STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

SPECIFICATIONS AND PROPOSAL

FOR

EMERGENCY GENERATOR AND MISCELLANEOUS ELECTRICAL EQUIPMENT MAINTENANCE SERVICES

STATEWIDE AIRPORTS

STATE OF HAWAII

PROJECT NO. BS1323-53

2022

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NOTICE TO BIDDERS
(Chapter 103D, HRS)

SEALED BIDS for EMERGENCY GENERATOR AND MISCELLANEOUS ELECTRICAL EQUIPMENT MAINTENANCE SERVICES, STATEWIDE AIRPORTS, PROJECT NO. BS1323-53, will begin as advertised in HIePRO. Bidders are to register and submit bids through HIePRO only. See the following HIePRO link for important information on registering: https://hiepro.ehawaii.gov/welcome.html.

Deadline to submit bids is December 21, 2022, at 2:00 p.m. Hawaii Standard Time (HST). Bids received after said due date and time shall not be considered.

The scope of work consists of servicing and maintaining all electrical switchgear equipment, switchboards, transfer switches, transformers, associated with the airport, as well as its subsystems, assemblies, subassemblies, and associated components, at various airports throughout the State of Hawaii.

To be eligible for award, bidders must possess a valid State of Hawaii Specialty Contractor's "C-13" or "C-63" License at the time of bidding.

A pre-bid conference is scheduled for 10:00 a.m. HST on November 29, 2022. Due to the impacts of Covid-19, the pre-bid will be held via Microsoft Teams teleconference. All bidders that wish to attend the conference must send an email indicating their interest to Mr. Reid Miyasato, State Project Manager, at reid.m.miyasato@hawaii.gov. They will be added to the Teams attendance list and will be sent an invitation email. The invitation will contain a web-link to join the pre-bid meeting via a computer and a teleconference number to join via phone. The deadline to sign up for the pre-bid conference is 4:30 p.m. HST one (1) working day prior to the date of the pre-bid conference.

A site visit for each airport will be scheduled at 9:00 a.m. HST on the following days. Prospective bidders must contact the airport representative to indicate they will be planning to attend the site visit and coordinate the meeting place. It is the responsibility of the Contractor to understand the required work scope. The work shall be performed and documented in accordance with these specifications.

- Daniel K. Inouye International Airport on December 7, 2022.
  Andrew Watson (808) 836-6481
- Kalaeloa Airport (JRF) @ 9:00 a.m. and Dillingham Airfield (HDH) @ 1:00 p.m. on December 8, 2022.
  Andrew Watson (808) 836-6481
- Lihue Airport on December 9, 2022.
  Sheldon Moniz (808) 241-3929
- Molokai Airport on December 12, 2022.
  Antone Kalilikane (808) 567-9660
- Lanai Airport on December 13, 2022.
  Alan Fernandez (808) 565-7942
- Kahului Airport on December 14, 2022.
  Karl Amoral (808) 872-3826
- Kona International Airport (KOA) @ 9:00 a.m. and Waimea Airport (MUE) @ 1:00 p.m. on December 15, 2022.
  Chauncey Wong Yuen (808) 327-9522
- Hilo International Airport on December 16, 2022.
  Steven Santiago (808) 961-9302

All prospective bidders or their representatives (employees) are encouraged to attend the pre-bid meeting and site visit, but attendance is not mandatory.

The deadline to submit requests for information relating to the subject project shall be at 3:15 p.m. HST, 14-calendar days prior to bid opening not including the bid opening day. Any requests for information submitted after this deadline shall not be answered prior to the bid opening and bidders will be expected to bid accordingly. Requests for information shall be submitted via email to Mr. Reid Miyasato and copied to benton.ho@hawaii.gov. Requests for information will not be accepted via phone.

Campaign contributions by State and County Contractors. Contractors are hereby notified of the applicability of Section §11-355, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, contact the Campaign Spending Commission at (808) 586-0285.

Any protest of this solicitation shall be submitted in writing to the Director of Transportation, in accordance with §103D-701, HRS and §3-126, HAR.

The Equal Employment Opportunity Regulations of the Secretary of Labor implementing Executive Order 11246, as amended, shall be complied with on this project.

The U.S. Department of Transportation Regulation entitled "Nondiscrimination in Federally-Assisted Programs of the U.S. Department of Transportation," Title 49, Code of Federal Regulations (CFR), Part 21 is applicable to this project. Bidders are hereby notified that the Department of Transportation will affirmatively ensure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the grounds of race, color, national origin or sex (as directed by 23 CFR Part 200).

For additional information, contact Mr. Reid Miyasato, Project Manager, by phone at (808) 838-8891, or by email at reid.m.miyasato@hawaii.gov.

The State reserves the right to reject any or all proposals and to waive any defects in said proposals for the best interest of the public.

JADE T. BUTAY
Director of Transportation

Posted:

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

S P E C I A L P R O V I S I O N S

SPECIAL PROVISIONS

SECTION 1 – DEFINITIONS AND TERMS IS AMENDED BY ADDING THE FOLLOWING:

The definition for "1.33 SUBCONTRACTOR" is amended by deleting it and replacing it with the following:

"1.33 SUBCONTRACTOR – An individual partnership, firm, corporation, or joint venture, or other legal entity, as licensed or required to be licensed under Chapter 444, Hawaii Revised Statutes, as amended, which enters into an agreement with the Contractor to perform a portion of the work."

1.39 AIRPORT – The Kona International Airport (KOA), Island of Hawaii, State of Hawaii.

1.40 ASSIGNMENT – Operating Facilities which includes furnishings and space provided by the State to the Contractor necessary for the successful completion of the project and execution of all the duties and obligations imposed by the Contract.

1.41 PREMISES – All areas included in the Airport Property described in Section 10.3, which the contractor may use for operational purposes.

SECTION 2 – PROPOSAL REQUIREMENTS AND CONDITION IS AMENDED BY ADDING THE FOLLOWING:

2.4 DELIVERY OF PROPOSALS is amended by replacing the entire subsection with:

"2.4 DELIVERY OF PROPOSALS – The bidder shall submit the proposal in HIePRO. Bids received after said date and time shall not be considered. Original bid documents do not have to be submitted. Award will be made based on proposals submitted via HIePRO."

2.5 WITHDRAWAL OF PROPOSALS is amended by replacing the entire subsection with:

"2.5 WITHDRAWAL OF PROPOSALS – A bidder may withdraw or revise a proposal after the bidder submits the proposal in HIePRO. Withdrawal or revision of proposal must be completed before the time set for receiving of bids. "

2.6 PUBLIC OPENING OF PROPOSALS is not applicable.

2.9 CERTIFICATE FOR PERFORMANCE OF SERVICES – Pursuant to Section 103-55, Hawaii Revised Statutes, and unless indicated otherwise, bidders should submit the attached "Certificate for Performance of Services" in the event bids are in excess of $25,000. The notarized certificate must be submitted to said Contracts Office, Department of Transportation, 869 Punchbowl Street, Honolulu, Hawaii 96813, before entering into a contract to perform services.

As of the bid opening date, salaries of State employees performing work similar to the work called for under this contract are as follows:

Class	Salary Range	Hourly Wage
Electrician Supervisor II	F-210	$36.56^
Electrician Supervisor I	F-110	$34.36^
Electrician II	WS-10	$31.37*
Electrician I	BC-10	$29.63*

^Effective July 1, 2022
*Effective January 1, 2021

The above information is provided to the Contractor for guidance only and is subject to change in accordance with existing collective bargaining contracts or shall change as contracts are renegotiated. It is the bidder's responsibility to verify the accuracy of the wage rates contained herein and to provide for changes in the minimum wages which must be paid for the personnel working on the project at all times. Information may be obtained from the State Department of Personnel Services, Classification and Compensation Review Division (587-1010).

Bidders are further advised that they are not restricted to hire only those classifications of employees as listed, but are free to employ such other classifications of workers as the bidder deems proper and proposes to use on the project, and as may be according to his/her common hiring practice. However, the principal duties of employees other than those listed in Section 10 of the Specifications will be matched against those of State workers to determine the closest equivalent State employee classifications, and the Contractor must compensate such employee(s) at a rate which is no less than that of the equivalent State employee.

The Contractor shall be obligated to notify its employees performing work under this contract of the provisions of Section 103-55, H.R.S., and the current wage rate for public employees performing similar work. The Contractor may meet this obligation by posting a notice to this effect in the Contractor's place of business accessible to all employees, or the Contractor may include such notice with each paycheck or pay envelope furnished to the employee.

SECTION 3 – AWARD AND EXECUTION OF CONTRACT IS AMENDED BY ADDING THE FOLLOWING:

3.1 Requirement for award

D. Hawaii Compliance Express (HCE)-In lieu of the certificates referenced above, the bidder may make available proof of compliance through the Hawaii Compliance Express or any other designated certification process. Bidders may apply and register at the "Hawaii Compliance Express" website: https://vendors.ehawaii.gov/hce/splash/welcome.html

Section 7.8 – Labor and Compensation Requirements is amended by replacing the first two paragraphs with the following:

"SECTION 7.8 – LABOR AND COMPENSATION REQUIREMENTS – Pursuant to Section 103-55, H.R.S., Wages, Hours, Working Conditions of Employees of Contractor's Supplying Services, services to be rendered shall be performed by employees paid at wages or salaries not less than the wages paid to public officers and employees for similar work. Additional information on the requirements of Section 103-55, H.R.S., may be obtained at http://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0103/HRS_0103-0055.htm"

SECTION 7 – LEGAL RELATIONS AND RESPONSIBILITY IS AMENDED BY ADDING THE FOLLOWING:

7.10 Airport Rules, Security, and Violations

1. Rules and Regulations. The Contractor shall observe and obey all rules and regulations in effect at the commencement of this contract or which may from time to time during and throughout the term of this contract be prescribed, adopted or amended by the State and/or U.S. Department of Transportation's Transportation Security Administration, the Contractor's conduct and operations at or on the Airport. The Contractor acknowledges that it is familiar with the rules and/or regulations of the State currently in effect at the Airport.

2. Airport Security. The Contractor shall observe, comply with, and/or completely satisfy any and all of the security requirements for the Airport and any and all applicable security access procedures, rules, or regulations prescribed by the State and/or the U.S. Department of Transportation's Transportation Security Administration.

a. Security agreements. The Contractor shall enter into a security agreement or agreements with the State that may be required by the U.S. Department of Transportation's Transportation Security Administration for Airport security purposes, and said agreements shall become part of the contract and the agreements, covenants, promises, provisions, requirements, terms, and conditions contained herein, although executed separately.

b. The Contractor to maintain security. The Contractor shall also maintain security in such a manner that unauthorized persons shall not have access to any secure or restricted aircraft operations area through any part or portion of the Premises, and Contractor's officers, employees, agents, and guests, or any other party acting with the permission or consent of the Contractor, shall be under the control, supervision, or guidance of the Contractor when entering any secure or restricted aircraft operations area. The Contractor shall enter into any separate supplemental agreement required by the State or U.S. Department of Transportation's Transportation Security Administration that covers Airport security requirements to ensure the protection of the Airport.

c. Failure to prevent violations. The Contractor accepts liability and responsibility for: (i) The Contractor's failure to observe, comply with, and/or completely satisfy any and all Airport security requirements and applicable security access procedures, rules, or regulations prescribed by the State and/or the U.S. Department of Transportation's Transportation Security Administration;(iii) any and all reimbursements to the State for the State making direct payments to any citing authority for any fines or penalties of any and all Airport security violations by the Contractor, and/or Contractor's officers, employees, agents, and/or guests. Failure on the part of the Contractor to observe, comply with, and/or completely satisfy any security requirement shall be cause for the assessment of additional charges under this contract and/or termination of this contract by the State.

7.11 SPECIAL REQUIREMENTS FOR CONTRACTOR'S OPERATIONS IN THE AIRPORT OPERATIONAL AREAS (AOA) – The Contractor shall conform with the applicable sections of the State Airports Division Rules and Regulations pertaining to its access and operation in the AOA hereinafter described as follows:

A. Comprehensive General Liability Insurance - The Contractor shall obtain and maintain during the course of work, insurance coverage as specified by Section 7.9.

B. Authorized Vehicles

1. Only vehicles considered safe and necessary for the performance of this contract shall be allowed to operate in the AOA.

2. All authorized vehicles shall be identified with the Contractor's company name on each side with letters not less than four (4) inches in height or a logo no less than six (6) inches in height.

3. As a condition to enter and operate in the AOA, the Contractor shall obtain insurance coverage as required by Section 7.9.

4. The Contractor's operations on, over, across, and/or immediately adjacent to any runway and/or taxiway at a towered airport may require the use of a two-way radio communication. The Contractor shall obtain the necessary equipment at its own expense.

5. No person shall operate a motor vehicle on the AOA without personally possessing a current Motor Vehicle Operator's Permit issued by the Airport Manager to that person.

   a. The Motor Vehicle Operator's Permit will be issued only to persons who apply through the Airport Security Section and pass a written exam covering those portions of the Airport Rules and Regulations relating to the operation of vehicles in the AOA.

   b. Permits issued may be suspended or revoked for cause at any time by the Airports Division.

C. Airport Operational Area Identification Badge – Contractor's employees requiring entrance to the AOA must apply and obtain identification badges through the Airport Security Office.

1. All persons employed under this contract who have unescorted access to the AOA shall have background checks (to the extent permitted by law) including at a minimum, references and prior employment histories by the employees relating to employment in the preceding ten

(10) years.

2. As a condition in the issuance of AOA Identification Badges, Certification of Compliance shall be submitted with the application. The Certification shall affirm that a background check has been performed, correct and complete of those persons requiring access to the AOA. Background check records shall be maintained by the Contractor during the course of the work and shall contain the name, address, social security number, and previous employment and the person(s) contacted to verify such employment. The records shall be made available for inspection by the State."

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

S P E C I F I C A T I O N S

SECTION 1 - DEFINITION AND TERMS

Whenever the following pronouns are used in these specifications, or in any documents or instruments where these specifications govern, the intent and meaning shall be interpreted as follows:

1.1 ADDENDA - A written document which may be issued by the Director during the bidding period involving changes to the specifications and plans, if any, which shall be considered and made a part of the contract.

1.2 AIRPORTS DIVISION - Airports Division, Department of Transportation, State of Hawaii.

1.3 AWARD - The written acceptance of a proposal by the State.

1.4 BIDDER - Any individual, partnership, corporation or other legal entity, or combination thereof, submitting a proposal for the work contemplated, acting either directly or through a duly authorized representative.

1.5 CALENDAR DAY - Every day shown on the calendar. If no designation of calendar or working day is made, "day" shall mean calendar day.

1.6 CHANGE ORDER - A written order issued by the Director to the Contractor requiring the contract work to be performed in accordance with a change or changes that may involve an adjustment in contract time and price or requiring performance of any unforeseen work essential to complete the contract.

1.7 CONTRACT - The written agreement between the State and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment.

The contract includes the (1) notice to bidders, (2) proposal, (3) contract form and contract bond, (4) specifications, (5) special provisions and plans, if any, (6) addenda, (7) notice to proceed, and (8) change orders and agreements that are required to complete the work, all of which constitute one instrument.

1.8 CONTRACT BOND - The approved form of security, executed by the Contractor and its Surety or Sureties, guaranteeing the completion of the work in accordance with the terms of the contract, and guaranteeing full payment of all claims for labor, materials, and supplies used or incorporated in the work.

1.9 CONTRACT TIME - The number of working days or calendar days allowed for completion of the contract, including authorized time extensions.

If a calendar date is specified as the date of completion in lieu of the number of working days or calendar days, the contract shall be completed by that date.

In case the contract is for a specified period of time, the contract time shall be for said specified period of time.

1.10 CONTRACTOR - The individual, partnership, corporation or other legal entity, or combination thereof, contracting with the State for performance of the prescribed work.

1.11 DEPARTMENT - The State Department of Transportation.

1.12 DIRECTOR - The Director of Transportation, acting either directly or through the Director's duly authorized representative.

1.13 EQUAL OR APPROVED EQUAL - Whenever this term is used in the specifications and plans, if any, it means a brand or article pre-qualified in accordance with Section 6.2 Trade Names and Alternates and which may be used in place of the one specified.

1.14 H.A.R. or HAR - Hawaii Administrative Rules.

1.15 H.R.S. or HRS - Hawaii Revised Statutes.

1.16 HARBORS DIVISION - Harbors Division, Department of Transportation, State of Hawaii.

1.17 HIGHWAYS DIVISION - Highways Division, Department of Transportation, State of Hawaii.

1.18 HOLIDAYS - The days which are set apart and established as State holidays pursuant to Section 8-1, H.R.S.

1.19 INSPECTOR - The Director's authorized representative assigned to make detailed inspections of contract performance and materials supplied.

1.20 NOTICE TO BIDDERS - The public announcement, as required by law, inviting proposals for the work to be performed or materials to be furnished.

1.21 NOTICE OF FINAL ACCEPTANCE - Written notice from the Director to the Contractor that the entire contract has been completed in all respects in accordance with the specifications and plans, if any, and any changes thereof previously approved by the Director.

1.22 NOTICE TO PROCEED - Written notice from the Director to the Contractor advising the Contractor of the date on which he is to begin the prosecution of the work.

1.23 PLANS - The contract drawings approved by the Director which show the location, character, dimensions and details of the work to be done and shall be a part of the contract.

1.24 PROCUREMENT OFFICER - The Director's duly authorized representative including project managers, project engineers and contract administrators assigned to prepare, evaluate and administer contracts for the purchasing of goods and services.

1.25 PROPOSAL (OR BID) - The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

1.26 PROPOSAL FORM - The approved format prepared by the Department or a facsimile thereof on which bids for the work must be prepared and submitted. (Reasonable facsimile acceptable for bidding.)

1.27 PROPOSAL GUARANTY - The security furnished with a proposal to guarantee that the bidder will enter into the contract and furnish all other requirements if the bidder's proposal is accepted.

1.28 QUALIFICATION QUESTIONNAIRE - The specified forms on which the bidder shall furnish required information as to the bidder's ability to perform and finance the work.

1.29 S.L.H. or SLH - Session Laws of Hawaii.

1.30 SPECIAL PROVISIONS - Revisions to the specifications. The specific clauses setting forth conditions or requirements peculiar to the project under consideration which are not thoroughly or satisfactorily stipulated in these specifications.

1.31 SPECIFICATIONS - The directions, provisions, and requirements pertaining to the method and manner of performing the work and to the quantities and qualities of materials to be furnished under the contract.

1.32 STATE - The State of Hawaii.

1.33 SUBCONTRACTOR - An individual, partnership, corporation, other legal entity, or any combination thereof, that enters into an agreement with the Contractor to perform a portion of the work for the Contractor.

1.34 SUPERINTENDENT - The Contractor's representative who is responsible for and in charge of the work.

1.35 SURETY - The corporation, partnership or individual, other than the Contractor, executing a bond furnished by the Contractor and guaranteeing performance by the Contractor.

1.36 TITLES (OR HEADINGS) - The titles or headings of the Sections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation. Unless otherwise indicated, whenever the word "Section" is used, reference is being made to a Section in these specifications.

1.37 WORK - The furnishing of all labor, materials, equipment, and other incidentals necessary or convenient for the successful completion of the project and the execution of all the duties and obligations imposed by the contract.

