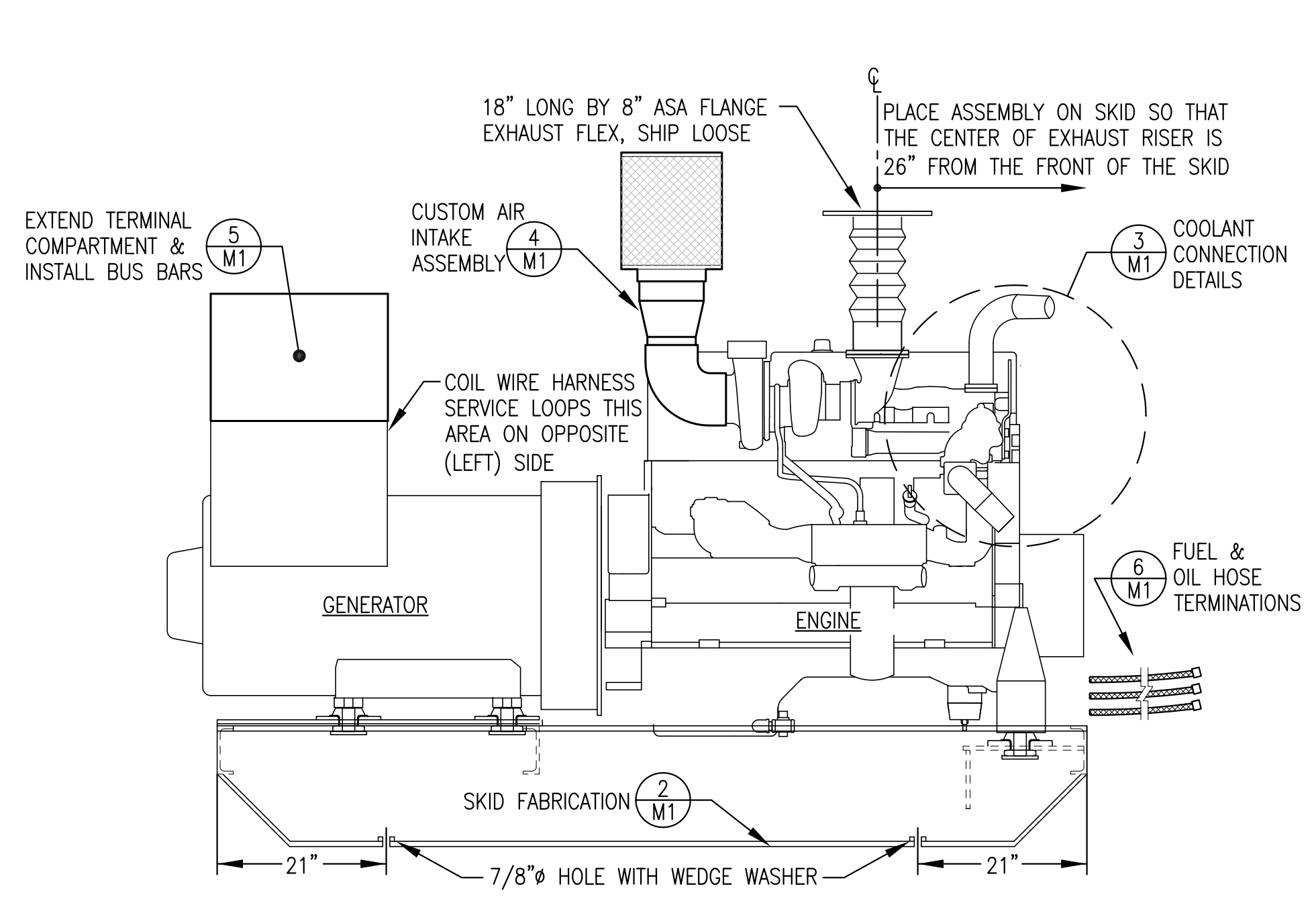
- E. Tests shall indicate satisfactory operation and attainment of guarantees and specified performance. Contractor shall not ship equipment without approval by the Owner of the shop test reports.

3.2 SHIPPING

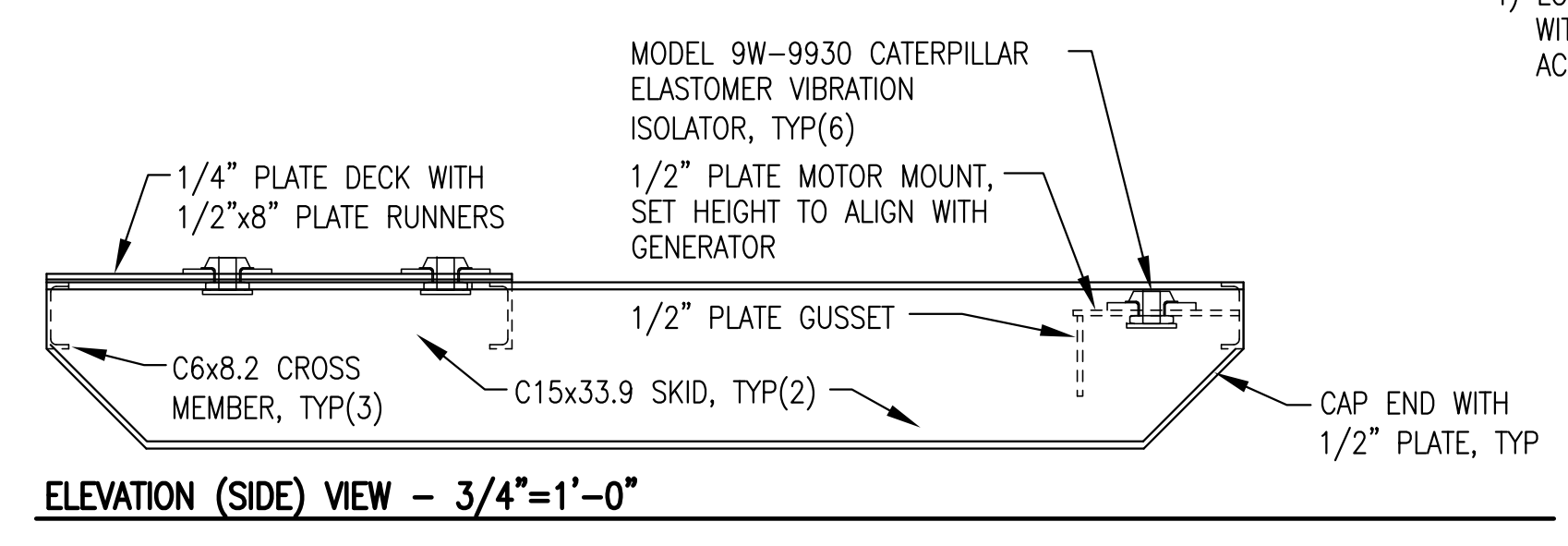
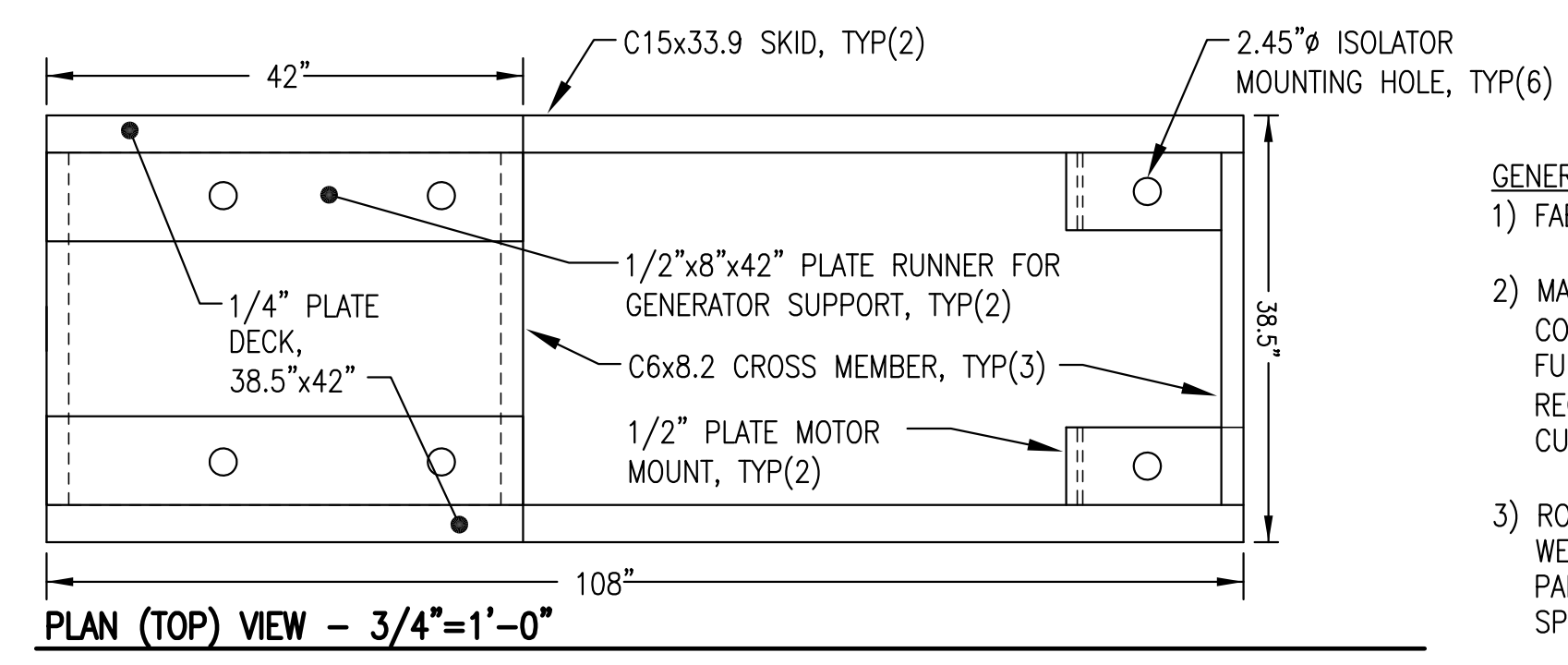
- A. After testing, and immediately prior to shutdown for shipping perform the steps listed in Specification 16201 paragraph 3.2 A.
- B. After preparing the equipment for shipping, package each engine/generator separately as follows:
 - 1. Coil wiring harnesses and secure control wiring to genset.
 - 2. Put a waterproof cover over the entire engine/generator set. Make the cover tight, but loose enough to let air circulate around the unit to prevent damage to exposed metal parts from condensation.
 - 3. All other included components (spare parts, loose items, etc.) shall be packaged in a box or crate. All boxes or crates shall be palletized onto the minimum number of pallets, as required for the quantity and size of the boxes/crates.
 - 4. Each component package shall be sequentially numbered and marked for ease of identification. Each box/crate shall also be marked with a unique identifying number. Each pallet shall be provided with a packing slip identifying the number of each box/crate on the pallet, in addition to a listing of each component package within each box/crate. Each pallet shall be marked (with two inch high letters/numbers), on all four sides and the top, with the purchase order number.
 - 5. Two copies of the packing slip identifying the quantity of pallets, the crates/boxes on each pallet, and the listing of component packages within each box/crate shall be provided to the Owner.