1.38 WORKING DAY - Any day, except Saturdays, Sundays and State holidays.

SECTION 2 - PROPOSAL REQUIREMENTS AND CONDITIONS

2.1 QUALIFICATION OF BIDDERS - Prospective bidders must be capable of performing the work for which bids are called.

In accordance with Section 103D-310, HRS, the Department may require any prospective bidder to submit answers to questions contained in the "Standard Qualification Questionnaire for Prospective Bidders on Public Works Contracts" on the form furnished by the Department, properly executed and notarized, setting forth a complete statement of the experience of such prospective bidder and its organization in performing similar work and a statement of the equipment proposed to be used, together with adequate proof of the availability of such equipment. Whenever it appears to the Department, from answers to the questionnaire or otherwise, that the prospective bidder is not fully qualified and able to perform the intended work, the Department will, after affording the prospective bidder an opportunity to be heard and if still of the opinion that the bidder is not fully qualified to perform the work, refuse to receive or consider any bid offered by the prospective bidder. All information contained in the answers to the questionnaire shall be kept confidential. Questionnaire so submitted shall be returned to the bidders after serving their purpose.

Failure to complete the qualification questionnaire will be sufficient cause for the Department to disqualify a prospective bidder.

No person, firm or corporation may bid where (1) the person, firm, or corporation, or (2) a corporation owned substantially by the person, firm, or corporation, or (3) a substantial stockholder or an officer of the corporation, or (4) a partner or substantial investor in the firm is in arrears in payments owed to the State of Hawaii or its political subdivisions or is in default as a surety or failure to do faithfully and diligently previous contracts with the State.

2.2 REJECTION OF PROPOSALS CONTAINING ALTERATIONS, ERASURES, OR IRREGULARITIES - Proposals may be rejected if they show any alterations of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.

When proposals are signed by any agent, other than the officer or officers of a corporation authorized to sign contract on its behalf or a member of copartnership, a Power of Attorney must be on file with the Department prior to opening bids or shall be submitted with the proposal; otherwise, the proposal may be rejected as irregular and unauthorized.

Members of a joint venture may be requested to supply the Department with a copy of their joint venture agreement or each member of the joint venture may be required to sign the proposal.

2.3 PROPOSAL GUARANTY - A proposal guaranty (bid bond) is not required except when specifically noted in the proposal section of the bid document.

When a proposal guaranty is required with a bid, it will be specifically stated in the proposal; and no proposal totaling $25,000 or more will be considered unless accompanied by one of the following forms of bidder's security:

A. a deposit of legal tender; or

B. a surety bid bond underwritten by a company licensed to issue bonds in the State of Hawaii and submitted on the standard form provided herewith; or

C. a certificate of deposit, share certificate, cashier's check, treasurer's check, teller's check, or official check drawn by, or a certified check accepted by and payable on demand to the State by a bank, savings institution, or credit union insured by the Federal Deposit Insurance Corporation (FDIC) or the National Credit Union Administration (NCUA).

1. The bidder may use these instruments only to a maximum of one hundred thousand dollars ($100,000.00).

2. If the required security or bond amount totals over one hundred thousand dollars ($100,000.00), more than one instrument not exceeding one hundred thousand dollars ($100,000.00) each and issued by different financial institutions shall be acceptable.

3. The instrument shall be made payable at sight to the Department of Transportation, State of Hawaii.

According to Section 103D-323, HRS, the above shall be in a sum not less than five percent (5%) of the amount bid.

2.4 DELIVERY OF PROPOSALS - Each proposal shall be placed, together with the proposal guaranty when required, in an envelope and sealed and so marked as to indicate the identity of the project, the name and address of the bidder, and other required information and then delivered as indicated in the Notice to Bidders. Proposals will be received up to the time fixed in the Notice to Bidders for the opening of bids.

2.5 WITHDRAWAL OF PROPOSALS - Any proposal may be withdrawn at any time prior to the time fixed in the Notice to Bidders for the opening of proposals upon the filing of a written request therefore with the Department, executed by the bidder or a duly authorized representative. The withdrawal of a proposal shall not preclude a bidder from submitting a new proposal.

2.6 PUBLIC OPENING OF PROPOSALS - Proposals will be opened and read publicly at the time and place indicated in the Notice to Bidders. Bidders or their authorized agents are invited to be present.

2.7 DISQUALIFICATION OF BIDDERS - Any of the following reasons may be considered as being sufficient grounds for the disqualification of a bidder and the rejection of his proposal or proposals.

A. More than one proposal for the same work from an individual, firm, or corporation under the same or different name.

B. Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the Department until such participant shall have been reinstated as a qualified bidder.

C. Evidence of assistance from a person who has been an employee of the agency within the preceding two years and who participated while in State office or employment in the matter with which the contract is directly concerned, pursuant to Section 84-15, H.R.S.

D. Lack of proposal guaranty.

E. Unsigned proposal or proposal not signed in ink by person or persons legally authorized to submit a proposal on behalf of the bidder.

2.8 MATERIAL GUARANTY - The bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the prosecution of the work, together with samples. Such samples may be subjected to tests to determine their quality and fitness for the work.

SECTION 3 - AWARD AND EXECUTION OF CONTRACT

3.1 AWARD OF CONTRACT - The State reserves the right to reject any and all proposals and to waive any defects as may be deemed to be in the best interest of the public.

The award of contract, if it be awarded, will be made within sixty (60) calendar days after the opening of bids to the lowest responsive and responsible bidder whose proposal complies with all the prescribed requirements. The successful bidder will be notified, by letter mailed to the address shown in its proposal, that its proposal has been accepted and it has been awarded the contract.

Requirement for award. To be eligible for award, the apparent low Bidder will be contacted to submit copies of the documents listed below to demonstrate compliance with Section 103D-310(c), HRS. The documents should be submitted to the Department as soon as possible. If a valid certificate/clearance is not submitted on a timely basis for award of a contract, a Bidder otherwise responsive and responsible may not receive the award.

A. Tax Clearance.

Pursuant to §103D-310(c), 103-53 and 103D-328, HRS, the successful bidder shall be required to submit a certified copy of its tax clearance issued by the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS) to demonstrate its compliance with Chapter 237, HRS. A tax clearance is valid for six (6) months from the most recent approval stamp date on the tax clearance and must be valid on the bid's first legal advertisement date or any date thereafter up to the bid opening date.

FORM A6, TAX CLEARANCE CERTIFICATE, is available at the following website:

http://www.hawaii.gov/tax/

To receive DOTAX Forms by fax or mail, phone (808)587-7572 or 1-800-222-7572.

The application for the Tax Clearance Certificate is the responsibility of the bidder, and must be submitted directly to the DOTAX or IRS. The approved certificate may then be submitted to the Department.

B. DLIR Certificate of Compliance.

Pursuant to §103D-310(c), HRS, the successful bidder shall be required to submit a copy (faxed copies are acceptable) of its approved Certificate of Compliance issued by the Hawaii State Department of Labor and Industrial Relations (DLIR) to demonstrate its compliance with unemployment insurance (Chapter 383, HRS), workers' compensation (Chapter 386, HRS), temporary disability insurance (Chapter 392, HRS), and prepaid health care (Chapter 393, HRS). The certificate is valid for six (6) months from the most recent approval stamp date on the certificate and must be valid on the bid's first legal advertisement date or any date thereafter up to the bid opening date. For certificates which receive a "pending" approval stamp, a DLIR approval stamp is required prior to the issuance of the Notice to Proceed.

FORM LIR#27, APPLICATION FOR CERTIFICATE OF COMPLIANCE WITH SECTION 3-122-112, HAR, is available at the following website:

www.hawaii.gov/labor

More information is available by calling the DLIR Unemployment Insurance Division at (808) 586-8926.

Inquiries regarding the status of a LIR#27 Form may be made by calling the DLIR Disability Compensation Division at (808)586-9200.

The application for the Certificate of Compliance is the responsibility of the bidder, and must be submitted directly to the DLIR. The approved certificate may then be submitted to the Department.

C. DCCA Certificate of Good Standing.

Pursuant to §103D-310(c), HRS, the successful bidder shall be required to submit a copy (faxed copies are acceptable) of its approved Certificate of Good Standing issued by the Hawaii State Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) to demonstrate that it is either:

(1) incorporated or organized under the laws of the State; or

(2) registered to do business in the State as

a separate branch or division that is capable of fully performing under the contract.

A Certificate of Good Standing is valid for six (6) months from the approval date on the certificate and must be valid on the bid's first legal advertisement date or any date thereafter up to the bid opening date. A Hawaii business that is a sole proprietorship, is not required to register with the BREG, and therefore not required to submit a Certificate of Good Standing. Bidders are advised that there are costs associated with registering and obtaining a Certificate of Good Standing from the DCCA.

To purchase a CERTIFICATE OF GOOD STANDING, go toOn-Line Services at the following website:

www.hawaii.gov/dcca/

The application for the Certificate of Good Standing is the responsibility of the bidder, and must be submitted directly to the DCCA. The approved certificate may then be submitted to the Department.

3.2 CANCELLATION OF AWARD - The State reserves the right to cancel the award of any contract any time before the execution of said contract by all parties without any liability to the successful bidder or any other bidder.

3.3 RETURN OF PROPOSAL GUARANTY - All proposal guaranties, except those of the lowest two (2) bidders, will be returned immediately following the opening and checking of the proposals. The retained proposal guaranty of the second lowest bidder, if not a bid bond, will be returned within ten (10) calendar days following execution of contract by the successful bidder. The successful bidder's proposal guaranty, if not a bid bond, will be returned after a satisfactory contract bond has been furnished and the contract has been executed.

3.4 REQUIREMENT OF CONTRACT BOND - Only when required by the proposal, the successful bidder at the time of the execution of the contract shall file good and sufficient performance and payment bonds on the forms furnished by the Department, or a facsimile thereof, conditioned for the full and faithful performance of the contract in accordance with the terms and intent thereof and also for the prompt payment to all others for all labor and materials furnished by them to it and use in the prosecution of the work provided for in such contract,

in the manner, form and amount required by Section 3-122-224(b)(2), H.A.R., which bonds shall be in an amount equal to fifty per cent (50%) of the contract price, including amounts estimated to be required for extra work, or in the case of price-term, open-end, or requirements contract under which the total amount to be paid to the Contractor cannot be accurately estimated at the time the contract is to be awarded, the bond amounts shall be as designated in the bid documents. Such bonds shall also by their terms inure to the benefit of any and all persons entitled to file claims for labor performed or materials furnished in the work so as to give them a right of action as contemplated by Section 103D-324, H.R.S.

The bidder shall limit the acceptable performance and payment bonds to the following:

(a) Legal tender; or

(b) Surety bond underwritten by a company licensed to issue bonds in the State of Hawaii; or

(c) A certificate of deposit; share certificate,; cashier's check; treasurer's check; teller's check drawn by or a certified check accepted by and payable on demand to the State by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation (FDIC) or the National Credit Union Administration (NCUA).

1. The bidder may use these instruments only to a maximum of one hundred thousand dollars ($100,000.00).

2. If the required security or bond amount totals over one hundred thousand dollars ($100,000.00) more than one instrument not exceeding one hundred thousand dollars ($100,000.00) each and issued by different financial institutions shall be acceptable.

3.5 EXECUTION OF CONTRACT - The contract and the "Certificate for Performance of Services", similar to a copy of the same annexed hereto, shall be executed by the successful bidder and returned, together with the contract bonds, when required, within ten (10) days after the award of the contract or within such further time as the Director may allow after the bidder has received the contract for execution.

Pursuant to Section 103D-309, H.R.S., the contract shall not bind the State in any way unless said contract has been fully and properly executed by all the parties thereto and

the Comptroller has endorsed thereon a certificate that there is available an unexpended appropriation over and above all outstanding contracts, sufficient to cover the amount required by the contract.

3.6 FAILURE TO EXECUTE CONTRACT - Failure to execute the contract, Certificate for Performance of Services and file acceptable bonds, when required, within ten (10) days after the award of the contract, or within such further time as the Director may allow, shall be cause for the cancellation of the award and the forfeiture of the proposal guaranty. Award of the contract may then be made to the next lowest responsible bidder.

SECTION 4 - SCOPE OF WORK

4.1 WORK TO BE DONE - The work to be done is described in the Section(s) following Section 9 of these specifications.

4.2 PERFORMANCE OF WORK - The Contractor shall employ, so far as possible, such methods and means in carrying out his work so as not to cause any interruption, disturbance, or interference with the public.

In case the Contractor is performing work in a building, the Contractor shall conduct the work in such a manner so as not to cause any interruption, disturbance, or interference with the business activities of the tenants in the building.

4.3 EXTRA WORK - New and unforeseen items of work will be classed as extra work when they cannot be covered by any of the various items for which there is a bid price.

4.4 CHANGES AND CLAIMS FOR ADJUSTMENT

A. Change order. By a written order, at any time, and without notice to any surety, the procurement officer may, subject to all appropriate adjustments, make changes within the general scope of this contract in any one or more of the following:

1. Drawings, designs, or specifications, if the goods to be furnished are to be specially manufactured for the State in accordance therewith;
2. Method of shipment or packing;
3. Place of delivery;
4. Changes in the work within the scope of the contract; or
5. Changes in the time of performance of the contract that do not alter the scope of work.

B. Adjustments of price or time for performance. If any change order increases or decreases the contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed by the order, an adjustment shall be made and the contract modified in writing accordingly. Any adjustment in contract price made pursuant to this clause shall be determined in accordance with the price adjustment clause of this contract. Failure of the parties to agree to an adjustment shall not excuse the contractor from proceeding with the contract as changed, provided that the procurement officer promptly and duly make the provisional adjustments in payment or time for performance as may be reasonable. By proceeding with the work, the contractor shall not be deemed to have

prejudiced any claim for additional compensation, or an extension of time for completion.

C. Time period for claim. Within thirty (30) days after receipt of a written change order under subsection (a) unless the period is extended by the procurement officer in writing, the contractor shall file notice of intent to assert a claim for an adjustment. Later notification shall not bar the contractor's claim unless the State or county is prejudiced by the delay in notification.

D. Claim barred after final payment. No claim by the contractor for an adjustment hereunder shall be allowed if notice is not given prior to final payment under this contract.

E. Other claims not barred. In the absence of a change order, nothing in this clause shall be deemed to restrict the contractor's right to pursue a claim as under the contract or for breach of contract.

4.5 PRICE ADJUSTMENT

Any adjustment in contract price pursuant to a clause in this contract shall be made in one or more of the following ways:

A. By agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable;

B. By unit prices specified in the contract or subsequently agreed upon;

C. By the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as specified in the contract or subsequently agreed upon;

D. In such other manner as the parties may mutually agree; or

E. In the absence of agreement between the parties, by a unilateral determination by the procurement officer of the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as computed by the procurement officer in accordance with generally accepted accounting principles and applicable sections of chapters 3-123 and 3-126 of the Hawaii Administrative Rules.

4.6 VARIATION IN QUANTITY

Upon agreement of the parties, the quantity of goods or services or both specified in this contract may be increased by a maximum of ten (10) percent provided (1) the unit prices will remain the same except for any price adjustments otherwise applicable and (2) the procurement officer makes a written determination that such an increase will either be more economical than awarding another contract or that it would not be practical to award another contract.

SECTION 5 - CONTROL OF WORK

5.1 AUTHORITY OF DIRECTOR - The Director shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed; the manner of performance and rate of progress of the work; the compensation for work performed; the interpretation of the contract and the fulfillment of the contract on the part of the Contractor. The Director's decision shall be final and the Director shall have the authority to enforce any such decision and order which the Contractor fails to carry out promptly and diligently. The Director shall have the following powers in the way of enforcement:

A. The right to suspend the work.

B. The right to withhold payment due the Contractor.

5.2 COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS - These specifications, the plans, special provisions, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to describe and provide for the complete work.

5.3 COOPERATION OF CONTRACTOR AND DIRECTOR - The Contractor shall have available at the work site at all times, a copy of the specifications, special provisions and plans. The Contractor shall give the work constant attention to facilitate the progress thereof and shall cooperate with the Director in every way possible.

Before starting work on the project, the Contractor shall designate in writing a superintendent who shall have complete authority to represent and to act for the Contractor.

5.4 INSPECTION - The Director at all times shall have access to the work during its prosecution and shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of these specifications and special provisions. All work done and all materials furnished shall be subject to the Director's inspection and approval.

The inspection of the work shall not relieve the Contractor of any of its obligations to fulfill its contract as prescribed, and defective work shall be made good and unsuitable materials may be rejected, notwithstanding that such defective work and materials may have been previously overlooked by the Director and accepted or included in an estimate for payment.

Projects financed in whole or in part with Federal funds shall be subject to inspection at all times by representatives of the Federal agency involved.

5.5 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK - All work which has been rejected shall be corrected or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed the Contractor for such correction or removal and replacement. Upon failure on the part of the Contractor to comply promptly with any order of the Director, the Director may cause any rejected work to be corrected or removed and replaced and to deduct the costs thereof from any monies due or to become due the Contractor.

5.6 CLAIMS AND DISPUTES - The Contractor may give notice in writing to the Director for claims that extra compensation, damages, or an extension of time for completion is due the Contractor for one or more of the following reasons:

A. Requirements not clearly covered in the contract, or not ordered by the Director as extra work;

B. Failure between the State and the Contractor to agree to an adjustment in price for a contract change order issued by the State; or

C. An action or omission on the part of the Director requiring performance changes within the scope of the contract.

The Contractor shall continue with performance of the contract in compliance with the directions or orders of the procurement officer, but by so doing, the Contractor shall not be deemed to have prejudiced any claim for additional compensation, damages, or an extension of time for completion; provided:

A. The notice in writing be given:

1. Before the commencement of the work involved, if at that time the Contractor knows of such requirements or the occurrence of such actions or omissions; or

2. Within thirty (30) calendar days after the Contractor knows of such requirements or the occurrence of such action or omission if the Contractor did not have such knowledge before the commencement of the work; or

3. Within thirty (30) calendar days after receipt of the written contract change order that was not

agreed upon by both parties; or

4. Within such further time as may be allowed by the Director in writing.

B. The notice shall clearly state the Contractor's intention to make claim and the reasons why the Contractor believes that additional compensation, changes or an extension of time may be remedies to which the Contractor is entitled; and afford the Director every facility for keeping records of the actual cost of work. Failure on the part of the Contractor to give such notification or to afford the procurement officer proper facilities for keeping strict account of actual cost shall constitute waiver of the claim for such extra compensation. The filing of such notice by the Contractor and the keeping of costs by the procurement officer shall not in any way be construed to prove the validity of the claim.

The Director will review the notice and render a decision. The Director's decision shall be final and conclusive unless, within thirty (30) calendar days from the date of the decision, the Contractor mails or otherwise furnishes a written appeal to the Director. The decision of the Director shall be final. Later notification of such claims shall not bar the Contractor's claim unless the State is prejudiced by the delay in notification. No claim by the Contractor for an adjustment hereunder shall be allowed if notice is not given before final payment under this contract. Any adjustment in the contract price made pursuant to this clause shall be determined according to Section 4.5 - Price Adjustment.

The provisions of this Section shall not be construed as establishing any claims contrary to the terms of Section 4.4 - Changes and Claims for Adjustment.

Nothing herein contained, however, shall excuse the Contractor from compliance with any rules of law precluding any state officers and any Contractors from acting in collusion or bad faith in issuing or performing contract change orders which are clearly not within the scope of the contract.

SECTION 6 - CONTROL OF MATERIAL AND EQUIPMENT

6.1 DEFECTIVE MATERIALS - All materials not conforming to the requirements of these specifications or the special provisions shall be considered defective and all such materials, whether in place or not, shall be rejected. They shall be removed immediately from the site of the work, unless otherwise permitted by the Director. No rejected materials, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the Director. Upon failure on the part of the Contractor to comply promptly with any order to remove and replace defective materials, the Director may remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

6.2 TRADE NAMES AND ALTERNATES - For convenience in designation on the plans or in the specifications, certain equipment or articles or materials may be designated under a trade name or the name of a manufacturer and its information catalogue. The use of alternate equipment or an article or material which is of equal quality and of the required characteristics for the purposes intended will be permitted, subject to the written approval of the Director, in accordance with the following requirements:

A. QUALIFICATION BEFORE BID OPENING - When the specifications and/or plans specify one or more manufacturer's brand names of materials or equipment to indicate a quality, style, appearance, or performance, the bidder will be assumed to have based its bid on one of the specified named products, except where such proprietary product are specified, alternate brands may be qualified if found equal or better by the Director. Bidders requesting qualification of alternate proprietary products must submit a request to the Director for review and approval at the earliest date possible, but in any event, such request must be received at the Contracts office not later than ten (10) days before the bid opening date, not including the bid opening date.