END OF WRITTEN SPECIFICATION

SEE ATTACHED DRAWING M1

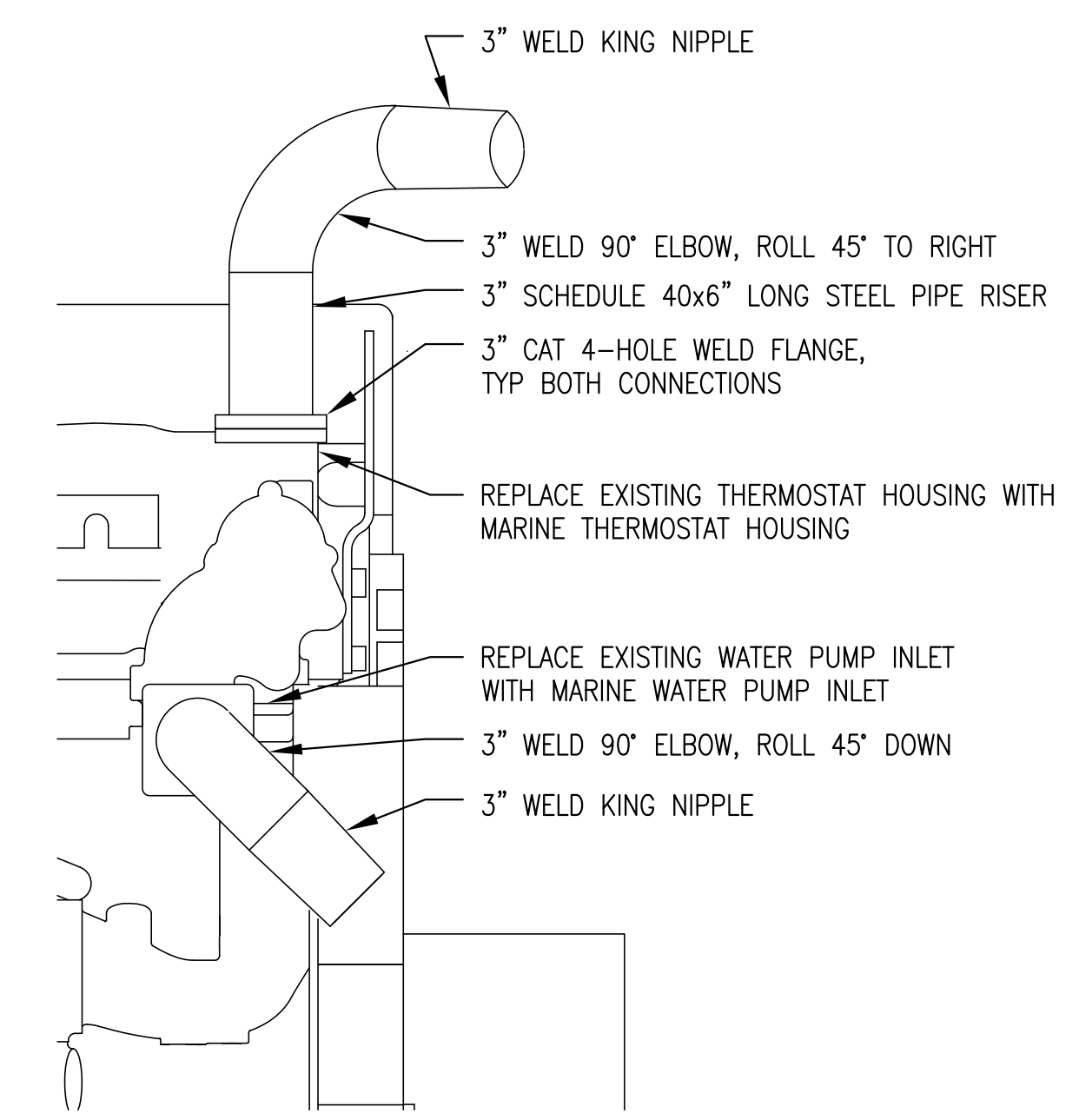


1 GENERATOR ASSEMBLY
M1 3/4"=1'-0"



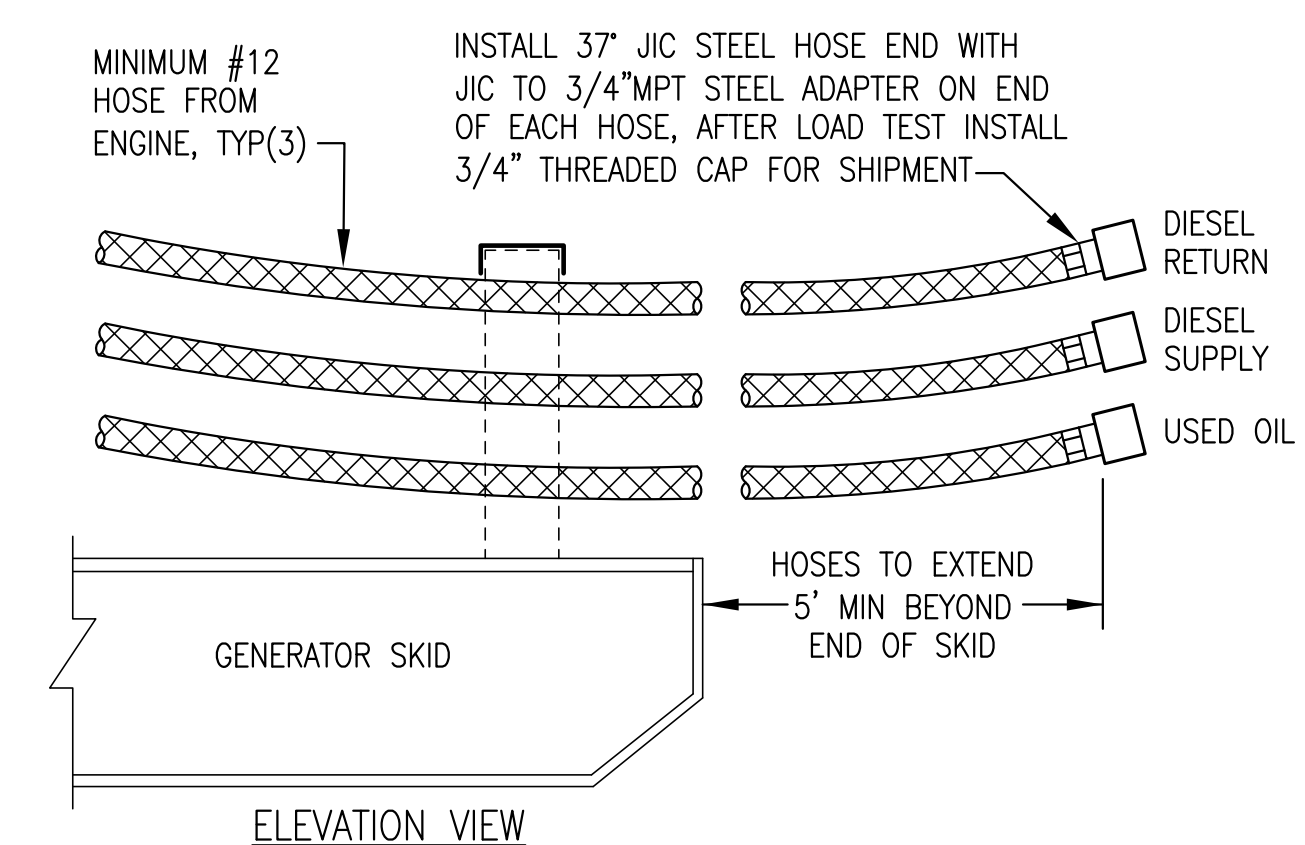
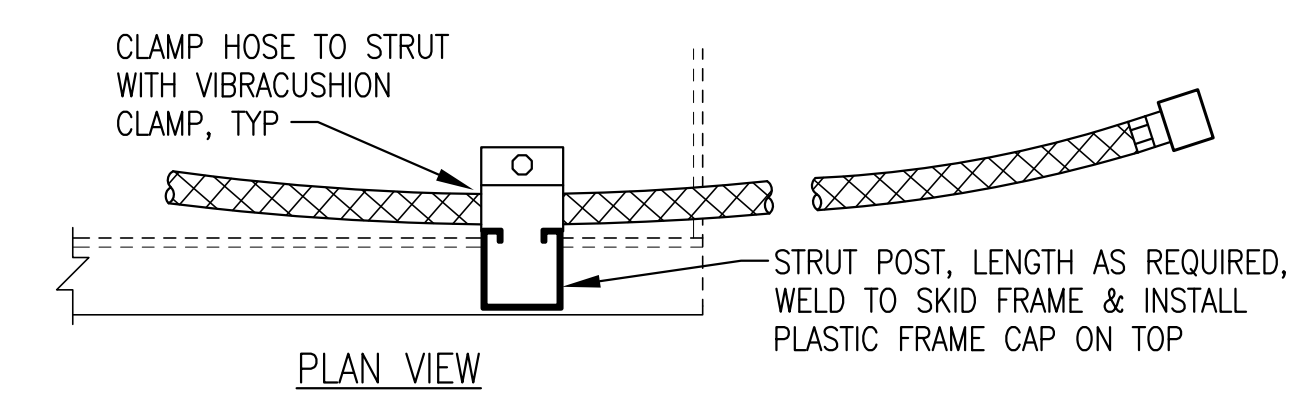