It shall be the responsibility of the bidder to submit sufficient evidence based upon which a determination can be made by the Director that the alternate brand is qualified. The evidence shall be transmitted with a covering letter which shall list the evidence submitted and the items for which the substitution is requested.

If the evidence accompanying a request for substitution is insufficient to qualify a particular

model, the request shall be denied provided that further evidence may be submitted to qualify the item five (5) days prior to the bid opening date if the initial request was made prior to the deadline set above.

B. SUBSTITUTION AFTER BID OPENING - Substitution of material or equipment will not be allowed after the bid opening date except under the following unforeseen circumstances:

1. If a specified or pre qualified item is delayed by a lengthy strike in the factory or other unforeseeable contingency beyond the control of the Contractor which would cause an abnormal delay in the project completion.

2. If a specified or pre qualified item is found to be unusable due to change or other circumstances.

3. If the Contractor is willing to provide a more recently developed or manufactured item of material or equipment of the same manufacturer which the Director determines to be equal or better than the one specified or pre-qualified.

A substitution request, regardless of reason, shall be fully explained in writing by the Contractor and shall include its justification for said request, the quantities and unit prices involved, quotations and such other documents as are deemed necessary to support the request. Any savings in cost will accrue to the State and any additional cost for the substituted items will be paid by the Contractor.

The burden of proof as to the comparative quality and suitability of alternate equipment, articles, or materials shall be upon the bidder or Contractor and bidder or Contractor shall furnish, at its own expense, all information necessary or related thereto as required by the Director. The Director shall be the sole judge as to the comparative quality and suitability of alternate equipment, articles or materials and the Director's decisions shall be final.

The above shall not be construed to mean that substitution for brand name specified materials and equipment will be allowed; the Director reserves the right to deny any request he deems irregular or not in the best interest of the State.

6.3 ASSIGNMENT OF ANTITRUST CLAIMS FOR OVERCHARGES FOR GOODS AND MATERIALS PURCHASED

A. Vendor and purchaser recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, vendor hereby assigns to purchaser any and all claims for such overcharges as to goods and materials purchased in connection with this order or contract, except as to overcharges which result from antitrust violations commencing after the price is established under this order or contract and which are not passed on to the purchaser under an escalation clause.

B. Contractor and owner recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the owner. Therefore, contractor hereby assigns to owner any and all claims for such overcharges as to goods and materials purchased in connection with this order or contract, except as to overcharges which result from antitrust violations commencing after the price is established under this order or contract and any change order. In addition, contractor warrants and represents that each of its first tier suppliers and subcontractors shall assign any and all such claims to owner, subject to the aforementioned exception.

SECTION 7 - LEGAL RELATIONS AND RESPONSIBILITY

7.1 LAWS TO BE OBSERVED - The Contractor shall comply with all federal, state, city and county laws, ordinances, rules and regulations which in any manner affect those engaged or employed in the work, the materials used in the work, and the conduct of the work. Any reference to such laws, ordinances, rules and regulations shall include any amendments thereto effective as of the date of the call for sealed proposals.

The Contractor shall hold harmless, indemnify, defend and where appropriate, insure the State, its officers, agents and employees against any claim or liability arising from or based on the violation of any such laws, ordinances, rules or regulations. If any discrepancy or inconsistency is discovered in the contract for the work in relation to any law, ordinance, rule, regulation, order or decree, the Contractor shall forthwith report the same to the Director in writing.

7.2 PERMITS AND LICENSES - The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work.

7.3 PATENTS - The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and shall hold harmless, indemnify, defend and where appropriate, insure the State, its officers, agents and employees from all suits at law or actions of every nature, for or on account of the use of any patented materials, equipment, devices or processes.

7.4 RESPONSIBILITY FOR INJURY AND DAMAGE - The State, its officers, agents and employees shall not be held accountable in any manner for any loss or damage to the work or any part thereof, or for any of the materials and equipment used or employed in performing the work, or for any injury to any person or persons either workers or the public, or for any damage to property caused by the Contractor or its workers or any one employed by the Contractor. The Contractor shall be responsible for any liability imposed by law for any injury to any person or any damage to property resulting from defects or obstructions or from any cause whatsoever during the progress of the work or at any time before its completion and final acceptance. The acceptance of the completed work of the Contractor by the Director shall not relieve the Contractor from any liability which may have accrued or may accrue as a result of the performance of the work by the Contractor. The Contractor shall hold harmless, indemnify, defend and where appropriate, insure the State, its officers, agents and employees, from all suits or actions of every name, kind and description, brought for or on account of

any injuries or damages sustained by any persons or property caused by the Contractor, its servants or agents, or by or on account of any act or omission of the Contractor or its servants or agents, regardless of whether such actions or any claim is brought against them or any one of them before or after the final acceptance of the work. In addition to any remedy authorized by law, the State may withhold payment of any money due to Contractor as shall be reasonable until disposition has been made of any suits or claims for injuries or damages.

It is not the intention of the parties to this contract to make the public or any member thereof a third party beneficiary hereunder, or to authorize anyone not a party hereto to maintain a suit for personal injuries or property damage based on a contract theory of liability. In any event, the Contractor shall hold harmless, indemnify, defend and where appropriate, insure the State from suits and claims for personal injuries or property damage where such injuries or damage are caused by the negligent acts or omissions of the Contractor, its agents or employees.

7.5 COOPERATION BETWEEN CONTRACTORS - Where two or more Contractors are employed on related or adjacent work, each shall conduct its operations in such a manner as not to cause any unnecessary delay or hindrance to the other.

7.6 CONTRACTOR'S RESPONSIBILITY FOR WORK - Until the acceptance of the contract, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all damages to any portion of the work occasioned by any of the above causes before its completion and acceptance and shall bear the expenses thereof.

7.7 NO PERSONAL LIABILITY - Neither the Director nor any other officer or authorized employee of the Department shall be personally responsible for any liability arising under the contract.

7.8 LABOR AND COMPENSATION REQUIREMENTS - Wages paid each laborer employed by the Contractor or any subcontractor shall not be less than the prevailing minimum wage rate prescribed by law.

Every laborer employed by the Contractor or any subcontractor whose rate of compensation is Five Dollars ($5.00) or less per day shall be paid his wages weekly pursuant to Section 103-54, H.R.S.

The Contractor's attention is directed to Chapter 377, H.R.S., Hawaii Employment Relations Act; Chapter 378, H.R.S., Employment Practices; Chapter 383, H.R.S., Hawaii Employment Security Law; Chapter 386, H.R.S., Workers' Compensation Law; Chapter 387, H.R.S., Wage and Hour Law; Chapter 392, H.R.S., Temporary Disability Insurance; Chapter 393, H.R.S., Prepared Health Care Act; Chapter 396, H.R.S., Occupational Safety and Health; and Section 103-55, H.R.S., Wages, Hours, Working Conditions of Employees of Contractor's Supplying Services.

7.9 INSURANCE - Prior to commencing with the work, the Contractor shall, at its own expense, obtain and submit to the Department, Certificate of Insurance from an insurance company authorized by the laws of the State to issue such insurance in the State of Hawaii showing full policy coverage of the Contractor.

TYPES OF INSURANCE:

A. Workers' Compensation:

The Contractor shall obtain worker's compensation insurance for all persons whom they employ in carrying out the work under this contract. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract. The minimum limit of liability for workers compensation is the HRS 386 statutory limit.

B. Comprehensive Automobile Liability:

The Contractor shall obtain Auto Liability Insurance covering all owned, non-owned and hired autos with a combined single Limit of not less than $1,000,000 per accident for bodily injury and property damage with the State of Hawaii named as additional insured. The required limit of insurance may be provided by a single policy or with a combination of primary and excess

policies.

C. Commercial General Liability:

The Contractor shall obtain General Liability insurance with a limit of not less than $1,000,000 per occurrence and in the aggregates. The General liability insurance shall include the State of Hawaii as an additional insured. The required limit of insurance may be provided by a single policy or with a combination of primary and excess policies.

All policies must provide that 30 days prior written notice of cancellation or material change in coverage be given to certificate holders stated above.

Such insurance when accepted by the Director in writing shall become applicable and shall remain unmodified throughout the entire term of the contract and in no event shall be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the State. Such insurance aforementioned shall cover the State for all work performed under the contract, all work performed incidental thereto or directly or indirectly connected therewith, including other work performed outside of the work area, and all change orders.

Any delay in the submission and approval of insurance certificates shall not be justification of or grounds for a request by the Contractor postponing the issuance of a notice to proceed notwithstanding the fact that the Contractor shall not be allowed to proceed with the work until said certificates are submitted and approved.

Failure to obtain insurance in accordance with the Section, on the part of the Contractor, shall be considered a major breach of the contract; and should the State be forced to expend funds which would have been covered under the insurance, the Contractor agrees to assume the liability for such funds and to indemnify and hold the State harmless.

SECTION 8 - PROSECUTION AND PROGRESS

8.1 NOTICE TO PROCEED - A "Notice to Proceed" letter will be written to the Contractor by the Director. Such letter will indicate the date the Contractor is to begin work and from which date the contract time will commence to run.

The Contractor shall diligently perform the required duties during the term of the contract, or if the work is to be completed within a specified time limit, the Contractor shall diligently prosecute the work to completion within the specified time limit.

8.2 SUBCONTRACTING - The Contractor shall give its personal attention to the fulfillment of the contract and shall keep the work under its control.

Subject to Section 103D-302, H.R.S., the Contractor may subcontract a portion of the work pursuant to the provisions of this section, but the Contractor shall be primarily responsible for the work so subcontracted. The Contractor shall not subcontract any work to any subcontractor who has been suspended by the State.

Before any work is started under a subcontract, the Contractor shall have the written approval of the Director on a written statement on forms furnished by the Department, indicating the work to be subcontracted, the names of the subcontractors and the description of each portion of the work to be so subcontracted and showing that the subcontractors are particularly experienced and equipped to do the work subcontracted. The Contractor shall give assurance that the minimum wage rate schedule as stated in the contract shall apply to labor performed on the work so subcontracted. Consent of the Director to the subcontracting of work shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the contract.

When any portion of the work which has been subcontracted by the Contractor is not prosecuted in a manner satisfactory to the Director, the Contractor, upon receipt of a notice thereof in writing from the Director, shall remove the subcontractor immediately from the project and the subcontractor shall not again be employed on the work.

8.3 ASSIGNMENT OF CONTRACT - The performance of the contract may be assigned only with the prior written consent of the Director and when applicable, the Contractor's surety. Consent to any assignment shall not relieve the Contractor or the Contractor's surety of any obligations of the contract.

8.4 INSUBORDINATION - If any subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the Director or shall appear to the Director to be incompetent or to act in a disorderly or improper manner, the subcontractor or person shall be removed immediately upon request by the Director and shall not again be employed on the work, nor shall it be employed upon any other Department project currently under contract to the same Contractor or subcontractor.

8.5 TEMPORARY SUSPENSION OF WORK

A. Order to stop work. The Director, may, by written order to the contractor, at any time, and without notice to any surety, require the contractor to stop all or any part of the work called for by this contract. This order shall be for a specified period not exceeding sixty (60) days after the order is delivered to the contractor, unless the parties agree to any further period. Any such order shall be identified specifically as a stop work order issued pursuant to this section. Upon receipt of such an order, the contractor shall forthwith comply with its terms and take all reasonable steps to minimize the occurrence of costs allocable to the work covered by the order during the period of work stoppage. Before the stop work order expires, or within any further period to which the parties shall have agreed, the Director shall either:

1. Cancel the stop work order; or

2. Terminate the work covered by such order as provided in the "termination for default clause" or the "termination for convenience clause" of this contract.

B. Cancellation or expiration of the order. If a stop work order issued under this section is canceled or if the period of the order or any extension thereof expires, the contractor shall have the right to resume work. An appropriate adjustment shall be made in the delivery schedule or contract price, or both, and the contract shall be modified in writing accordingly; if:

1. The stop work order results in an increase in the time required for, or in the contractor's cost properly allocable to, the performance of any part of this contract; and

2. The contractor asserts a claim for such an adjustment within thirty (30) days after the end of the period of work stoppage; provided that, if the Director decides that the facts justify such

action, any such claim asserted may be received and acted upon at any time prior to final payment under this contract.

C. Termination of stopped work. If a stop work order is not canceled and the work covered by such order is terminated for default or convenience, the reasonable costs resulting from the stop work order shall be allowable by adjustment or otherwise.

D. Adjustment of price. Any adjustment in contract price made pursuant to this clause shall be determined in accordance with the price adjustment clause of this contract.

8.6 LIQUIDATED DAMAGES - It is mutually understood and agreed by and between the parties to the contract that the performance by the Contractor of its duties every calendar/working day is an essential part of the contract and in case of failure on the part of the Contractor to perform its duties for the time specified in the contract, the State will be damaged thereby and the amounts of said damages being difficult, if not impossible of definite ascertainment and proof, shall be estimated, agreed upon and fixed at the sum shown in the proposal for each and every calendar/working day that the Contractor fails to perform its duties during the period the contract is in effect; and the Contractor shall pay the liquidated damages as provided for in the proposal and, in case the same are not paid, the Department may deduct the amount thereof from any monies due or that may become due the Contractor under the contract.

8.7 DEFAULT AND TERMINATION OF CONTRACT

A. Termination by Default. If the contractor refuses or fails to perform any of the provisions of this contract with such diligence as will ensure its completion within the time specified in this contract, or any extension thereof, otherwise fails to timely satisfy the contract provisions, or commits any other substantial breach of this contract, the Director may notify the contractor in writing of the delay or non-performance and if not cured in ten (10) days or any longer time specified in writing by the Director, such officer may terminate the contractor's right to proceed with the contract or such part of the contract as to which there has been delay or a failure to properly perform. In the event of termination in whole or in part the Director may procure similar goods or services in the manner and upon terms deemed appropriate by the Director. The contractor shall continue performance of the contract to the extent it is not terminated and shall be liable for excess costs incurred in procuring

similar goods or services.

1. Contractor's duties. Notwithstanding termination of the contract and subject to any directions from the Director, the contractor shall take timely, reasonable, and necessary action to protect and preserve property in the possession of the contractor in which the State or county has an interest.

2. Compensation. Payment for completed goods delivered and accepted by the State shall be at the contract price. Payment for the protection and preservation of property shall be in an amount agreed upon by the contractor and Director; if the parties fail to agree, the Director shall set an amount subject to the contractor's rights under chapter 3-126, HAR. The State may withhold from amounts due the contractor such sums as the Director deems to be necessary to protect the State against loss because of outstanding liens or claims of former lien holders and to reimburse the State for the excess costs incurred in procuring similar goods and services.

3. Excuse for nonperformance or delayed performance. Except with respect to defaults of subcontractors, the contractor shall not be in default by reason of any failure in performance of this contract in accordance with its terms, including any failure by the contractor to make progress in the prosecution of the work hereunder which endangers such performance, if the contractor has notified the Director within fifteen (15) days after the cause of the delay and the failure arises out of causes such as: acts of God; acts of the public enemy; acts of the State and any other governmental body in its sovereign or contractual capacity; fires; floods; epidemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; or unusually severe weather. If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the contractor shall not be deemed to be in default, unless the goods or services to be furnished by the subcontractor were unreasonably obtained from other sources in sufficient time to permit the contractor to meet the contract requirements. Upon request of the contractor, the Director shall ascertain the facts and extent of such failure, and if such officer determines that any failure to perform was

occasioned by any one or more of the excusable causes, and that, but for the excusable cause, the contractor's progress and performance would have met the terms of the contract, the delivery schedule shall be revised accordingly, subject to the rights of the State under the clause entitled "Termination for Convenience". As used in this paragraph of this clause, the term "subcontractor" means subcontractor at any tier.

4. Erroneous termination for default. If, after notice of termination of the contractor's right to proceed under the provisions of this clause, it is determined for any reason that the contractor was not in default under the provisions of the clause, or that the delay was excusable under the provisions of paragraph 3 above, Excuse for nonperformance or delayed performance of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the State, be the same as if the notice of termination had been issued pursuant to such clause.

5. Additional rights and remedies. The rights and remedies provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

B. Termination for convenience. The Director may, when the interests of the State so require, terminate this contract in whole or in part, for the convenience of the State. The Director shall give written notice of the termination to the contractor specifying the part of the contract terminated and when termination becomes effective.

1. Contractor's obligation. The contractor shall incur no further obligations in connection with the terminated work and on the dates set in the notice of termination the contractor will stop work to the extent specified. The contractor shall also terminate outstanding orders and subcontracts as they relate to the terminated work. The contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated work. The Director may direct the contractor to assign the contractor's right, title, and interest under terminated orders or subcontracts to the State. The contractor must still complete the work not terminated by the notice of termination and may incur obligations as are necessary to do so.

2. Right to goods. The Director may require the contractor to transfer title and deliver to the State in the manner and to the extent directed by the Director:

a. Any completed goods; and

b. The partially completed goods and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights hereinafter called "manufacturing material," as the contractor has specifically produced or specially acquired for the performance of the terminated part of this contract.

The Contractor shall, upon direction of the Director, protect and preserve property in the possession of the contractor in which the State has an interest. If the Director does not exercise this right, the contractor shall use the Contractor's best efforts to sell such goods and manufacturing materials. Use of this section in no way implies that the State has breached the contract by exercise of the termination for convenience clause.

3. Compensation:

a. The Contractor shall submit a termination claim specifying the amounts due because of the termination for convenience together with cost or pricing data to the extent required by subchapter 15, chapter 3-122, HAR, bearing on such claim. If the Contractor fails to file a termination claim within one (1) year from the effective date of termination, the Director may pay the Contractor, if at all, an amount set in accordance with subparagraph c. below.

b. The Director and the Contractor may agree to settlement provided the Contractor has filed a termination claim supported by cost or pricing data to the extent required by subchapter 15, chapter 3-122, HAR, and that the settlement does not exceed the total contract price plus settlement costs reduced by payments previously made by the State, the proceeds of any sales of goods and manufacturing materials under paragraph (2) of this clause, and the contract price of the work not terminated.

c. Absent complete agreement under subparagraph b above, the Director shall pay the Contractor the following amounts, provided payments agreed to under subparagraph b shall not duplicate payments under this subparagraph for the following:

(i) Contract prices for goods or services accepted under the contract;

(ii) Costs incurred in preparing to perform and performing the terminated portion of the work plus a fair and reasonable profit on such portion of the work, such profit shall not include anticipatory profit or consequential damages, less amounts paid or to be paid for accepted goods or services; provided that if it appears that the Contractor would have sustained a loss if the entire contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss;

(iii) Costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to paragraph 1 of this clause. These costs must not include costs paid in accordance with subparagraph (ii) above.

(iv) The reasonable settlement costs of the Contractor including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to the terminated portion of this contract. The total sum to be paid the Contractor under this subparagraph shall not exceed the total contract price plus the reasonable settlement cost of the Contractor reduced by the amount of payments otherwise made, the proceeds of any sales of supplies and manufacturing materials under subparagraph b of this paragraph, and the contract price of work not terminated.

d. Cost claimed, agreed to, or established under subparagraphs b and c shall be in accordance with chapter 3-123, HAR. bearing on such claim.

8.8 FINAL INSPECTION - Upon notice from the Contractor of the completion of the work or contract, the Director shall make an inspection. If the contract is found completed to the Director's satisfaction, such inspection shall constitute the final inspection and acceptance of the work.