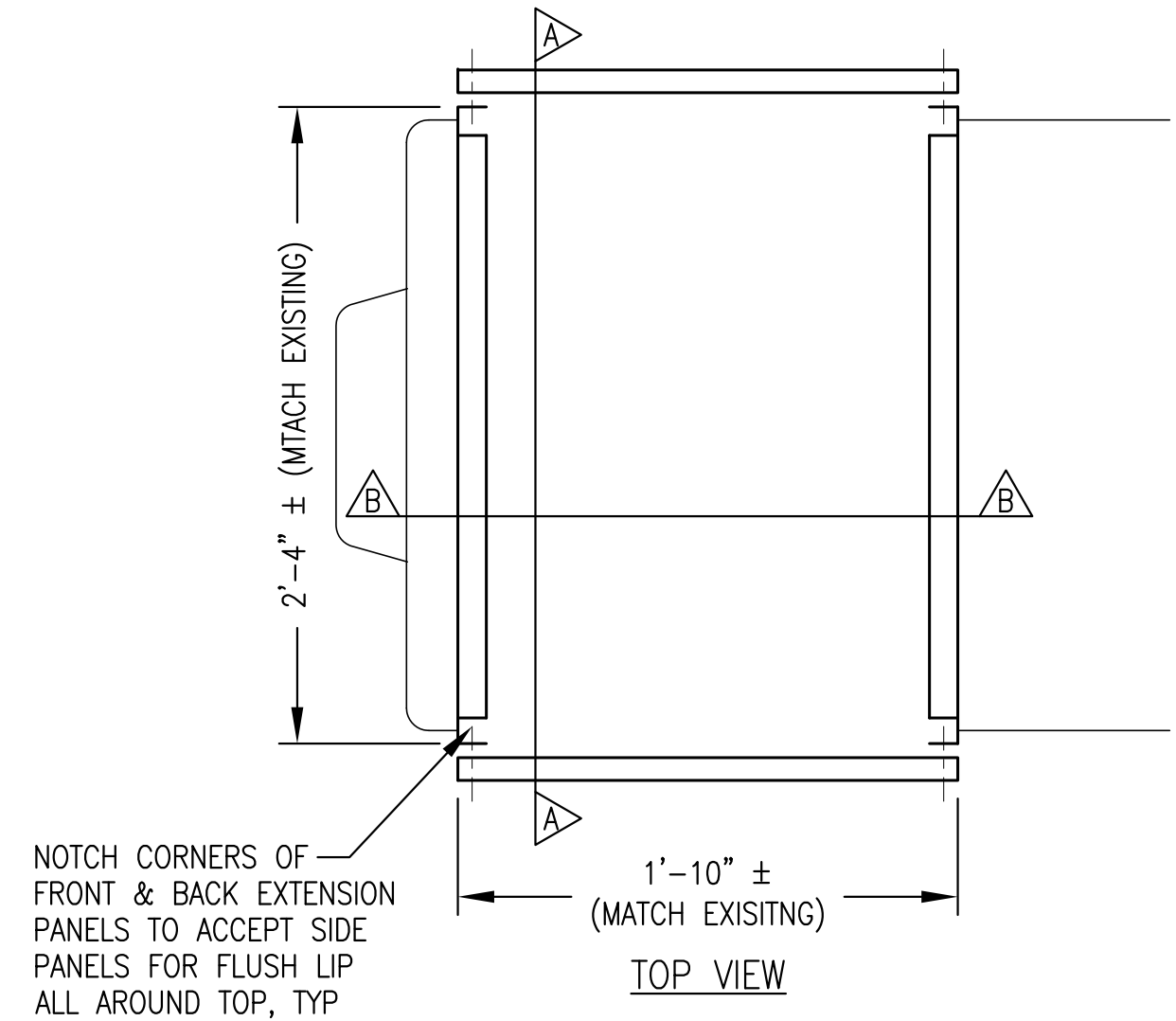
2 GENERATOR SKID FABRICATION
M1 3/4"=1'-0"