If the work is unsatisfactory in whole or in part, the Director shall notify the Contractor of the work necessary for final completion and acceptance and the Contractor shall forthwith perform the work required by the Director. Upon performance of such required work by the Contractor, another inspection shall be made which shall constitute the final inspection if the work is completed satisfactorily.

Within ten (10) days after final inspection and acceptance of the work, or as soon thereafter as is practicable, the Contractor shall be notified by the Director in writing of such acceptance.

8.9 TERMINATION OF CONTRACTOR'S RESPONSIBILITY - The contract will be considered complete when all work has been completed, the final inspection made, the work accepted by the Director, and the final estimate paid. The Contractor will then be released from further obligation except as set forth in the contract and bond, when applicable.

SECTION 9 - PAYMENT

9.1 SCOPE OF PAYMENT - The Contractor's bid price shall be inclusive of all costs, direct or indirect, including all taxes, required for the fulfillment of the contract.

Contract payments to the Contractor by the State shall be full payment for the furnishing of all labor, tools, equipment, and other incidentals, including all taxes, necessary for performing all work and services contemplated and embraced under the contract.

9.2 RETAINAGE/DEDUCTION FROM PAYMENT - The Director may at any time retain or deduct out of any sums due the Contractor to cover claims of the State against the Contractor, or such sums sufficient to cover any unpaid claims of others supported by sworn statements filed in the office of the Director, without any liability for damages, interest or otherwise to the Contractor for such retention or deduction.

Provided the work of the Contractor is progressing satisfactorily in the judgment of the Director and in accordance with the provisions of this contract, monthly payments, less five percent (5%), will be made to the Contractor. The amount of such monthly payments shall be determined by the Director based on the Director's estimate of the items of work performed and materials incorporated in the work and the value therefor at the unit prices or lump sum prices set forth in the contract. All monthly payments are shall be subject to correction at any time prior to or in the final payment.

At any time after fifty per cent (50%) of the work has been completed, if the State determines that the work contracted to be performed is progressing satisfactorily, the State may make any of the remaining monthly payments in full.

If the Director finds that unsatisfactory progress is being made, the State may, from the beginning of such unsatisfactory progress, withhold any amount up to five per cent (5%) of any subsequent monthly payment.

9.3 ASSIGNMENT OF PAYMENTS - All monies payable under the contract, or any part thereof, shall be paid to the Contractor in accordance with the provisions of this Section and no assignment or order executed by the Contractor directing payment of any portion or all of such funds to any other person or persons shall be recognized by the State unless such assignment or order specifies the amounts to be so paid and the purposes for which the assignment or order is given. Such assignment or order shall have attached thereto, by endorsement or otherwise, the consent of the surety, when

applicable. No such assignment or order shall be binding on the State.

Any assignment of money shall, however, be subject to all proper set-offs in favor of the State, to all deductions provided for in the contract and to all liens and rights conferred by law on the State. All money withheld, whether assigned or not, shall be subject to being used by the State for the completion of the work in the event of the Contractor's default.

9.4 PROGRESS PAYMENTS – Payments under this contract shall be made only upon submission by the Contractor of an original invoice and 2 copies. The invoice shall specify the amount due less retainage and shall also certify that services requested under the contract have been performed by the Contractor according to the contract.

9.5 FINAL PAYMENT – Final payment will only be made after the Contractor receives final acceptance by the Director as provided in Section 8.8, and until the Contractor has filed with the Department the following:

A. Consent of the surety, when applicable, to payment of the final estimate;

B. Satisfactory evidence by affidavit that all debts resulting from the contract have been fully paid or satisfactorily secured;

C. A current “Certificate of Vendor Compliance” issued by the Hawaii Compliance Express (HCE). The Certificate of Vendor Compliance is used to certify the Contractor’s compliance with (a) Section 103D-328, HRS (for all contracts $25,000 or more) which requires a current tax clearance certificate issued by the Hawaii State Department of Taxation and the Internal Revenue Service; (b) Chapters 383, 386, 392, and 393, HRS; and (c) Subsection 103D-310(c), HRS. The State reserves the right to verify that compliance is current prior to the issuance of final payment. Contractors are advised that non-compliance status will result in final payment being withheld until compliance is attained.

The filing of willfully false affidavits will disqualify the Contractor from bidding on future work of the Department.

SECTION 10 – GENERAL REQUIREMENTS

10.1 GENERAL – All work is subject to the requirements of Sections 1 to 9 inclusive, and this Section 10.

The Contractor shall furnish labor, materials and equipment to maintain the emergency generators, and miscellaneous electrical equipment and accessories at the Statewide Airports, such as Honolulu, Kalaeloa, Dillingham, Kahului, Molokai, Lanai, Hilo, Kona, Waimea, and Lihue, per the specifications outlined herein. This service shall be accomplished using skilled and trained personnel, who shall regularly and systemically examine, monitor and maintain emergency generators and electrical equipment.

10.2 CONTRACTOR AND PERSONNEL QUALIFICATIONS AND SKILLS

A. Contractor Qualifications

1. At the time of bidding, the Contractor shall possess a valid and current State of Hawaii Specialty Contractor's "C-13" or "C-63" license.

2. The Contractor shall have a minimum of five (5) years of experience (immediately prior to the bid opening date) working on similar high voltage (more than 600volts phase to phase) electrical equipment performing maintenance and repair services.

3. The prospective bidder is required to have all specialized test equipment necessary to perform all of the maintenance procedures specified in this document at the time he submits his proposal. Non-possession of these specialized test equipment shall be considered "prima facie" evidence that the prospective bidder does not have the recent experience required under Section 10.2.A.1.

4. The Contractor shall possess the required business and tax licenses to conduct business in the State of Hawaii.

B. Personnel Qualifications

1. Employees assigned to this project shall be field engineers or electricians with current electrician journeyman license and a minimum of two (2) consecutive years of experience (immediately prior to the bid opening date) working on similar electrical equipment performing maintenance or repair services. Employees assigned to this project shall be factory trained to perform maintenance and testing service of the electrical equipment listed in these specifications.

2. Employees assigned to this project shall possess and submit arc-flash and electrical training certificates for each employee assigned in this work. The training shall be in accordance with OSHA, HIOSH, and NFPA 70E, 2015.

C. Availability

1. The Contractor shall furnish the State with telephone numbers of the place of business where a service technician can be called by the Director or a designate, every calendar day of the year to perform work under this contract.

2. Personnel assigned to this job shall be available to respond to trouble calls within the parameters of these specifications.

All prospective bidders must be able to produce documented maintenance experience records to substantiate their claim of experience as indicated in Subsections 10.2.A.1 and 10.2.B.1 hereinabove.

Falsification of personnel qualification shall result in rejection of bid.

10.3 VEHICLE REQUIREMENTS

A. Contractor's vehicles must have Contractor's company name and/or logo displayed on doors or side panels and shall be in letters large enough to be easily legible from a distance of one hundred (100) feet. Magnetic signs bearing the contractor's company name/logo are acceptable. Cost for the logo/contractor's company name shall be considered as incidental cost at no further cost to the State.

B. All vehicles shall be in good condition and appearance.

C. Shall meet all State licensing and registration and safety requirements and shall be equipped properly in accordance with City, State, Federal and OSHA requirements.

D. The Contractor shall obtain insurance coverages as specified by Section 7.9, Insurance of the Specifications.

10.4 WORK SCHEDULE

The Contractor shall perform inspection and maintenance services on the emergency generators and electrical equipment which have been installed at the Statewide Airports and described in this section, all in accordance with applicable industry practices and standards as required to provide assurance of safety and operational reliability.

Airport emergency generators and electrical equipment shall be serviced during normal working days, between 6:45 a.m. and 3:15 p.m., Monday through Friday and shall be coordinated with the Engineer resulting in the least disruption of normal tunnel operations. Normally energized power transformers and circuit breakers shall be serviced between the hours of 6:45 a.m. and 3:15 p.m.

10.5 COORDINATION OF WORK

A. All work under this contract shall be coordinated with the Engineer or a duly authorized representative.

B. Schedule all required power outages with the Airports Electrician or the duly authorized representative.

C. The Contractor shall sign in and out at the facilities security office daily whenever any work is performed under this contract.

10.6 SCOPE OF WORK

The Contractor shall provide all labor, supervision, equipment, materials, supplies and incidents necessary to perform the tasks required in Appendix A and to provide corrective maintenance to meet the operational availability of the list of Electrical equipment in Appendix B. The Contractor is required to respond to trouble calls as specified in Section 10.7, Service Hours and Trouble Calls.

The Contractor is required to sign in and out at the airport security office daily whenever it performs any work under this contract. Any work which is not properly documented and certified by an authorized State representative will not be compensated by the State.

The Contractor shall label all equipment inspected, record all malfunctions and corrective actions taken on the equipment in performing its work under this contract and shall provide the Department with the serviceperson's certified record together with tasks completed by them, the date, hours and time, at the end of each working day.

A. Annual Maintenance Tasks: Shall be performed on normal working days as coordinated with the Engineer. Any shut down of equipment necessary for servicing shall be coordinated with the Airports Electrician.

All maintenance tasks described herein shall be performed during normal working days between 6:45 a.m. and 3:15 p.m. If any maintenance task is scheduled for other than normal working hours by the State, the Contractor shall be compensated for additional costs incurred.

All work performed by the Contractor shall be subject to random periodic inspection and approval by representatives of the Airports Division, State of Hawaii. All deficiencies shall be corrected at no additional cost to the State.

10.7 SERVICE HOURS AND TROUBLE CALLS

A. Regular Working Hours Trouble Call – The term "regular working hours" as used in these specifications shall mean 6:45 a.m. to 3:15 p.m., Monday through Friday, State holidays excepted.

In case of failure or malfunction of electrical equipment for any cause, the Contractor is subject to be called by the State. Should the Contractor be called during regular working hours, it shall respond within one (1) day to the job site.

The trouble calls during regular working hours shall be paid for based on the hourly bid price in the Contractor's proposal multiplied by the time spent at the job site to complete the repair work.

Time spent at the job site to complete the repair work during regular working hours shall be taken to the closest 1/4 of an hour and any fraction of 1/4 of an hour shall be considered a full 1/4 of an hour.

All trouble call tickets during regular working hours shall be certified and signed by an authorized representative of the Director in order for the Contractor to receive payment therefore.

Except as noted in Subsection 10.8, Replacement of Parts herein below, the hourly bid price shall include all labor, materials, equipment, overhead, insurance, taxes, and all other incidentals necessary to complete the repair work. Trouble calls during regular working hours shall be paid by Bid Item No. K of the Proposal Schedule.

Should the Contractor require travel expenses (airfare, lodging, car rental, and per diem), the expenses shall be limited to travel costs directly related to the project and shall be subject to prior approval by the STATE. Travel expenses will be reimbursed as follows:

1. Airfare shall be coach fare or below. Charges associated with changes to flight schedules will not be reimbursed, unless caused by the STATE. Written approval must be provided from a DOT-A representative.

2. Lodging shall be limited to a maximum daily room rate of $180 per night, excluding taxes. All other charges such as room services, movies, telephone calls, internet charges, laundry service or any other charges will not be reimbursed.
3. Unless the travel duration extends over two consecutive weeks, travel expenses on a weekend or STATE holiday, including lodging and car rental will not be reimbursed.
   A. Travel starting on a Sunday will be reimbursed, including lodging and car rental.
   B. Travel ending on a Saturday will be reimbursed, as long as it does not include lodging for that day. Car rental returned on a Saturday will be reimbursed.
   C. Lodging cost on the same day as the return flight will not be reimbursed (i.e. late check-out for overnight flights).
4. Car rental shall be a mid-sized car or below.
5. Per diem rate for meals shall be $20 for arrival and departure days, $45 for full days. Overnight flight Meal receipts are not required to be submitted.
6. Gas for rental car shall be regular unleaded and shall be limited to one refuel per week.
7. Hotel parking.
8. Payment for travel expenses shall be paid for in Bid Item No. M of the Proposal Schedule as an "Allowance".

B. Off-Hours Trouble Calls – The term "off-hours" as used in these specifications mean 12:01 a.m. to 6:45 a.m. and 3:15 p.m. to midnight, Monday through Friday, all hours on Saturdays, Sundays, and State holidays.

If the Contractor is called by the State during off-hours to perform repair work, the Contractor shall respond within 24 hours to the job site. The off-hours rate of pay shall be based on the hourly bid rate of the Contractor's proposal for regular working hours and trouble calls plus 50% of the Contractor's hourly bid rate. Except as noted in Section 10.9, Replacement of Parts, herein below, such off-hourly rate of pay shall include all labor, materials and equipment, overhead, insurance taxes and other incidentals necessary to complete the repair work.

Time spent at the job site to complete the repair work during off-hours shall be taken to the closest 1/4 of an hour and any fraction of 1/4 of an hour shall be considered a full 1/4 of an hour. In any event, the Contractor shall receive a minimum of one (1) hour pay even if the repair work is completed in less than one (1) hour. The Contractor shall secure the authorization from an authorized representative of the Director for any repair work in excess of two (2) hours during off-hours.

All off-hour trouble call tickets shall be certified and signed by an authorized representative of the Director in order for the Contractor to receive payment therefore.

Repair work initiated during off-hours and finished during regular working hours shall be paid accordingly. That is, off-hours hourly rates shall only apply to repair work performed during off-hours, and regular working hours hourly rates shall apply for repair work performed during regular working hours.

Any travel expenses incurred as a result of the "off-hours trouble call", will be paid for as described in Part 10.7.A. above.

C. General – The number of personnel used to perform repair work on trouble calls by the Contractor shall be fully justified and approved by the Director or an authorized representative of the Director.

   The Contractor shall furnish the State with telephone numbers through which the Contractor can be called by the State 24 hours a day, every day of the week.

   The Contractor shall present trouble call tickets to an authorized State representative for certification at the end of each day or each job, whichever is earlier. The trouble call ticket shall include all chargeable time, material, and equipment used.

10.8 REPLACEMENT OF PARTS – If replacement parts are required on any trouble call, or the replacement of parts is not covered under any specific provisions of this contract, the Contractor shall be reimbursed for the cost of the new parts, excluding taxes, including shipping charges, plus 30% for overhead, profit, taxes, and other incidental expenses. The Contractor shall substantiate its charges by submitting original billing as required by the State. The Contractor shall submit a list of parts ordered and not received within 30 days and explain in writing what parts are not received, on the last day of each month. The Contractor shall be reimbursed for the cost of the replacement parts by appropriate Bid Item in the Proposal Schedule.

10.9 ADVISORY SERVICES AND SUBCONTRACTORS – All advisory services by a foreperson of any other Contractor's personnel to the mechanics in performing their work shall be considered as incidental costs to the Contractor and included in the Contractor's hourly bid rate for regular working hours trouble calls. No separate payment shall be made therefore.

All specifications and hourly bid rates for repair work under this contract shall be applicable to electrical, sheet metal, machinist, controls, chemical, insulation, and other subcontractor(s) should their services be required.

10.10 TERM OF CONTRACT – The term of this contract shall be for a three (3) year period beginning from the date indicated in the Notice to Proceed from the State.

10.11 INSPECTION AND CORRECTION OF DEFECTS – All materials furnished and services performed by the Contractor under this contract shall be subject to inspection and test by the Director to the extent practicable at all times (including the period of performance) and places, and in any event prior to the acceptance. All inspections and tests required by the Director shall be performed in such a manner that will not unduly delay or interrupt the Contractor's work.

At any time during performance of this contract, but not later than six months after acceptance of the services or materials incorporated in accordance with the requirements of this contract, the Director may require the Contractor to remedy by correction or replacement, any services or materials which have failed to comply with the requirements of this contract.

10.12 EQUIPMENT DATA – It is the responsibility of the Contractor to verify and review all construction and maintenance documents prior to start of term of contract.

10.13 FINAL REPORT - Two (2) copies of a typewritten final report shall be submitted within twenty (20) days of completing all fieldwork. The report shall include but not be limited to (a) an inventory of all equipment serviced, (b) malfunctions and deviations from norm detected, (c) corrective actions taken if any, (d) deviations of equipment inventory (field vs. specifications), (e) recommendations on maintenance tasks and project specifications, (f) evaluation of the status of individual components and or systems, and (g) estimated cost for any recommended additional work.

10.14 WARRANTY – There shall be a full thirty (30) day labor warranty on all items of equipment serviced by the Contractor, which period shall commence upon completion and acceptance of the final report (Section 10.15). All corrective work done during this period shall be at the Contractor's own expense.

10.15 SAFETY AND PROTECTION – The majority of the maintenance work is in and around transformer vaults, switching stations, switchgear, and other energized electrical equipment.

A. Contractor personnel shall exercise due care in performing any work on the electrical equipment in accordance with NFPA 70E, 2015.

B. All work shall be performed while the equipment is de-energized unless allowed by NFPA 70E. Energized work permits shall be submitted for approval prior to any work on energized equipment.

C. Notify the Airport Security Office (herein referred to as the "Control Center") when working on high voltage equipment.

D. All methods and practices shall be in accordance with the operator's manuals, National Electrical Code, NFPA 70E (2015), National Electrical Safety Code, Occupational Safety and Health Standards and safety regulations promulgated by other governmental agencies.

E. While working on this project, all employees shall wear OSHA, approved safety personal protection equipment (PPE), including but not limited to: arc flash protection,

goggles, safety shoes, hearing protection, and other equipment as required. Contractor employees on the job site shall wear clothing with the company name visible on the upper torso. Contractor's employees shall present a neat and clean appearance at all times. Cost of employees clothing and personal protective equipment (PPE) shall be incidental to the maintenance of electrical equipment.

10.16 BASIS OF PAYMENT – The contract unit shall be full compensation for furnishing all technical expertise, labor, materials, tools, equipment, trucks, communication costs, applicable taxes, insurance, overhead, travel and incidental to complete the work as specified herein.

A. Monthly payments to the Contractor will be made on the basis of actual number of services performed and the applicable unit bid prices.

B. Replacement Parts. The Contractor shall be reimbursed for the cost of new parts in accordance with Section 10.9, Replacement Parts of the Specifications.

C. Deductions (as applicable):

    1. Retainage – computed as specified in Section 9.2, of the Specifications.
    2. Liquidated Damages – computed as specified on in Section 8.6, of the Specifications and as specified on Proposal page P-1.

D. Monthly payments payable to the Contractor will be the monthly payments in Section 10.16.A above plus applicable Replacement Parts minus applicable Deductions.

Refer to Section 9.4, Progress Payments of the Specifications, for the required information on invoices.

SECTION 11 – SPECIFICATION FOR ELECTRICAL SERVICES AND MAINTENANCE PROGRAM

11.1 GENERAL – All work is subject to the requirements of Sections 1 to 10 inclusive, and this Section 11.

The Contractor shall furnish labor, materials and equipment to maintain the emergency generators, and miscellaneous electrical equipment and accessories at the Statewide Airports, per the specifications outlined herein. This service shall be accomplished using skilled and trained personnel, who shall regularly and systemically examine, monitor and maintain emergency generators and electrical equipment.

11.2 TEST EQUIPMENT

A. The Contractor shall provide for his/her use all required materials, tools, equipment, etc. necessary to appropriately carry out all testing, infrared and ultrasonic surveying, and preventive maintenance tasks and procedures outlined under this Electrical Services and Maintenance Program.

B. For Harmonics testing, the Contractor shall utilize test equipment which measures "true" RMS values, with one millisecond peak hold capability to capture the half cycle peak of the wave form. In addition, the test equipment shall have a crest factor capability of at least three (3) at full scale, and the ability to measure the frequency of the current. Portable test equipment which is average responding RMS calibrated shall not be acceptable testing instrumentation.

C. For infrared surveying, the Contractor shall utilize thermographic test equipment which meets or exceeds the following specifications for either short wave or long wave electromagnetic radiation:

C.1 Short Wave Electromagnetic Radiation

System Type: Focal plane array camera Spectral Range: 3.6 to 5 Microns (Std.) Detector: PtSi Nybrid Silicon FPA

Image Storage Capability: Image storage transferable to a color computer. Imaging and printing capability of problem areas.

Ultra high resolution 320 by 244 focal plane array detector

(78,080 pixels) (FPA required-rotating polygons and scanning mirrors unacceptable) Single element temperature measurement
Full ratio metric 12-bit images (4,096 thermal levels)

C.2 For Long Wave Electromagnetic Radiation

Imaging and Measurement Capabilities

System Focal plane array infrared camera

Spectral Range 7.5 – 13 microns

Detector Uncooled microbolometer

Temperature Measurement Accuracy + 2% of range or 2°

D. For Power Factor testing, the Contractor shall utilize a clamp-on type of Current/Power Probe that measures dc current, ac current, and ac power in conjunction with a true RMS multimeter. Probe shall be switch-selectable for outputs representing amps or kilowatts. Kilowatt measurement shall take into account the phase angle and waveform distortion of both voltage and current to provide good performance over a wide range of input signals. A zero control function shall be provided to offset core magnetization to improve accuracy of low-level dc current and kilowatt measurements. Multimeter shall
be a 4000 count instrument and shall measure frequencies between 0.5 Hz and 200 KHz with up to 0.01
Hz resolution. Accuracy shall be 1% for any range for all functions.

E. For Ultrasound Inspecting, the Contractor shall utilize ultrasonic test equipment which meets or exceeds the following specifications:

F. CIRCUITRY:

Solid state heterodyne receiver with temperature compensation.

F.1 FREQUENCY RESPONSE:

Detect ultrasonic frequencies between 20 kHz and 100 kHz, continuously variable. Frequencies are converted to 100 Hz to 3 kHz audio.

F.2 Scanning Module:

TRISONIC plug-in type consisting of a phased array of multiple transducers for airborne ultrasound. This probe is shielded against RF interference.

F.3 Frequency tuning adjustment dial:

Scale 20 – 100 kHz with "fixed band" position for ultra-narrow frequency response.

F.4 Bi-Modal Meter Switch:

For logarithmic and linear meter scale adjustments.

F.5 Auxiliary Mode:

Selection for chart recorder output: 0 – 50 mV, Precision 10 turn adjustment dial with numerically calibrated sensitivity increments for finite gain adjustment.

The ultrasonic test equipment meets and exceeds ASTM E1002-93 requirements for leak detection.

11.3 ENERGIZED TESTING AND INSPECTION

The Contractor shall provide the safety equipment, service instruments, and labor to conduct, interpret, and document the results of the applicable comprehensive diagnostic services and inspections that can be safely performed on the covered electrical component(s) and/or connection(s). These services shall be performed annually, at a minimum, and while the Owner's electrical distribution system is

energized. The following testing and inspection services, as appropriate, shall be conducted:

A. True RMS Voltage and Current Testing: Capture and record the square root of the average square of the instantaneous magnitude of the voltage and current. This service is used to determine if the correct voltage and current is present to properly operate the Owner's equipment and optimize its life cycle.

B. Voltage Drop: Measure and record the difference of voltages at the two terminals of passive impedance. This service is used to determine if the Owner's electrical components, i.e., circuit breakers, contact surfaces, etc., are operating properly to reduce hazards and equipment destruction.

C. Infrared Thermographic Imaging Service: Measure and record to identify temperatures that exceed NFPA Standard 70B recommendations, i.e., high resistance electrical connections, current overload, defective circuit breakers and/or defective insulator conditions. This service is used to reduce the risk of brown-outs and black-outs, as well as safety and fire hazards.

D. Ultrasonic Testing: Measure and record sound waves and/or vibrations that are above audible sound (16-18 KHZ). This service is used to complement the thermographic imaging service and determine if corona discharge, tracking, arcing and vibration are present, and to assure the quality and integrity of the Owner's electrical system.

E. Voltage and Current Harmonics Testing: Capture and record Total Harmonic Distortion-Voltage (THDV) and Total Harmonic Distortion-Current (THDC) that exceed IEEE recommendations. This service is used to determine if the Owner's harmonic contamination is within tolerance levels. In addition, this service is designed to assure accurate power (kW) charges and to minimize the risk of damage to microelectronic equipment, transformers, circuit breakers, motors, etc.

F. Power Factor Testing: Measure and record the ratio of the circuit power (watts) to the circuit volt- amperes. This service is used to determine if the Owner is paying increased costs to their utility company because the

Owner's power factor is in a higher rate schedule. In addition, correcting a poor power factor situation may allow the Owner to expand their electrical system's capacity without costly system additions.

G. Visual and Mechanical Inspections: Interior and exterior of all components will be inspected to ascertain, and if necessary, make certain adjustments to ensure that its performance remains within specified limits. The Contractor will also identify corrosion, rust and discoloration, leaks, safety hazards, applicable electric code violations, grounding, physical damage and the general condition of components.

H. Phase-Balance Measurements: Assure that the phases in the Owner's electrical system are balanced. This service is used to address unbalanced components that increase power-quality problems, total harmonic distortion as well as increased temperature rise of devices and current-carrying conductors.

11.4 DE-ENERGIZED SERVICE AND INSPECTION

The Contractor will provide the safety equipment, service instruments and labor to conduct, interpret, and document the results of the applicable comprehensive diagnostic services and inspections that can be safely performed on the covered electrical component(s) and/or connection(s). These services shall be performed at a mutually agreed schedule, while the Owner's electrical distribution system and/or electrical component(s) is de-energized and include, as appropriate, the following:

A. Insulation Resistance: Measure and record the resistance of insulation under specified conditions set forth by applicable standards such as NFPA Standard 70B. This service is designed to assure that the Owner's electrical system and components' insulation values are at an acceptable level, reducing the risk of explosions, fires and catastrophic breakdowns.

B. Winding Resistance Service: Measure, record and compare the winding resistance of components. This service will assure that components are operating to applicable specifications, extending useful life, and reducing the risk of catastrophic failure.

The Contractor shall perform inspection and maintenance services on the emergency generators and electrical equipment which have been installed at the Statewide Airports and described in this section, all in accordance with applicable industry practices and standards as required to provide assurance of safety and operational reliability.

Airport emergency generators and electrical equipment shall be serviced during normal working days, between 6:45 a.m. and 3:15 p.m., Monday through Friday and shall be coordinated with the Engineer resulting in the least disruption of normal tunnel operations. Normally energized power transformers and circuit breakers shall be serviced between the hours of 6:45 a.m. and 3:15 p.m.

11.5 SCOPE OF WORK

The Contractor shall perform appropriate maintenance tasks as outlined herein:

A. Daniel Inouye International (Honolulu) Airport

1. Emergency generator (500kW) @ Vault X (1 ea.)- Annual Service
2. Emergency generator (500kW) @ Vault X (1 ea.) – Annual Load Bank Test
3. Emergency generator (700kW) @ Vault Z (1 ea.) – Annual Service
4. Emergency generator (700kW) @ Vault Z (1 ea.) – Annual Load Bank Test
5. Emergency generator (1100kW) @ Lei Stands (1 ea.) – Annual Service
6. Emergency generator (1100kW) @ Lei Stands (1 ea.) – Annual Load Bank Test
7. Emergency generator (500kW) @ Mauka Concourse (1 ea.) – Annual Service
8. Emergency generator (500kW) @ Mauka Concourse (1 ea.) – Annual Load Bank Test

9. Emergency generator (1.75MW) @ OST/Vault 1B (1 ea.) – Annual Service
10. Emergency generator (1.75MW) @ OST/Vault 1B (1 ea.) – Annual Load Bank Test
11. Emergency generator (1.75MW) @ Diamond Head EXT/Vault 1G (1 ea.) – Annual Service
12. Emergency generator (1.75MW) @ Diamond Head EXT/Vault 1G (1 ea.) – Annual Load Bank Test
13. Emergency generator (600kW) @ Ewa Concourse/Vault 1E (1 ea.)- Annual Service
14. Emergency generator (600kW) @ Ewa Concourse/Vault 1E (1 ea.)- Annual Load Bank Test
15. Emergency generator (1.75MW) @ Inter-Island Terminal (IIT) (1 ea.)- Annual Service
16. Emergency generator (1.75MW) @ Inter-Island Terminal (IIT) (1 ea.)- Annual Load Bank Test
17. Emergency generator (600kW) @ Vault 1D (1 ea.) – Annual Service
18. Emergency generator (600kW) @ Vault 1D (1 ea.)– Annual Load Bank Test
19. Emergency generator (600kW) @ Vault Y (1 ea.) – Annual Service
20. Emergency generator (600kW) @ Vault Y (1 ea.) – Annual Load Bank Test

B. Dillingham Airfield

1. Emergency generator (80kW) @ Airfield (1 ea.) and Transfer Switch – Annual Service

2. Emergency generator (80kW) @ Airfield (1 ea.) and Transfer Switch – Annual Load Bank Test

C. Kalaeloa Airport

1. Switchgear (15kV) @ Main Terminal (1 ea.) – Annual Service.

2. Switchgear (15kV) @ Hanger 110 (1 ea.) – Annual Service.

3. Pad Mounted Transformer (1500kVA) @ Hangar 110(1 ea.)– Annual Service.

4. Pad Mounted Transformer (1500kVA) @ Runway Side of Bldg. 4 (1 ea.)– Annual Service.

5. Pad Mounted Transformer (150kVA) @ Admin. Bldg. Storage Room (1 ea.) - Annual Service.

6. Breakers (480V) @ Hangar 110 (4 ea.) – Annual Service

7. Emergency generators and Transfer Switches @ ARFF Station & Main Terminal Bldg. & Outside Hangar 110 (3 ea.) – Annual Service

8. Emergency generators @ ARFF Station & Main Terminal Bldg. & Outside Hangar 110 (3 ea.)– Annual Load Bank Test

D. Kahului Airport

1. Primary (12.47kV) Switchgear @ Room A-103 (2) & Room D-123 (2) (Total of 4 ea.)- Annual Preventive Maintenance

2. Secondary (480V) Switchgear @ Room A-103 (2) & Room D-123 (2) & TSA SWGR Room (1) (Total 5 ea.)- Annual Preventive Maintenance

3. Unit Substation @ Room B-106(2 ea.)- Annual Preventive Maintenance

4. Dry-Type Transformer (36 ea.)- Annual preventive Maintenance

5. Sub-distribution Panelboards @ Room C-132 (3 ea.)- Annual Preventive Maintenance

6. Emergency Generator (275kW) and Transfer Switch @ Main Terminal (2 ea.) – Annual Service

7. Emergency Generators (275kW) @ Main Terminal (2 ea.) - Annual Load Bank Test

8. Emergency Generator (2MW) and Transfer Switch @ Main Terminal (1 ea.) – Annual Service

9. Emergency generator (2MW) @ Main Terminal (1 ea.) – Annual Load Bank Test

E. Molokai Airport

1. Emergency Generator (40kW) @ Terminal Bldg. (1 ea.)- Annual service

2. Emergency Generator (40kW) @ Terminal Bldg. (1 ea.) - Annual Load Bank Test

3. Emergency Generator (66kW) @ Maintenance Base Yard (1 ea.)- Annual service

4. Emergency Generator (66kW) @ Maintenance Base Yard (1 ea.) - Annual Load Bank Test

5. Emergency Generator (125kW) @ New ARFF Station (1 ea.)- Annual service

6. Emergency Generator (125kW) @ New ARFF Station (1 ea.)- Annual Load Bank Test

7. Low Voltage Molded Case Circuit Breakers (1 ea.) @ Terminal Building Electrical Vault – Annual Maintenance Service

8. Medium Voltage Molded Case Circuit Breakers (1 ea.) @ Terminal Building Electrical Vault – Annual Maintenance Service

F. Lanai Airport

1. Emergency Generator (125kW) and Transfer Switch @ ARFF Station (1 ea.) – Annual Service

2. Emergency Generator (125kW) @ ARFF Station (1 ea.)- Annual Load Bank Test

3. Emergency Generator (315kW) and Transfer Switch @ Cargo Bldg. (1 ea.)- Annual service

4. Emergency Generator (315kW) @ Cargo Bldg. (1 ea.)- Annual Load Bank Test

5. Low Voltage Molded Case Circuit Breakers (1 Lot) @ Terminal Bldg. Electrical Panels – Annual Maintenance Service

6. Medium Voltage Molded Case Circuit Breakers (1 Lot) @ Emergency Generator Room Electrical Vault- Annual Maintenance Service

7. Dry-Type Transformer (80 kVA & 150 kVA) (2 ea.)- Annual Preventive Maintenance

8. Low Voltage Circuit Breakers @ Terminal Building and Emergency Generator Room. (1 Lot)- Annual Maintenance Service

G. Hilo International Airport

1. Emergency Generator (900kW) and Transfer Switch @ Terminal Bldg. (1 ea.)- Annual Service

2. Emergency Generator (900kW) @ Terminal Bldg. (1 ea.)- Annual Load Bank Test

3. Emergency Generator (350kW) and Transfer Switch @ ARFF Station (1 ea.) – Annual Service

4. Emergency Generator (350kW) @ ARFF Station (1 ea.)- Annual Load Bank Test

5. Emergency Generator (100kW) and Transfer Switch @ Maintenance Baseyard (1 ea.) – Annual Service

6. Emergency Generator (100kW) @ Maintenance Baseyard (1 ea.)- Annual Load Bank Test

7. Emergency Generator (100kW) and Transfer Switch @ Old ARFF Station (1 ea.) – Annual Service

8. Emergency Generator (100kW) @ Old ARFF Station (1 ea.)- Annual Load Bank Test

H. Ellison Onizuka Kona International Airport at Keahole

1. Emergency Generator (175kW) and Transfer Switch @ North and South side Terminal (2 ea.) -Annual Service

2. Emergency Generator (175kW) @ North and South side Terminal (2 ea.)- Annual Load Bank Test

3. Emergency Generator (500kW) and Transfer Switch @ ARFF Station (1 ea.) - Annual Service

4. Emergency Generator (500kW) @ ARFF Station (1 ea.)- Annual Load Bank Test

5. Emergency Generator (1500kW) and Transfer Switch @ Near Rental Car Area (1 ea.) - Annual Service

6. Emergency Generator (1500kW) @ Near Rental Car Area (1 ea.)- Annual Load Bank Test

7. Emergency Generator (500kW) and Transfer Switch @ WWTP (1 ea.) - Annual Service

8. Emergency Generator (500kW) @ WWTP (1 ea.)- Annual Load Bank Test

9. Emergency Generator (125kW) and Transfer Switch @ WWTP (1 ea.) - Annual Service

10. Emergency Generator (125kW) @ WWTP (1 ea.)- Annual Load Bank Test

I. Waimea-Kohala Airport

1. Emergency Generator (20kW) and Transfer Switch (1 ea.) – Annual Service

2. Emergency Generator (20kW) (1 ea.)- Annual Load Bank Test

3. Low Voltage Molded Case Circuit Breakers @ Emergency Generator Room Electrical Panels (1 Lot)- Annual Maintenance Service

4. Medium Voltage Molded Case Circuit Breakers @ Emergency Generator Room Electrical Vault (1 Lot)- Annual Maintenance Service

J. Lihue Airport

1. Emergency Generator (600kW) and Transfer Switch @ Terminal Bldg. (2 ea.) – Annual Service

2. Emergency Generator (600kW) @ Terminal Bldg. (2 ea.)- Annual Load Bank Test

3. Emergency Generator (180kW) and Transfer Switch @ ARFF Station (1 ea.) – Annual Service.

4. Emergency Generator (180kW) @ ARFF Station (1 ea.)- Annual Load Bank Test

5. Emergency Generator (125kW) and Transfer Switch @ Airfield (1 ea.) – Annual Service.

6. Emergency Generator (125kW) @ Airfield (1 ea.)- Annual Load Bank Test

7. Emergency Generator (300kW) and Transfer Switch @ Base Yard (1 ea.) – Annual Service.

8. Emergency Generator (300kW) @ Base Yard (1 ea.)- Annual Load Bank Test

Contractor is directed to review Appendix A for various maintenance tasks required, Appendix B for Equipment information, Appendix C for Generator and Transfer Switch Maintenance Scope of Work, Appendix D for airport maps with emergency generator approximate locations.

11.6 BASIS OF PAYMENT – The contract unit shall be full compensation for furnishing all technical expertise, labor, materials, tools, equipment, trucks, communication costs, applicable taxes, insurance, overhead, travel and incidental to complete the work as specified herein.

A. Monthly payments to the Contractor will be made on the basis of actual number of services performed and the applicable unit bid prices.

B. Replacement Parts. The Contractor shall be reimbursed for the cost of new parts in accordance with Section 10.9, Replacement Parts of the Specifications.

C. Deductions (as applicable):

1. Retainage – computed as specified in Section 9.2, of the Specifications.
2. Liquidated Damages – computed as specified on in Section 8.6, of the Specifications and as specified on Proposal page P-1.

D. Monthly payments payable to the Contractor will be the monthly payments in Section 11.6.A above plus applicable Replacement Parts minus applicable Deductions.

Refer to Section 9.4, Progress Payments of the Specifications, for the required information on invoices.

SECTION 12 - CONTRACTOR QUALITY CONTROL PROGRAM

PART 1 - GENERAL

A. GENERAL

The Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all services and materials required by this contract conform to contract requirements, whether provided by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The intent of this section is to enable the Contractor to establish a necessary level of control that will:

1. Adequately provide for the performance of acceptable services and supply of quality materials.

2. Provide sufficient information to assure both the Contractor and the State Project Manager that the specification requirements are being met.

3. Allow the Contractor as much latitude as possible to develop his or her own standard of control.

The Contractor shall be prepared to discuss and present, at the start of the contract, his/her understanding of the quality control requirements. The Contractor shall not begin any work until the Quality Control Program has been reviewed and approved by the State Project Manager

B. DESCRIPTION OF PROGRAM

1. General Description. The Contractor shall establish a Quality Control Program to verify all items of work are performed as required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications with respect to services, materials, workmanship, finish, and functional performance. The Quality Control Program shall be the effective control of all work performed under this Contract in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of quality control.

2. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document which shall be reviewed and approved by the State Project Manager prior to the start of any work. The written Quality Control Program shall be submitted to the State Project Manager for review no later than thirty (30) calendar days after award of the Contract.

3. The Quality Control Program shall be organized to address, as a minimum, the following items:

   a. Schedule of major work to be performed including a three week look ahead schedule to provide the State Project Manager the opportunity to be present to inspect any scheduled work;

   b. Spare parts list;

   c. Log of trouble calls including date of resolution and what was done to fix the problem;

d. Quarterly Report documenting quarterly meeting with State Project Manager, Users and the Construction Manager. The reports shall include an area for State Project Manager, Users and Construction Manager to comment with regard to specific and overall satisfaction with the work performed;

e. Log of elective work performed; and

f. Requirements for corrective action when quality control and/or acceptance criteria are not met.

The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all work processes required by this contract.

C. QUALITY CONTROL ORGANIZATION.

The Contractor's Quality Control Program shall be implemented by the establishment of a quality control organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and maintenance functions and personnel. The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. At the top of the chart, an overall Contractor Quality Control System Manager, CQCSM, shall be named and his/her subordinates shall follow thereafter.

The quality control organization shall consist of the following minimum personnel:

1. Contractor Quality Control System Manager. The CQCSM shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCSM shall have a minimum of 5 years of experience in airport work.

The CQCSM shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the technical specifications including authority to independently stop any work not in compliance with the contract. The CQCSM shall report directly to a responsible officer of the firm. The CQCSM may supervise the Quality Control Program on more than one project provided that person can be at the job site within 2 hours after being notified of a problem and a Quality Control Technician is present on the job site full time.

2. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate fields and shall have a minimum of 2 years of experience in their area of expertise.

   The quality control technicians shall report directly to the CQCSM and shall perform the following functions:

   a. Inspection of all work and materials for conformance to the technical specifications.

   b. Performance of all quality control tests as required by the technical specifications.

3. Staffing. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.

   All personnel shown on the organizational chart shall have, in resume form, all information regarding their education, any licenses, their present position, previous work experience, etc. included in the Quality Control Program written documentation. These resumes shall be verified by the CQCSM.

D. DOCUMENTATION

The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the State Project Manager monthly. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCSM.

E. CORRECTIVE ACTION REQUIREMENTS

The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

I. SURVEILLANCE BY THE STATE PROJECT MANAGER OR CONSTRUCTION MANAGER

All items of service, materials, and equipment shall be subject to surveillance by the State Project Manager or Construction Manager.

Surveillance by the State Project Manager or Construction Manager does not relieve the Contractor of performing quality control inspections of the Contractor's or subcontractor's work.

J. NONCOMPLIANCE

1. The State Project Manager will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the State Project Manager or his/her authorized representative to the Contractor or his/her authorized representative at the site of the work, shall be considered sufficient notice.

2. In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the Contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the or State Project Manager, the State Project Manager may:

   a. Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors.

   b. Order the Contractor to stop operations.

   c. Determine work performed by the Contractor during periods of noncompliance to be unacceptable and subject to inspection, removal or non-payment.

END OF SECTION

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

A P P E N D I X A

AUTOMATIC TRANSFER SWITCH WITH BYPASS/ISOLATION SWITCH ANNUAL PREVENTIVE MAINTENANCE

!!SAFETY INFORMATION!!

1. ALWAYS ADHERE TO ESTABLISHED SAFETY PROCEDURES.
2. THOROUGHLY REVIEW MANUFACTURER'S INSTRUCTIONS AND OBSERVE WARNINGS, CAUTIONS, AND NOTES.
3. ENSURE APPROPRIATE LOCKOUT AND TAGOUT PROCEDURES ARE OBSERVED.
4. PRIOR TO PERFORMING THIS TASK, COORDINATE WITH OGG ELECTRICAL MAINTENANCE DEPARTMENT.
5. REPORT ANY CONDITIONS REQUIRING MAINTENANCE THAT ARE BEYOND THE SCOPE OF THIS PM TO MAINTENANCE SUPERVISION.

NOTE

PERIODICALLY, THIS PM WILL NEED TO BE REVIEWED AND UPDATED TO ENSURE IT CONTAINS THE MOST CURRENT/RELEVANT INFORMATION AND THAT IT CONFORMS TO LOCAL REGULATIONS, REQUIREMENTS, AND CONDITIONS.

TOOLS AND MATERIALS:

1. ELECTRICAL TOOL KIT
2. CLEANING TOOLS AND MATERIALS
3. VACUUM CLEANER
4. LUBRICATION KIT 25-100
5. STOP WATCH
6. ANSI-49 LIGHT GRAY ENAMEL PAINT
7. PERSONAL PROTECTIVE EQUIPMENT (PPE)

AUTOMATIC TRANSFER SWITCH ANNUAL PREVENTIVE MAINTENANCE

A. PERFORM FUNCTIONAL CHECK-OUT OF TRANSFER FROM NORMAL TO EMERGENCY POWER AND FROM EMERGENCY BACK TO NORMAL POWER.
   1. TEST WITH A LOAD BANK OF EQUIVALENT LOAD TO PERFORM SIMULATIONS. IF UNABLE TO PROVIDE A LOAD BANK, SIMULATING AN OUTAGE, WITH APPROVAL FROM THE OGG ELECTRICAL MAINTENANCE DEPARTMENT, CAN ALSO BE PERFORMED.
B. CONDUCT THERMAL SCANS OF ALL CABLE CONNECTIONS AND BUS JOINTS.
   1. CHECK TO MAKE SURE THAT NO OVERHEATING IS OCCURRING AND MAKE NOTES OF AREAS THAT NEED ATTENTION.
C. INSPECT ALL INDICATING LIGHTS.
D. DE-ENERGIZE ALL POWER SOURCES.
E. INSPECT EXTERIOR OF CABINET FOR DAMAGE, CORROSION, OR SIGNS OF MORE SERIOUS PROBLEMS.

F. CHECK ALL INCOMING POWER LINES FOR SIGNS OF DISCOLORATION.
G. OPERATE ALL HINGED PANELS AND DOORS TO VERIFY THEY OPERATE IN A SMOOTH AND SAFE MANNER. TRY ALL LATCHES AND KNOBS. ROTATE AND PUSH ALL SWITCHES THROUGH ALL POSITIONS TO ENSURE SMOOTH OPERATION.
H. VISUALLY INSPECT ALL WIRING, CONNECTIONS AND FUSE BLOCKS FOR OBVIOUS SIGNS OF CHARRING, OVERHEATING, OR SHORT CIRCUITING.
I. USE A VACUUM CLEANER TO REMOVE DUST OR OTHER MATERIAL WHICH MAY CAUSE SHORTS OR ARCING. DRY-COMPRESSED AIR IS TO BE USED ONLY ON NON-ENCLOSED AREAS.
J. REMOVE TRANSFER SWITCH BARRIERS AND CHECK CONDITIONS OF CONTACTS. CLEAN, AS REQUIRED, OR REPLACE ANY CONTACTS THAT ARE EXCESSIVELY PITTED OR WORN.
K. CAREFULLY REINSTALL BARRIERS.
L. TIGHTEN ALL CONNECTIONS TO MAIN BUS.
M. INSPECT ALL INTERLOCKS AND CONTROLS. CLEAN AND LIGHTLY LUBRICATE FRICTION POINTS AND WIPE OFF ANY EXCESS LUBRICANT.
N. INSPECT THE SAFE MANUAL OPERATOR AND CHECK THAT THE CONTACT-TO-CONTACT TRANSFER SPEED IS THE SAME AS THE ELECTRICAL OPERATOR.
O. CHECK THE CONDITION OF ALL SWITCH AND RELAY CONTACTS, COILS, SPRINGS, AND CONTROL ELEMENTS. INSPECT RELAYS AND SWITCHES FOR PROPER OPERATION. REPAIR, OR REPLACE, AS NEEDED.
P. IF APPLICABLE, INSPECT CONTACTOR/SWITCH ARC CHUTES FOR CRACKS OR PITTING. REPAIR AND CLEAN AS NEEDED.
Q. OPERATE SWITCH IN NORMAL AND EMERGENCY MODES TO ENSURE PROPER MAKING.
R. USE THE TEST PUSHBUTTON SWITCH TO MOMENTARILY SIMULATE NORMAL SOURCE FAILURE.
S. CHECK OPERATION OF THE MANUAL TRANSFER PUSHBUTTON SWITCH TO BYPASS THE TIME DELAY ON A TRANSFER FROM EMERGENCY POWER TO NORMAL POWER. ENSURE THAT IF NORMAL POWER IS UNAVAILABLE THAT THE SWITCH BACK TO EMERGENCY POWER IS AUTOMATIC.
T. OPERATE THE TEST SWITCH IN ALL THREE POSITIONS AND CHECK FOR PROPER MAKING.
    1. TEST NO LOAD: WHILE THE TEST SWITCH IS ACTIVATED THE GENERATORS START WHILE THE TRANSFER SWITCH IS IN THE NORMAL POSITION.
    2. TEST WITH LOAD: THE TRANSFER SWITCH WILL TRANSFER TO THE EMERGENCY SOURCE.
    3. REMOTE: TRANSFER TO EMERGENCY SOURCE IS CONTROLLED BY A REMOTE SIGNAL FROM THE GENERATOR.

4. IN ANY POSITION, IN THE EVENT OF A FAILURE OF A POWER SOURCE, THE TRANSFER SWITCH SHOULD AUTOMATICALLY TRANSFER TO THE OTHER SOURCE.

U. CHECK ALL ADJUSTABLE DEVICES FOR PROPER SETTINGS, ACCORDING TO PREVIOUS SETTINGS. ADJUST SETTINGS, IF NEEDED.
V. LOOK FOR ARCING OR IMPROPER CONTACTING.
W. CLEAN ALL COVERS WITH A CLEAN-DRY LINT FREE CLOTH. DO NOT USE ABRASIVE MATERIALS.
X. ENSURE ALL WIRED, MOUNTING, AND BOLTED CONNECTIONS ARE TIGHT AND SECURE.
Y. CLEAN AND INSPECT ALL PAINTED SURFACES. REMOVE ANY SIGNS OF CORROSION AND REPAINT, AS REQUIRED.
Z. RE-ENERGIZE POWER SOURCES AND RETURN UNIT TO SERVICE.

BYPASS/ISOLATION SWITCH ANNUAL MAINTENANCE

A. DE-ENERGIZE POWER SOURCES AND REMOVE SWITCH FROM SERVICE.
B. ENSURE THAT THE AUTOMATIC TRANSFER SWITCH CAN BE DRAWN OUT WITHOUT NEEDING TO BE DISCONNECTED FROM POWER SOURCES AND CONTROL SOURCES VIA THE ISOLATING PORTION OF THE BYPASS/ISOLATION SWITCH.
C. USE A VACUUM CLEANER TO REMOVE ALL DIRT AND DUST FROM THE ENCLOSURE. CAUTION MUST BE USED WHEN USING DRY-COMPRESSED AIR OR NITROGEN (UNDER 25 PSI) TO ENSURE THAT DIRT AND DUST ARE NOT BLOWN INTO INACCESSIBLE AREAS.
D. WIPE WITH A CLEAN LINT-FREE CLOTH ALL NAMEPLATES AND COVERS.
    1. CAUTION MUST BE USED WHEN USING LIQUID CLEANERS AS THEY MAY CAUSE CORROSION OF THE NAMEPLATE. DO NOT USE ABRASIVE MATERIALS.
E. INSPECT ALL INTERLOCKS AND ROLLERS/CASTERS.
F. INSPECT ALL PRIMARY DISCONNECT FINGERS AND DISCONNECT CONTACTS.
G. CHECK THE CONDITION OF ALL CONTACTS. CLEAN, AS REQUIRED OR REPLACE ANY CONTACTS THAT ARE EXCESSIVELY PITTED OR WORN.
H. INSPECT ALL INDICATING LIGHTS.
I. ENSURE THAT ALL WIRED, BOLTED, AND MOUTING CONNECTIONS ARE TIGHT AND SECURE.
J. CHECK THAT THE BYPASS/ISOLATION SWITCH CAN BYPASS THE AUTOMATIC TRANSFER SWITCH AND TRANSFER BETWEEN NORMAL AND EMERGENCY POWER INDEPENDENT OF THE AUTOMATIC TRANSFER SWITCH'S CONDITION AND POSITION.
K. CHECK THE MECHANICAL OPERATION OF THE BYPASS HANDLE AND ENSURE THAT THE OPERATING SPEED OF THE SWITCH CONTACTS ARE INDEPENDENT OF THE SPEED OF THE BYPASS HANDLE.

L. CHECK FOR PROPER OPERATION OF THE BYPASS AND ISOLATION HANDLES.
M. ENSURE THAT THE “GENERATOR START/RUN” CIRCUIT REMAINS CLOSED WHILE THE BYPASS/ISOLATION SWITCH IS IN THE BYPASS-TO-EMERGENCY POSITION, WHILE THE AUTOMATIC TRANSFER SWITCH IS IN THE “NORMAL” POSITION OR COMPLETELY REMOVED.
N. LOOK FOR ARCING OR IMPROPER CONTACTING.
O. CLEAN AND INSPECT ALL PAINTED SURFACES. REMOVE ANY SIGNS OF CORROSION AND REPAINT, AS REQUIRED.
P. RE-ENERGIZE POWER SOURCES AND RETURN AUTOMATIC TRANSFER SWITCH AND BP/IS SWITCH TO SERVICE

PRIMARY 12.47KV SWITCHGEAR PREVENTIVE MAINTENANCE

!!SAFETY INFORMATION!!

1. ALWAYS ADHERE TO ESTABLISHED SAFETY PROCEDURES.
2. THOROUGHLY REVIEW MANUFACTURER'S INSTRUCTIONS AND OBSERVE WARNINGS, CAUTIONS, AND NOTES.
3. ENSURE APPROPRIATE LOCKOUT AND TAGOUT PROCEDURES ARE OBSERVED.
4. PRIOR TO PERFORMING THIS TASK, COORDINATE WITH OGG ELECTRICAL MAINTENANCE DEPARTMENT.
5. REPORT ANY CONDITIONS REQUIRING MAINTENANCE THAT ARE BEYOND THE SCOPE OF THIS PM TO MAINTENANCE SUPERVISION.

NOTE

PERIODICALLY, THIS PM WILL NEED TO BE REVIEWED AND UPDATED TO ENSURE IT CONTAINS THE MOST CURRENT/RELEVANT INFORMATION AND THAT IT CONFORMS TO LOCAL REGULATIONS, REQUIREMENTS, AND CONDITIONS.

TOOLS AND MATERIALS:

1. ELECTRICAL TOOL KIT
2. LUBRICANT (AS PER MANUFACTURER'S REQUIREMENTS)
3. STOP WATCH
4. VACUUM CLEANER
5. CLEANING TOOLS AND MATERIALS
6. ANSI-61 GRAY ACRYLIC ENAMEL PAINT (AS PER MANUFACTURER'S REQUIREMENTS)
7. FILTERS
8. BURNISHING TOOL
9. MEGGER
10. PERSONAL PROTECTIVE EQUIPMENT (PPE)

SWITCHGEAR ANNUAL PREVENTIVE MAINTENANCE

A. OVERALL SWITCHGEAR
   1. INSPECT FOR ANY UNWARRANTED SOUNDS COMING FROM THE SWITCHGEAR.

B. MAIN CIRCUIT BREAKER UNITS
   1. THERMAL SCAN THE BREAKERS FOR SIGNS OF OVERHEATING.
   2. DE-ENERGIZE THE BREAKERS AND REMOVE FROM SERVICE.
   3. REMOVE AND CLEAN INTERPHASE BARRIERS.
      a. CLEAN ALL INSULATING MATERIALS WITH VACUUM AND/OR CLEAN LINT FREE RAGS.
      b. INSPECT FOR SIGNS OF CORONA, TRACKING, ARCING, OR THERMAL OR PHYSICAL DAMAGE.

4. ENSURE THAT ALL CONTACTS ARE CLEAN, SMOOTH, AND IN PROPER ALIGNMENT, AS PER MANUFACTURER'S RECOMMENDATIONS. ENSURE THAT SPRING PRESSURES ARE MAINTAINED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
    a. CLEAN SILVER CONTACTS WITH ALCOHOL OR SILVER CLEANER USING NON-ABRASIVE CLOTHS.
    b. DISCOLORATION ON SILVER CONTACTS ARE USUALLY HARMFUL UNLESS CAUSED BY INSULATING DEPOSITS.
5. MANUALLY CLOSE BREAKER TO CHECK FOR PROPER WIRE CONTACT PRESSURE, CONTACT ALIGNMENT, AND TO MAKE SURE ALL CONTACTS MAKE AT APPROXIMATELY THE SAME TIME.
6. PERFORM A CONTACT RESISTANCE TEST AND COMPARE RESULTS WITH PREVIOUS DATA AND MANUFACTURER'S SPECIFICATIONS.
7. DRAW-OUT CONTACTS ON THE CIRCUIT BREAKER SHOULD BE CLEANED, USING A CLEAN LINT-FREE RAG, AND INSPECTED FOR OVERHEATING, ALIGNMENT, AND BROKEN OR WEAK SPRINGS. COAT CONTACT SURFACES WITH CONTACT LUBRICANT AS PER MANUFACTURER'S RECOMMENDATIONS.
8. CLEAN ALL CERAMIC MATERIALS OF LOOSE DIRT AND EXAMINE FOR SIGNS OF MOISTURE. EXAMINE FOR CRACKED OR BROKEN PIECES. DO NOT USE EMERY CLOTH OR WIRE BRUSHES.
9. EXAMINE ARC CHUTES FOR DIRT AND/OR DUST ACCUMULATIONS AND CLEAN AS NECESSARY.
10. INSPECT FOR LOOSE, BROKEN, WORN, OR MISSING PARTS.
11. EXAMINE FOR EXCESSIVE WEAR OF MOVING PARTS. OBSERVE THAT OPERATING MECHANISMS FUNCTION PROPERLY WITHOUT BINDING, HANGING, OR WITHOUT DELAYED ACTION. ENSURE ANY LUBRICATION IS DONE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
12. ENSURE THAT ALL BOLTS AND SCREWS ARE PROPERLY SECURED.
13. INSPECT OPERATING DEVICES FOR PROPER OPERATION AND GENERAL CONDITION. ENSURE ALL INDICATING DEVICES ARE FULLY FUNCTIONAL AND PROPERLY SET.

C. CONTROL TRANSFORMER
1. PERFORM A THERMAL SCAN TO INSPECT FOR SIGNS OF OVERHEATING AND LOOSE CONNECTIONS.
2. DE-ENERGIZE THE SWITCHGEAR AND REMOVE FROM SERVICE.
3. INSPECT ALL CONNECTIONS FOR SECURITY.
4. CHECK DEVICE MOUNTINGS.
5. ENSURE TRANSFORMER IS FREE OF DIRT AND MOISTURE.

D. EJ CURRENT-LIMITING POWER FUSES
1. CHECK FUSE CLIPS FOR SECURITY.

2. INSPECT ALL CONTACT SURFACES FOR CORROSION OR CONTAMINATION. CLEAN OR REPLACE, AS NEEDED.
3. ENSURE CONTACTS HAVE A BRIGHT APPEARANCE.
4. INSPECT SECONDARY DISCONNECTING DEVICE CONTACTS AND STUDS.

E. RELAYS
   1. AUXILIARY RELAYS
      a. PERFORM "AS FOUND" TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
         i. MAKE A NOTE OF PROPER OR IMPROPER OPERATIONS OF RELAYS.
      b. MANUALLY OPERATE RELAY CONTACTS TO ENSURE ALL DEVICES OPERATED BY THE RELAY FUNCTION FREELY AND PROPERLY. CHECK THE BREAKER TIP COILS AND OTHER DEVICES OPERATED BY THE RELAYS TO ENSURE PROPER OPERATION.
      c. PERFORM A VISUAL INSPECTION OF ANY RELAYS. REMOVE COVERS AND REMOVE ALL EXCESS DUST.
         i. CHECK FOR LOOSE CONNECTIONS, BROKEN STUDS, BURNED INSULATION, AND DIRTY CONTACTS.
         ii. CHECK EACH RELAY FOR PROPER SETTINGS. CHECK THE SETTING FROM PRIOR DOCUMENTED TESTS.
      d. CHECK THAT ALL CONNECTIONS ARE TIGHT.
      e. INSPECT FOR PROPER COIL AND RESISTANCE AS RECOMMENDED BY THE MANUFACTURER.
      f. CHECK THAT ALL GAPS ARE FREE OF FOREIGN MATERIAL.
      g. CHECK FOR FOREIGN MATERIAL BETWEEN THE MAGNETS AND ROTATING DISC.
      h. ENSURE COIL IS CONNECTED PROPERLY USING BOTH COIL CONTACTS FOR DOUBLE BREAK ACTION.
      i. ENSURE COIL HAS A MINIMUM ¼ INCH CONTACT GAP WHEN OPEN.
      j. ENSURE ROLLERS SPIN FREELY ON LATCHING ASSEMBLY.
      k. INSPECT WIRING TO ENSURE IT DOES NOT INTERFERE WITH THE LATCHING MECHANISM AND WIRES ARE WITHIN OUTER EDGES OF BARRIERS.
      l. INSPECT TIE BOLTS FOR SECURITY (25 INCH POUNDS).
      m. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING IF NECESSARY.
      n. MEASURE CONTACTS FOR ALIGNMENT AND WIPE ACCORDING TO MANUFACTURER'S MANUAL.
   2. TIME OVERCURRENT RELAYS
      a. PERFORM AN "AS FOUND" TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.

i. MAKE A NOTE OF PROPER OR IMPROPER OPERATION OF RELAYS.

b. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE BURNISHING TOOL FOR CLEANING, IF NECESSARY.

c. CLEAN CLEAR LEXAN COVER WITH A SOFT CLOTH AND WATER ONLY.

d. PERFORM PICK-UP TEST FOR THE TAP SETTING IN SERVICE, AS RECOMMENDED BY THE MANUFACTURER.

e. PERFORM THE TIME TESTS AS RECOMMENDED BY THE MANUFACTURER.