- GENERATOR SKID FABRICATION NOTES**
- 1) FABRICATE FROM ASTM A-36 STEEL.
 - 2) MAKE ALL CONNECTIONS WITH CONTINUOUS WELDS (FILLET OR FULL-PENETRATION GROOVE AS REQUIRED) IN ACCORDANCE WITH CURRENT AWS STANDARD CODE.
 - 3) ROUND ALL CORNERS & GRIND WELDS SMOOTH AFTER FABRICATION. PAINT IN ACCORDANCE WITH SPECIFICATIONS.
 - 4) LOCATE UNIT ON SKID AND ATTACH WITH ELASTOMER ISOLATORS IN ACCORDANCE WITH SPECIFICATIONS.

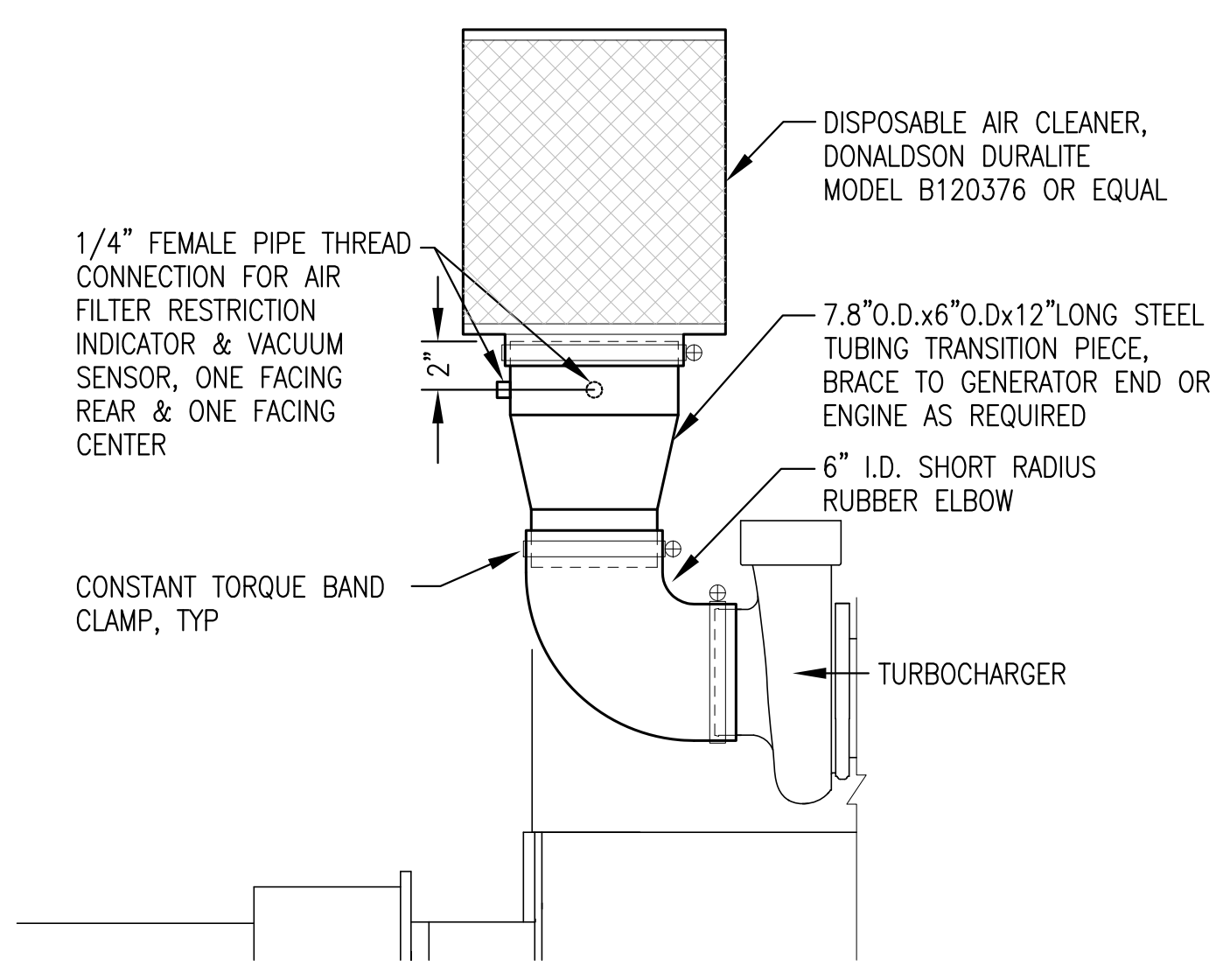


3 GENERATOR COOLANT CONNECTION DETAILS
M1 3/4"=1'-0"

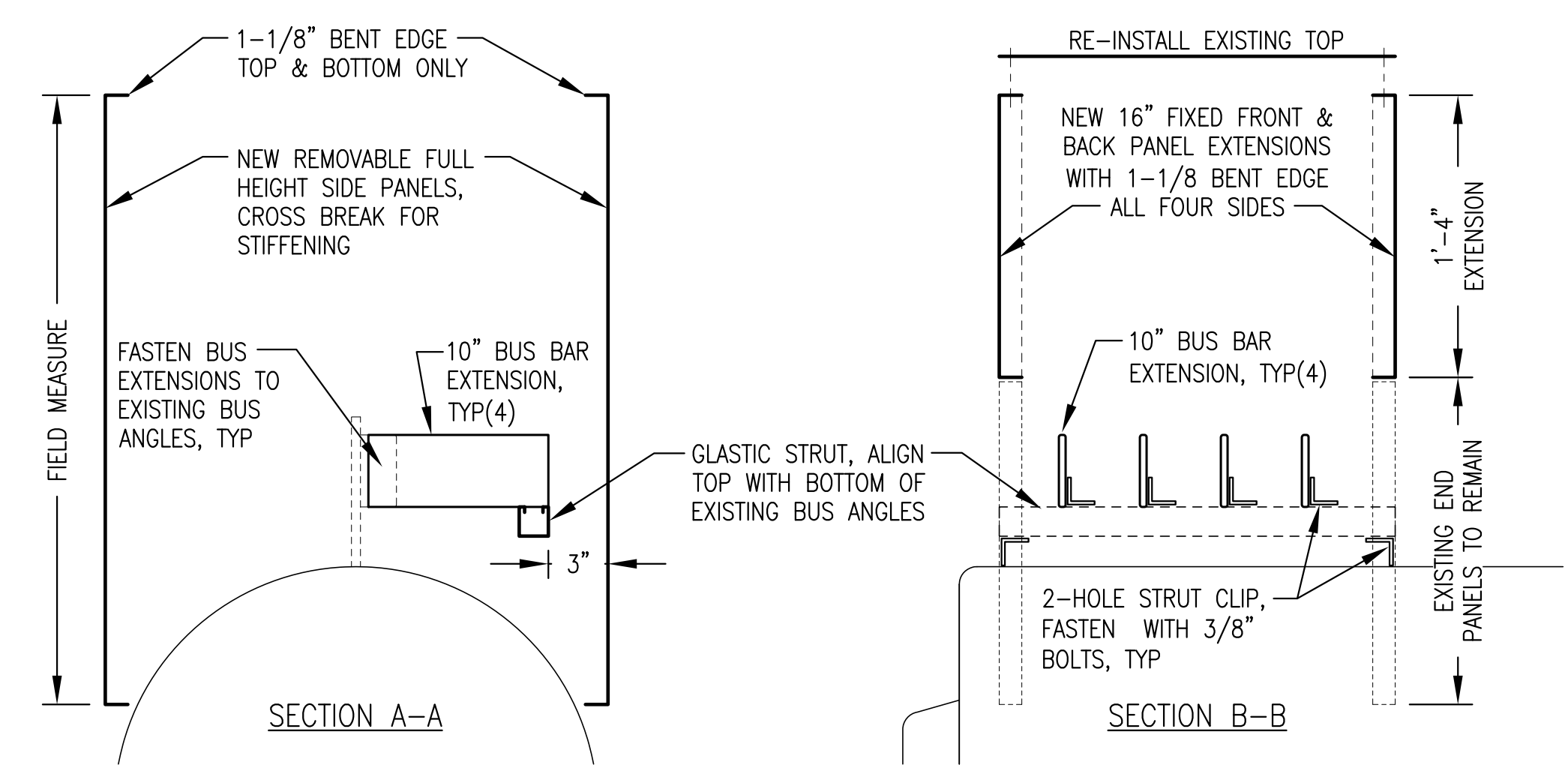
- GENERATOR TERMINAL COMPARTMENT NOTES:**
- 1) EXTEND COMPARTMENT AND INSTALL BUS BARS AS SHOWN TO FACILITATE FIELD INSTALLATION OF TOP ENTRY CABLES (BY OTHERS).
 - 2) REMOVE EXISTING SIDE AND TOP PANELS. SAVE TOP PANEL FOR REINSTALLATION.