3. HIGH-SEISMIC INSTANTANEOUS UNIT.
   a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
4. HIGH-SEISMIC TARGET AND SEAL-IN UNIT
   a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
   b. CHECK THAT THE UNIT DROPS OUT AT 25% OR MORE OF THE TAP VALUE.

F. BREAKER COMPARTMENT INTERIOR
1. THOROUGHLY CLEAN THE INTERIOR OF THE COMPARTMENTS USING A VACUUM CLEANER AND CLEAN RAGS.
   a. DO NOT USE STEEL WOOL OR OXIDE PAPERS. COMPRESSED AIR IS ALSO NOT RECOMMENDED.
2. INSPECT PRIMARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
3. CLEAN AND LUBRICATE THE RACKING MECHANISM.
4. INSPECT INDICATING DEVICES, MECHANICAL, AND KEY INTERLOCKS.
5. BEFORE REPLACING THE BREAKER, CLEAN AND APPLY A THIN LAYER OF LUBRICANT TO THE PRIMARY AND SECONDARY DISCONNECTING DEVICE CONTACTS AND STUDS.

G. SWITCHES
1. TEST SWITCHES FOR MECHANICAL OPERATION.
2. INSPECT SWITCHES FOR SIGNS OF BURNING ON CONTACTS.
3. IF CONTACTS APPEAR TO BE PITTED OR COATED WITH SULPHITE, SCRAPE THEM GENTLY WITH A SHARP KNIFE OR DRESS THEM WITH A FINE FILE.
4. IF THERE IS NO OPENING BETWEEN THE CONTACTS, IT WOULD INDICATE THAT THE PARTS OF THE MOVING CONTACT SUPPORT THAT BEARS ON THE CAM OR THE CAM ITSELF HAS BECOME WORN AND NEEDS TO BE REPLACED.

H. BUS AREA
1. CLEAN RACKING MECHANISM AND LUBRICATE JACK SCREWS AND GEARS.

2. CHECK PRIMARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
3. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE BURNISHING TOOL FOR CLEANING, IF NECESSARY.
4. USE A 1000 OR 2500 VOLT MEGGER TO MEASURE THE RESISTANCE OF EACH PHASE TO GROUND AND BETWEEN PHASES OF THE INSULATION OF BUSES AND CONNECTIONS. RECORD RESULTS FOR COMPARISON WITH PREVIOUS RECORDINGS TO UNCOVER ANY WEAKENING OF THE INSULATION.
    a. IF POSSIBLE, READINGS SHOULD BE TAKEN UNDER CONDITIONS SIMILAR TO PREVIOUS READINGS.
    b. CHECK FOR ANY MAJOR DIFFERENCES IN RESISTANCE BETWEEN EACH OF THE PHASE TO GROUND TESTS.

I. METERS
1. ENSURE THAT ALL METERS ARE PROPERLY MOUNTED AND ALL CONNECTIONS ARE SECURE.
2. WIPE DOWN COVERS WITH A CLEAN LINT-FREE CLOTH. DO NOT USE ABRASIVE MATERIALS.

J. CABLE AND BUSWAY COMPARTMENT
1. INSPECT AND POWER BUSWAY CONNECTIONS FOR SIGNS OF OVERHEATING.
2. INSPECT ALL ELECTRICAL CONNECTIONS FOR SECURITY.
3. INSPECT ALL BOLTS THAT HOLD CABLE TERMINALS TO THE CONNECTION BAR FOR SECURITY.
4. INSPECT THE NEUTRAL AND GROUND BUSES AND MOUNTING BOLTS FOR SECURITY.
5. INSPECT ALL SECONDARY CONTROL WIRING CONNECTIONS FOR SECURITY AND ENSURE THAT ALL CABLING IS INTACT.
6. ENSURE THAT COMPARTMENT IS FREE OF DUST AND MOISTURE.

K. OVERALL SWITCHGEAR
1. THOROUGHLY CLEAN EQUIPMENT USING A VACUUM CLEANER TO REMOVE ALL DUST AND OTHER ACCUMULATIONS.
2. WIPE AND CLEAN THE BUSES AND SUPPORTS.
3. ENSURE ALL COMPARTMENT DOOR LATCHES OPERATE PROPERLY.
4. OPERATE ALL HINGED PANELS AND DOORS TO VERIFY THEY OPERATE IN A SMOOTH AND SAFE MANNER. TRY ALL LATCHES AND KNOBS. ROTATE AND PUSH ALL SWITCHES THROUGH ALL POSITIONS TO ENSURE SMOOTH OPERATION.
5. INSPECT ALL CONNECTIONS/WIRING FOR SECURITY AND SIGNS OF CORROSION OR OVERHEATING.
6. CLEAN AND INSPECT ALL PAINTED SURFACES. REMOVE CORROSION AND REPAINT, AS REQUIRED.
7. INSPECT ALL ANCHOR AND STRUCTURAL BOLTS FOR SECURITY.

8. INSPECT HEATERS FOR PROPER OPERATION AS APPLICABLE.
9. REMOVE ANY EXTERIOR VENT FILTERS AND CLEAN USING WARM, SOAPY, WATER SOLUTION OR REPLACE AS NEEDED.
10. RE-ENERGIZE UNIT AND RETURN TO SERVICE.
11. IF NO DEFICIENCIES EXIST, AFFIX INSPECTION LABEL, INDICATING THE SERVICE DATE, NAME OF SERVICE COMPANY, AND TECHNICIAN OR ELECTRICIAN.
12. MAKE A REPORT ON EACH INDIVIDUAL BREAKER, INDICATING DATA OF EQUIPMENT (UNIT/CIRCUIT IDENTIFICATION, TYPE, MODEL, MANUFACTURER, SERIAL NO., VOLTAGE/CURRENT RATINGS, AND VAULT LOCATION), INSPECTION CHECKS PERFORMED, AND BOTH "AS FOUND" AND "AS LEFT" DATA. ALSO MAKE A SUMMARY REPORT OF ALL DEFICIENCIES FOUND, RECOMMENDED CORRECTIVE ACTIONS, AND DATE.
13. INFRARED THERMOGRAPHIC ELECTRICAL SYSTEMS SURVEY
    a. USING STATE-OF-THE-ART THERMOGRAPHIC EQUIPMENT AND TECHNOLOGY, SCAN ALL SWITCHGEARS, INCLUDING, BUT NOT LIMITED TO; VIEWABLE BUS; BUS JOINTS AND CONNECTIONS; FEEDER CONNECTIONS AND TERMINATIONS; POWER STABS; AND CONTACTS AT VARIOUS ELECTRICAL VAULTS AS LISTED IN APPENDIX "B".
    b. PROVIDE A REPORT PER ELECTRICAL VAULT, DETAILING ASSESSMENT OF THE FINDINGS WITH ACCOMPANYING THERMOGRAMS AND DIGITAL COLOR PHOTOS OF EACH PIECE OF EQUIPMENT EVALUATED AT VARIOUS ELECTRICAL VAULTS.
    c. CATEGORIZE THE DEFICIENCIES FOUND (THOSE TO BE OPERATING AT TEMPERATURES EXCEEDING ACCEPTABLE INDUSTRY STANDARDS) AS TO:
        i. CRITICAL-COMPONENT FAILURE REPRESENTS POTENTIAL PERSONNEL HAZARD.
        ii. SEVERE-FAILURE IS IMMINENT BUT SHOULD HAVE RELATIVE MINOR IMPACT ON OPERATION.
        iii. ALERT FAILURE IS OF A ROUTINE NATURE AND REPAIRS CAN BE EASILY MADE.

SECONDARY 480V SWITCHGEAR PREVENTIVE MAINTENANCE

!!SAFETY INFORMATION!!

1. ALWAYS ADHERE TO ESTABLISHED SAFETY PROCEDURES.
2. THOROUGHLY REVIEW MANUFACTURER'S INSTRUCTIONS AND OBSERVE WARNINGS, CAUTIONS, AND NOTES.
3. ENSURE APPROPRIATE LOCKOUT AND TAGOUT PROCEDURES ARE OBSERVED.
4. PRIOR TO PERFORMING THIS TASK, COORDINATE WITH OGG ELECTRICAL MAINTENANCE DEPARTMENT.
5. REPORT ANY CONDITIONS REQUIRING MAINTENANCE THAT ARE BEYOND THE SCOPE OF THIS PM TO MAINTENANCE SUPERVISION.

NOTE

PERIODICALLY, THIS PM WILL NEED TO BE REVIEWED AND UPDATED TO ENSURE IT CONTAINS THE MOST CURRENT/RELEVANT INFORMATION AND THAT IT CONFORMS TO LOCAL REGULATIONS, REQUIREMENTS, AND CONDITIONS.

TOOLS AND MATERIALS:

1. ELECTRICAL TOOL KIT
2. KEROSENE
3. SMALL HAND-HELD TEST KIT
4. LUBRICANT (AS PER MANUFACTURER'S REQUIREMENTS)
5. STOP WATCH
6. VACUUM CLEANER
7. CLEANING TOOLS AND MATERIALS
8. ANSI-61 GRAY ACRYLIC ENAMEL PAINT OR EQUIVALENT
9. FILTERS
10. BURNISHING TOOL
11. MEGGER
12. PERSONAL PROTECTIVE EQUIPMENT (PPE)

SWITCHGEAR ANNUAL PREVENTIVE MAINTENANCE

A. LOW VOLTAGE AIR CIRCUIT BREAKERS AND INSTRUMENT COMPARTMENTS
   1. CONDUCT THERMAL SCANS OF ALL CABLE CONNECTIONS AND BUS JOINTS.
   2. WHILE IN TEST MODE, OPERATE EACH BREAKER AND CHECK ALL FUNCTIONS.
   3. DE-ENERGIZE BREAKERS AND REMOVE FROM SERVICE.
   4. MANUALLY OPERATE THE BREAKER SEVERAL TIMES, CHECKING FOR OBSTRUCTIONS OR EXCESSIVE FRICTION.

5. VISUALLY INSPECT THE BREAKER FOR LOOSE HARDWARE. INSPECT THE COMPARTMENT FLOOR FOR ANY HARDWARE THAT MAY HAVE FALLEN FROM THE BREAKERS.
6. INSPECT ARC CHUTES FOR SIGNS OF CORROSION OR BURNING.
7. CHECK ELECTRO-MECHANICAL DEVICES FOR POSITIVE TRIP.
8. CHECK INSULATING PARTS FOR SIGNS OF OVERHEATING AND CRACKS THAT MAY INDICATE EXCESSIVE THERMAL AGING.
9. ENSURE ALL MECHANICAL PARTS ARE WELL LUBRICATED. LUBRICATE ALL MOVING CURRENT CARRYING PARTS. REMOVE ANY HARDENED GREASE AND DIRT USING KEROSENE PRIOR TO APPLYING A NEW, THIN FILM OF LUBRICANT.
10. INSPECT THE CONTACT SURFACE OF THE DISCONNECT FINGERS FOR CLEANLINESS AND PROPER LUBRICATION.
11. VERIFY THAT ALL BOLTED CONNECTIONS ARE PROPER TORQUED.
12. VERIFY THAT ALL DIMENSIONS CRITICAL TO THE PROPER OPERATION OF THE CIRCUIT BREAKER ARE CORRECT, PER MANUFACTURER'S RECOMMENDATIONS.
13. USE A HAND-HELD TEST KIT, PER MANUFACTURER'S RECOMMENDATIONS, TO CHECK FOR THE FOLLOWING VALUES AND COMPARE AGAINST MANUAL'S VALUES.
    a. MINIMUM PICKUP CURRENT
    b. LONG-TIME DELAY
    c. SHORT-TIME PICKUP/DELAY
    d. GROUND-FAULT PICKUP/DELAY
    e. INSTANTANEOUS PICKUP
14. MEGGER THE BREAKER BETWEEN EACH PHASE AND FROM EACH PHASE TO GROUND USING A 1000 OR 2500 VOLT MEGGER. RECORD THE RESISTANCES OF EACH AND COMPARE WITH PREVIOUS READINGS TO UNCOVER ANY WEAKENING OF THE INSULATION. ANY VALUE BELOW 1 MEGOHM SHOULD BE INVESTIGATED.

B. INSTRUMENTS, INSTRUMENT TRANSFORMERS AND RELAYS
1. CHECK AND INSPECT ALL DEVICES TO ENSURE THEY ARE FUNCTIONING PROPERLY.
2. INSPECT ALL ELECTRICAL CONNECTIONS FOR SECURITY.
3. CHECK DEVICE MOUNTINGS.
4. ENSURE INSTRUMENT COMPARTMENTS ARE FREE OF DIRT AND MOISTURE.

C. BREAKER COMPARTMENTS INTERIOR
1. THOROUGHLY CLEAN THE INTERIOR OF THE COMPARTMENTS USING A VACUUM CLEANER AND CLEAN RAGS.
    a. DO NOT USE STEEL WOOL OR OXIDE PAPERS. COMPRESSED AIR IS ALSO NOT RECOMMENDED.
2. INSPECT INDICATING DEVICES, MECHANICAL AND KEY INTERLOCKS.

3. INSPECT PRIMARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
4. CLEAN AND LUBRICATE THE RACKING MECHANISM.
5. BEFORE REPLACING THE BREAKER, CLEAN AND APPLY A THIN LAYER OF LUBRICANT TO THE PRIMARY AND SECONDARY DISCONNECTING DEVICE CONTACTS AND STUDS.

D. CABLE AND BUSWAY COMPARTMENT
   1. INSPECT ALL POWER AND BUSWAY CONNECTIONS FOR SIGNS OF OVERHEATING.
   2. INSPECT ALL CONNECTIONS FOR SECURITY.
   3. INSPECT ALL BOLTS THAT HOLD CABLE TERMINALS TO THE CONNECTION BAR FOR SECURITY.
   4. INSPECT THE NEUTRAL AND GROUND BUSES AND MOUNTING BOLTS FOR SECURITY.
   5. INSPECT ALL SECONDARY CONTROL WIRING CONNECTIONS FOR SECURITY AND ENSURE THAT ALL CONTROL CABLING IS INTACT.
   6. ENSURE THAT COMPARTMENT IS FREE OF DUST AND MOISTURE.

E. CIRCUIT BREAKER LIFTING MECHANISM
   1. INSPECT CABLE FOR SIGNS OF DETERIORATION OR BROKEN STRANDS. REPLACE IF FOUND TO BE DEFECTIVE IN ANY WAY.

F. RELAYS
   1. AUXILIARY RELAYS
      a. PERFORM “AS FOUND” TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
         i. MAKE A NOTE OF PROPER OR IMPROPER OPERATIONS OF RELAYS.
      a. MANUALLY OPERATE RELAY CONTACTS TO ENSURE ALL DEVICES OPERATED BY THE RELAY FUNCTION FREELY AND PROPERLY. CHECK THE BREAKER TIP COILS AND OTHER DEVICES OPERATED BY THE RELAYS TO ENSURE PROPER OPERATION.
      b. PERFORM A VISUAL INSPECTION OF ANY RELAYS. REMOVE COVERS AND REMOVE ALL EXCESS DUST.
         i. CHECK FOR LOOSE CONNECTIONS, BROKEN STUDS, BURNED INSULATION, AND DIRTY CONTACTS.
         ii. CHECK EACH RELAY FOR PROPER SETTINGS. CHECK THE SETTING FROM PRIOR DOCUMENTED TESTS.
      c. CHECK THAT ALL CONNECTIONS ARE TIGHT.
      d. INSPECT FOR PROPER COIL AND RESISTANCE AS RECOMMENDED BY THE MANUFACTURER.
      e. CHECK THAT ALL GAPS ARE FREE OF FOREIGN MATERIAL.
      f. CHECK FOR FOREIGN MATERIAL BETWEEN THE MAGNETS AND ROTATING DISC.

g. ENSURE COIL IS CONNECTED PROPERLY USING BOTH COIL CONTACTS FOR DOUBLE BREAK ACTION.
h. ENSURE EACH COIL HAS A MINIMUM ¼ INCH CONTACT GAP WHEN OPEN.
i. ENSURE ROLLERS SPIN FREELY ON LATCHING ASSEMBLY.
j. INSPECT WIRING TO ENSURE IT DOES NOT INTERFERE WITH THE LATCHING MECHANISM AND WIRES ARE WITHIN OUTER EDGES OF BARRIERS.
k. INSPECT TIE BOLTS FOR SECURITY (25 INCH POUNDS).
l. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING IF NECESSARY.
m. MEASURE CONTACTS FOR ALIGNMENT AND WIPE ACCORDING TO MANUFACTURER'S MANUAL.

2. TIME OVERCURRENT RELAYS
    a. PERFORM AN "AS FOUND" TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
        i. MAKE A NOTE OF PROPER OR IMPROPER OPERATION OF RELAYS.
    b. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE BURNISHING TOOL FOR CLEANING, IF NECESSARY.
    c. PERFORM AN OVERALL FUNCTIONAL SYSTEM TEST.
    d. CLEAN CLEAR LEXAN COVER WITH A SOFT CLOTH AND WATER ONLY.
    e. PERFORM PICK-UP TEST FOR THE TAP SETTING IN SERVICE, AS RECOMMENDED BY THE MANUFACTURER.
    f. PERFORM THE TIME TESTS AS RECOMMENDED BY THE MANUFACTURER.
3. HIGH-SEISMIC INSTANTANEOUS UNIT.
    a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
4. HIGH-SEISMIC TARGET AND SEAL-IN UNIT
    a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
    b. CHECK THAT THE UNIT DROPS OUT AT 25% OR MORE OF THE TAP VALUE.
5. UNDERVOLTAGE RELAYS
    a. PERFORM AN "AS FOUND" TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
        i. MAKE A NOTE OF PROPER OR IMPROPER OPERATION OF RELAYS.
    b. CHECK THE GAP ON THE NORMALLY OPEN CONTACTS. GAPS SHOULD BE BETWEEN 0.010-0.015 INCHES.

c. OBSERVE THE WIPE ON EACH NORMALLY CLOSED CONTACT BY DEFLECTING THE STATIONARY CONTACT MEMBER TOWARDS THE FRAME. WHICH SHOULD BE APPROXIMATELY 0.005 INCH.
d. CHECK THE WIPE ON EACH NORMALLY OPEN CONTACT BY INSERTING A 0.005-INCH-THICK SHIM BETWEEN THE RESIDUAL SCREW AND THE POLE PIECE AND OPERATING THE ARMATURE BY HAND. THE CONTACTS SHOULD MAKE CONTACT BEFORE THE RESIDUAL SCREW STRIKES THE SHIM.
e. CONNECT A VARIABLE SOURCE OF VOLTAGE (AT RATED FREQUENCY) TO THE COIL STUDS AND CHECK THE PICK-UP AND DROPOUT VOLTAGES. USE A VARIABLE RHEOSTAT TO THE RELAY AND, IF NECESSARY, THE RESIDUAL SCREW TO ADJUST TO THE VALUES REQUIRED.
f. CHECK THE PICK-UP AMPERES BY CONNECTING VARIABLE DC SOURCE TO THE TARGET CIRCUITS.
g. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE BURNISHING TOOL FOR CLEANING, IF NECESSARY.