 - 3) FABRICATE 16" HIGH FRONT AND BACK PANELS. FABRICATE NEW FULL HEIGHT SIDE PANELS. ALL PANELS 14 GA STEEL, BENT AS INDICATED.
 - 4) ASSEMBLE PANELS WITH 1/4" SELF THREADING SCREWS AND STAR LOCK WASHERS.
 - 5) MAKE ALL BOLTED CONNECTIONS FOR STRUT AND BUS BAR WITH 3/8" PLATED BOLTS AND NYLOCK NUTS.
 - 6) ALL BUS BAR EXTENSIONS TO BE 3/8"x4" SILVER PLATED LOW-OXYGEN COPPER BAR.



6 FUEL & OIL HOSE TERMINATIONS
M1 NO SCALE

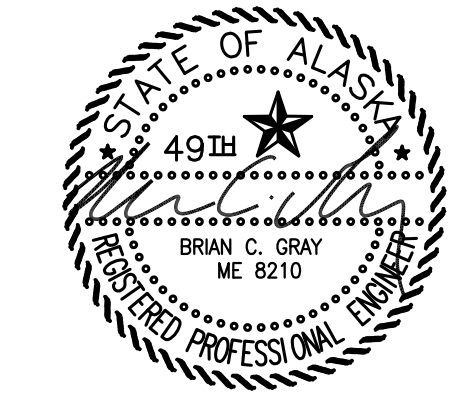


4 GENERATOR AIR INTAKE ASSEMBLY
M1 1-1/2"=1'-0"



5 GENERATOR TERMINAL COMPARTMENT EXTENSION & BUS BAR INSTALLATION
M1 1-1/2"=1'-0"

ISSUED FOR PROCUREMENT
OCTOBER 2016



PROJECT: KAKE POWER SYSTEM UPGRADE	
TITLE: ENGINE-GENERATOR ASSEMBLY DETAILS	
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 10/26/16
FILE NAME: ITB 17042 M1	SHEET: M1 OF 1
PROJECT NUMBER:	
P.O. 111405, Anchorage, AK 99511 (907)349-0100	

APPENDIX C. BID SCHEDULE

1. **Scope** - This Invitation to Bid is for furnishing commodities as described in the specifications (rebuilt or low-hour used), generators, skids, and accessories and assembling them into complete engine-generator sets (Gensets). The Gensets shall be fabricated, assembled, tested, and packaged in strict compliance with the preceding specifications. The quantity shall be as indicated in the Bid Schedule below.
2. **Submittals** - Submittals shall be provided to the Engineer for review and approval prior to beginning fabrication. Submittals shall be prepared in accordance with the specifications.
3. **Progress Reports** – Upon commencement of assembly work, progress reports shall be provided to the Authority every week. Reports shall include a brief written description and digital photographs of work completed. Adequate photographs shall be provided to document each step in the fabrication procedure. Each report shall be submitted via email within one working day of completion of the work week.
4. **Inspection** - The work may be inspected by the Authority's representative at the Bidder's fabrication facility during the fabrication process. A final inspection will be performed and approval will be issued prior to items being released for shipment. The Vendor shall provide a minimum of two weeks' notice prior to completion to allow the Authority adequate time to schedule the final inspection.
5. **Point of Delivery** - All completed Gensets shall be delivered F.O.B. to the **Alaska Energy Authority shop at 2601 Commercial Drive, Anchorage, AK 99501, (907) 771-3092.**
6. **Pricing** - The Bidder shall provide unit, extended, and total prices as indicated in the bid schedule below. All prices shall be firm fixed prices, which include all costs and profit associated with furnishing the items as specified to the point of delivery by the date indicated. If awarded a contract, bidder's firm prices will be integrated into the contract.
7. **Required Delivery Date** – The bid schedule lists the required delivery for each unit. This is the maximum time in calendar weeks from award of order to delivery at the F.O.B. point. In order for a bid to be considered responsive the bidder must provide a firm delivery in calendar weeks. A firm delivery greater than the time indicated may result in a bid being declared non-responsive, unless no bidders can meet the delivery schedule.
8. **Method of Award** - Contract award shall be made on the basis of the total Base Bid plus additive alternates as selected by Alaska Energy Authority. If Bid Alternates are included in the Bid Documents, the Alaska Energy Authority reserves the right to award some, none, or all of the alternates. Alternates may be awarded in any order in the best interest of the Alaska Energy Authority.
9. **Progress Payments** - There will be no progress payments. Payments are NET30 on receipt of an invoice and acceptance of the materials at the point of delivery.
10. **Bid Schedule** – The following Bid Schedule is for three low hour diesel engines. The Additive Alternate is for a fourth low hour diesel engine. The Bidder must provide pricing for the Base Bid and Additive Alternate.

11. Base Bid

The Base Bid is for furnishing complete Gensets in accordance with all provisions of attached Specification 16201 Parts 1, 2, 3, and, Specification 16202 in its entirety.

Item Description	Quan.	Delivery Date	Unit Price (\$)	Extended Price (\$)
Complete Gensets per Specifications	3 ea.	12 weeks		

11a. Additive Alternate #1

Additive Alternate #1 is for furnishing complete Genset in accordance with all provisions of attached Specification 16201 Parts 1, 2, 3 and, Specification 16202 in its entirety.

Item Description	Quan.	Delivery Date	Unit Price (\$)	Extended Price (\$)
Complete Genset per Specifications	1 ea.	12 weeks		

Acknowledge all addenda

Addendum No	Date Issued	Addendum No	Date Issued	Addendum No	Date Issued

BIDDER'S NOTICE: By signature on this form, the Bidder certifies that:

- a. The price(s) submitted are independent and without collusion.
- b. The Bidder will comply with the laws of the State of Alaska;
- c. The Bidder will comply with applicable portions of the Federal Civil Rights Act of 1964;
- d. The Bidder will comply with the Equal Employment Opportunity Act and the regulations issued there under by the State and Federal Government; and
- e. The Bidder has reviewed all terms and conditions in this Invitation to Bid.

If any Bidder fails to comply with any of these requirements, the Authority may reject its bid, terminate the contract, or consider the Vendor in default.

Company Submitting Bid	Telephone Number
Address	Fax Number
Authorized Signature	E-mail Address
Print Name	Alaska Business License number DATE: _____

End of Bid Schedule.

APPENDIX D. Debarment Certification

**ALASKA INDUSTRIAL DEVELOPMENT AND EXPORT AUTHORITY
AND ALASKA ENERGY AUTHORITY**

**CERTIFICATION OF CONTRACTOR AND LOWER-TIER PARTICIPANTS REGARDING
DEBARMENT, SUSPENSION, AND OTHER INELIGIBILITY AND VOLUNTARY EXCLUSION**

Contractor

PLEASE INSERT YOUR COMPANY'S NAME AND ADDRESS IN THIS BOX

I, _____ hereby certify on behalf
(Name and title of official)

Of _____ that:
(Name of contractor)

- (1) The prospective contractor and lower tier participant certifies, by submission of this bid or proposal, that neither it nor its "principals" [as defined at 49 C.F.R. § 29.105(p)] is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. In the event, your company or any principals become ineligible from participating in federally funded transactions, you are required to notify us immediately.
- (2) When the prospective contractor and lower tier participant is unable to certify to the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Executed this _____ day of _____, 20__

By:

(Signature of authorized official)

(Title of authorized official)