G. TRANSFORMER
1. INSPECT CONNECTIONS/WIRING FOR SECURITY AND SIGNS OF CORROSION OR OVERHEATING.
2. THOROUGHLY CLEAN UNIT WITH VACUUM CLEANER AND CLEAN RAGS.

H. OVERALL SWITCHGEAR
1. INSPECT FOR ANY UNWARRANTED SOUNDS COMING FROM THE SWITCHGEAR.
2. THOROUGHLY CLEAN EQUIPMENT USING A VACUUM CLEANER TO REMOVE ALL DUST AND OTHER ACCUMULATIONS.
3. WIPE CLEAN THE BUSES AND SUPPORTS.
4. INSPECT ALL CONNECTIONS/WIRING FOR SECURITY AND SIGNS OF CORROSION OR OVERHEATING.
5. CLEAN AND INSPECT ALL PAINTED SURFACES. REMOVE CORROSION AND REPAINT, AS REQUIRED.
6. INSPECT ALL ANCHOR AND STRUCTURAL BOLTS FOR SECURITY.
7. INSPECT HEATERS FOR PROPER OPERATION, AS APPLICABLE.
8. ENSURE ALL COMPARTMENT DOOR LATCHES OPERATE PROPERLY.
9. OPERATE ALL HINGED PANELS AND DOORS TO VERIFY THEY OPERATE IN A SMOOTH AND SAFE MANNER. TRY ALL LATCHES AND KNOBS. ROTATE AND PUSH ALL SWITCHES THROUGH ALL POSITIONS TO ENSURE SMOOTH OPERATION.
10. CONDUCT A THERMAL SCAN OF ENTIRE SWITCHGEAR FOR SIGNS OF OVERHEATING. ENSURE TO CHECK BUS AREAS, BUS JOINTS, CONNECTIONS, INSTRUMENTS, ETC.
11. RETURN UNIT TO SERVICE.

12. INFRARED THERMOGRAPHIC ELECTRICAL SYSTEMS SURVEY
    a. USING STATE-OF-THE-ART THERMOGRAPHIC EQUIPMENT AND TECHNOLOGY, SCAN ALL SWITCHGEARS, INCLUDING BUT NOT LIMITED TO; VIEWABLE BUS; BUS JOINTS AND CONNECTIONS; AND CONTACTS AT ALL ELECTRICAL ROOMS.
    b. PROVIDE A REPORT PER ELECTRICAL ROOM, DETAILING ASSESSMENT OF THE FINDINGS WITH ACCOMAPNYING THERMOGRAMS AND DIGITAL COLOR PHOTOS OF EACH PIECE OF EQUIPMENT EVALUATED AT VARIOUS ELECTRICAL ROOMS.
    c. CATEGORIZE THE DEFICIENCIES FOUND (THOSE TO BE OPERATING AT TEMPERATURES EXCEEDING ACCEPTABLE INDUSTRY STANDARDS) AS TO:
        i. CRITICAL-COMPONENT FAILURE REPRESENTS POTENTIAL PERSONNEL HAZARD.
        ii. SEVERE-FAILURE IS IMMINENT BUT SHOULD HAVE RELATIVE MINOR IMPACT ON OPERATION.
        iii. ALERT-FAILURE IS OF A ROUTINE NATURE AND REPAIRS CAN BE EASILY MADE.

UNIT SUBSTATION PREVENTIVE MAINTENANCE

!!SAFETY INFORMATION!!

1. ALWAYS ADHERE TO ESTABLISHED SAFETY PROCEDURES.
2. THOROUGHLY REVIEW MANUFACTURER'S INSTRUCTIONS AND OBSERVE WARNINGS, CAUTIONS, AND NOTES.
3. ENSURE APPROPRIATE LOCKOUT AND TAGOUT PROCEDURES ARE OBSERVED.
4. PRIOR TO PERFORMING THIS TASK, COORDINATE WITH OGG ELECTRICAL MAINTENANCE DEPARTMENT.
5. REPORT ANY CONDITIONS REQUIRING MAINTENANCE THAT ARE BEYOND THE SCOPE OF THIS PM TO MAINTENANCE SUPERVISION.

NOTE

PERIODICALLY, THIS PM WILL NEED TO BE REVIEWED AND UPDATED TO ENSURE IT CONTAINS THE MOST CURRENT/RELEVANT INFORMATION AND THAT IT CONFORMS TO LOCAL REGULATIONS, REQUIREMENTS, AND CONDITIONS.

TOOLS AND MATERIALS:

1. ELECTRICAL TOOL KIT
2. KEROSENE
3. SMALL HAND-HELD TEST KIT/FULL-FUNCTION TEST KIT
4. LUBRICANT (AS PER MANUFACTURER'S REQUIREMENTS)
5. STOP WATCH
6. VACUUM CLEANER
7. CLEANING TOOLS AND MATERIALS
8. ANSI-61 GRAY ACRYLIC ENAMEL PAINT OR EQUIVALENT
9. FILTERS
10. BURNISHING TOOL
11. MEGGER
12. QUART, SMALL NECK BROWN BOTTLE
13. DRY HYDROCARBON SOLVENT (KEROSENE)
14. TYGON TUBING (AT LEAST 1 PER TRANSFORMER)
15. DISTILLED WATER
16. DRY INSULATING LIQUID (AS PER MANUFACTURER'S SPECIFICATIONS)
17. PORTABLE TEST SET (GE MODEL 9T11Y8454, OR EQUIVALENT)
18. PERSONAL PROTECTIVE EQUIPMENT (PPE)

UNIT SUBSTATION ANNUAL PREVENTIVE MAINTENANCE

PRIMARY ENTRANCE SWITCHGEAR (12.47 KV SWITCHGEAR) ANNUAL PREVENTIVE MAINTENANCE

A. SWITCHGEAR ENCLOSURE

1. INSPECT FOR ANY UNWARRANTED SOUNDS COMING FROM THE SWITCHGEAR.
2. DE-ENERGIZE THE SWITCHGEAR AND REMOVE FROM SERVICE.

B. MAIN CIRCUIT BREAKER UNITS
1. ENSURE THAT BREAKERS ARE DE-ENERGIZED AND REMOVED FROM SERVICE.
2. REMOVE AND CLEAN INTERPHASE BARRIERS.
    a. CLEAN ALL INSULATING MATERIALS WITH VACUUM AND/OR CLEAN LINT-FREE RAGS.
    b. INSPECT FOR SIGNS OF CORONA, TRACKING, ARCING, OR THERMAL OR PHYSICAL DAMAGE.
3. ENSURE THAT ALL CONTACTS ARE CLEAN, SMOOTH, AND IN PROPER ALIGNMENT, AS PER MANUFACTURER'S RECOMMENDATIONS. ENSURE THAT SPRING PRESSURES ARE MAINTAINED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
    a. CLEAN SILVER CONTACTS WITH ALCOHOL OR SILVER CLEANER USING NON-ABRASIVE CLOTHS.
    b. DISCOLORATION ON SILVER CONTACTS ARE NOT USUALLY HARMFUL UNLESS CAUSED BY INSULATING DEPOSITS.
4. MANUALLY CLOSE BREAKER TO CHECK FOR PROPER WIPE, CONTACT PRESSURE, CONTACT ALIGNMENT, AND TO MAKE SURE ALL CONTACTS MAKE AT APPROXIMATELY THE SAME TIME.
5. PERFORM A CONTACT RESISTANCE TEST AND COMPARE RESULTS WITH PREVIOUS DATA AND MANUFACTURER'S SPECIFICATIONS.
6. DRAW-OUT CONTACTS ON THE CIRCUIT BREAKER SHOULD BE CLEANED, USING A CLEAN LINT-FREE RAG, AND INSPECTED FOR OVERHEATING, ALIGNMENT, AND BROKEN OR WEAK SPRINGS. COAT CONTACT SURFACES WITH CONTACT LUBRICANT AS PER MANUFACTURER'S RECOMMENDATIONS.
7. CLEAN ALL CERAMIC MATERIALS OF LOOSE DIRT AND EXAMINE FOR SIGNS OF MOISTURE. EXAMINE FOR CRACKED OR BROKEN PIECES. DO NOT USE EMERY CLOTH OR WIRE BRUSHES.
8. EXAMINE ARC CHUTES FOR DIRT AND/OR DUST ACCUMULATIONS AND CLEAN AS NECESSARY.
9. INSPECT FOR LOOSE, BROKEN, WORN, OR MISSING PARTS.
10. EXAMINE FOR EXCESSIVE WEAR OF MOVING PARTS. OBSERVE THAT OPERATING MEACHANISMS FUNCTION PROPERLY WITHOUT BINDING, HANGING, OR WITHOUT DELAYED ACTION. ENSURE ANY LUBRICATION IS DONE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
11. ENSURE THAT ALL BOLTS AND SCREWS ARE PROPERLY SECURED.

C. BUS AREA

1. CLEAN RACKING MECHANISM AND LUBRICATE JACK SCREWS AND GEARS.
2. CHECK PRIMARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
3. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING, IF NECESSARY.
4. USE A 1000 OR 2500 VOLT MEGGER TO MEASURE THE RESISTANCE OF EACH PHASE TO GROUND AND BETWEEN PHASES OF THE INSULATION OF BUSES AND CONNECTIONS. RECORD RESULTS FOR COMPARISON WITH PREVIOUS RECORDINGS TO UNCOVER ANY WEAKENING OF THE INSULATION.
    a. IF POSSIBLE READINGS SHOULD BE TAKEN UNDER CONDITIONS SIMILAR TO PREVIOUS READINGS.
    b. CHECK FOR ANY MAJOR DIFFERENCES IN RESISTANCE BETWEEN EACH OF THE PHASE TO GROUND TESTS.

D. RELAYS
1. AUXILIARY RELAYS
    a. PERFORM “AS FOUND” TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
        i. MAKE A NOTE OF PROPER OR IMPROPER OPERATIONS OF RELAYS.
    b. MANUALLY OPERATE RELAY CONTACTS TO ENSURE ALL DEVICES OPERATED BY THE RELAY FUNCTION FREELY AND PROPERLY. CHECK THE BREAKER TIP COILS AND OTHER DEVICES OPERATED BY THE RELAYS TO ENSURE PROPER OPERATION.
    c. PERFORM A VISUAL INSPECTION OF ANY RELAYS. REMOVE COVERS AND REMOVE ALL EXCESS DUST.
        i. CHECK FOR LOOSE CONNECTIONS, BROKEN STUDS, BURNED INSULATION, AND DIRTY CONTACTS.
        ii. CHECK EACH RELAY FOR PROPER SETTINGS. CHECK THE SETTING FROM PRIOR DOCUMENTED TESTS.
    d. CHECK THAT ALL CONNECTIONS ARE TIGHT.
    e. INSPECT FOR PROPER COIL AND RESISTANCE AS RECOMMENDED BY THE MANUFACTURER.
    f. CHECK THAT ALL GAPS ARE FREE OF FOREIGN MATERIAL.
    g. CHECK FOR FOREIGN MATERIAL BETWEEN THE MAGNETS AND ROTATING DISC.
    h. ENSURE COIL IS CONNECTED PROPERLY USING BOTH COIL CONTACTS FOR DOUBLE BREAK ACTION.
    i. ENSURE EACH COIL HAS A MINIMUM ¼ INCH CONTACT GAP WHEN OPEN.
    j. ENSURE ROLLERS SPIN FREELY ON LATCHING ASSEMBLY.

k. INSPECT WIRING TO ENSURE IT DOES NOT INTERFERE WITH THE LATCHING MECHANISM AND WIRES ARE WITHIN OUTER EDGES OF BARRIERS.
l. INSPECT TIE BOLTS FOR SECURITY (25 INCH POUNDS).
m. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING, IF NECESSARY.
n. MEASURE CONTACTS FOR ALIGNMENT AND WIPE ACCORDING TO MANUFACTURER'S MANUAL.

2. TIME OVERCURRENT RELAYS
   a. PERFORM AN "AS FOUND" TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
      i. MAKE A NOTE OF PROPER OR IMPROPER OPERATION OF RELAYS.
   b. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING, IF NECESSARY.
   c. CLEAN CELAR LEXAN COVER WITH A SOFT CLOTH AND WATER ONLY.
   d. PERFORM PICK-UP TEST FOR THE TAP SETTING IN SERVICE, AS RECOMMENDED BY THE MANUFACTURER.
   e. PERFORM THE TIME TESTS AS RECOMMENDED BY THE MANUFACTURER.
3. HIGH-SEISMIC INSTANTANEOUS UNIT
   a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
4. HIGH-SEISMIC TARGET AND SEAL-IN UNIT
   a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
   b. CHECK THAT THE UNIT DROPS OUT AT 25% OR MORE OF THE TAP VALUE.

E. EJ CURRENT-LIMITING POWER FUSES
1. CHECK FUSE CLIIPS FOR SECURITY.
2. INSPECT ALL CONTACT SURFACES FOR CORROSION OR CONTAMINATION. CLEAN OR REPLACE, AS NEEDED.
3. ENSURE CONTACTS HAVE A BRIGHT APPEARANCE.
4. INSPECT SECONDARY DISCONNECTING DEVICE CONTACTS AND STUDS.

F. BREAKER COMPARTMENT INTERIOR
1. THOROUGHLY CLEAN THE INTERIOR OF THE COMPARTMENTS USING A VACUUM CLEANER AND CLEAN RAGS.
   a. DO NOT USE STEEL WOOL OR OXIDE PAPERS. COMPRESSED AIR IS ALSO NOT RECOMMENDED.
2. INSPECT PRIMARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
3. CLEAN AND LUBRICATE THE RACKING MECHANISM.

4. INSPECT INDICATING DEVICES, MECHANICAL, AND KEY INTERLOCKS.
5. BEFORE REPLACING THE BREAKER, CLEAN AND APPLY A THIN LAYER OF LUBRICANT TO THE PRIMARY AND SECONDARY DISCONNECTING DEVICE CONTACTS AND STUDS.

G. SWITCHES
1. TEST SWITCHES FOR MECHANICAL OPERATION.
2. INSPECT SWITCHES FOR SIGNS OF BURNING ON CONTACTS.
3. IF CONTACTS APPEAR TO BE PITTED OR COATED WITH SULPHITE, SCRAPE THEM GENTLY WITH A SHARP KNIFE OR DRESS THEM WITH A FINE FILE.
4. IF THERE IS NO OPENING BETWEEN THE CONTACTS, IT WOULD INDICATE THAT THE PARTS OF THE MOVING CONTACT SUPPORT THAT BEARS ON THE CAM OR THE CAM ITSELF HAS BEEN WORN AND NEEDS TO BE REPLACED.

H. METERS
1. ENSURE THAT ALL METERS ARE PROPERLY MOUNTED AND ALL CONNECTIONS ARE SECURE.
2. WIPE DOWN COVERS WITH A CLEAN LINT FREE CLOTH. DO NOT USE ABRASIVE MATERIALS.

I. CONTROL TRANSFORMER
1. INSPECT ALL CONNECTIONS FOR SECURITY.
2. CHECK DEVICE MOUNTINGS.
3. ENSURE TRANSFORMER IS FREE OF DIRT AND MOISTURE.

J. OVERALL SWITCHGEAR
1. USING A VACUUM CLEANER, REMOVE DIRT AND DUST FROM THE SWITCHGEAR. COMPRESSED-DRY AIR OR NITROGEN (UNDER 25 PSI) CAN BE USED TO REMOVE DIRT FROM HARD TO REACH AREAS. CARE MUST BE TAKEN WHEN USING COMPRESSED-DRY AIR TO NOT BLOW DIRT INTO AREAS THAT CANNOT BE REACHED.
2. WIPE AND CLEAN THE BUSES AND SUPPORTS.
3. INSPECT ALL CONNECTIONS/WIRING FOR SECURITY AND SIGNS OF CORROSION OR OVERHEATING.
4. CLEAN AND INSPECT ALL PAINTED SURFACES. REMOVE CORROSION AND REPAINT, AS REQUIRED.
5. ENSURE THAT ALL ANCHORAGE BOLTS AND CONNECTING BOLTS ARE SECURED.
6. INSPECT HEATERS FOR PROPER OPERATION, AS APPLICABLE.
7. REMOVE ANY EXTERIOR VENT FILTERS AND CLEAN USING WARM, SOAPY, WATER SOLUTION OR REPLACE AS NEEDED.
8. ENSURE ALL COMPARTMENT DOOR LATCHES OPERATE PROPERLY.
9. OPERATE ALL HINGED PANELS AND DOORS TO VERIFY THEY OPERATE IN A SMOOTH AND SAFE MANNER. TRY ALL LATCHES AND KNOBS.

ROTATE AND PUSH ALL SWITCHES THROUGH ALL POSITIONS TO ENSURE SMOOTH OPERATION.

TRANSFORMER SECTION

LIQUID-FILLED TRANSFORMER ANNUAL PREVENTIVE MAINTENANCE

A. CHECK THE LEVEL OF THE INSULATING LIQUID.
   1. ADD MAKE-UP LIQUID AS NEEDED. FILL TO THE REQUIRED LEVEL AS PRINTED ON NAMEPLATE.
B. SAMPLING INSULATING LIQUID
   1. IDENTIFY AND VERIFY THE LIQUID TO BE DRAWN.
      a. BE CAUTIOUS WITH INSULATING LIQUID SAMPLES, AS THEY MAY CONTAIN PCB. DO NOT POUR ON GROUND.
      b. IF NO PCB LABEL IS PRESENT, ALWAYS TREAT INSULATING LIQUID SAMPLE AS IF IT CONTAINS PCB.
   2. CHECK TO MAKE SURE THE APPARATUS IS UNDER POSITIVE PRESSURE.
   3. OBTAIN A ONE QUART, SMALL NECK, BOTTLE. (A BROWN GLASS BOTTLE IS PREFERRED. IF A METAL CONTAINER IS USED, BE SURE ALL TRACES OF SOLDERING FLUX IS REMOVED FROM THE SEAMS.).
      a. DO NOT USE RUBBER OR A COMPOSITION OF RUBBER FOR THE GASKETS OR STOPPERS.
   4. THOROUGHLY RINSE BOTTLES WITH A DRY, HYDROCARBON SOLVENT (SUCH AS KEROSENE) THEN WASH WITH STRONG SOAPSUDS. RINSE WITH DISTILLED WATER AND DRY IN AN OVEN AT 105-110 DEG C. FOR 8 HOURS. AFTER DRYING, SEAL TIGHTLY UNTIL USE.
   5. ATTACH A LENGTH OF TYGON TUBING, FILLED WITH CLEAN INSULATING LIQUID, TO THE SAMPLING VALVE BEFORE OPENING.
      a. OBSERVE THE DIRECTION OF THE INSULATING LIQUID FLOW. IF THE FLOW IS IN THE DIRECTION OF THE TRANSFORMER, CLOSE VALVE IMMEDIATELY. ADJUST PRESSURE GAUGE TO ENSURE TRANSFORMER IS UNDER POSITIVE PRESSURE BEFORE SAMPLING AGAIN.
   6. FLUSH VALVE THOROUGHLY BY ALLOWING APPROXIMATELY HALF A GALLON OF INSULATING LIQUID TO FLOW INTO A WASTE CONTAINER.
   7. RINSE THE SAMPLING BOTTLE AT LEAST THREE TIMES WITH SMALL PORTIONS OF THE INSULATING LIQUID FROM THE SAMPLING VALVE. ALLOW THE BOTTLE TO THOROUGHLY DRAIN BETWEEN RINSES.
   8. DRAW A SAMPLE INTO THE BOTTLE, LEAVING SUFFICIENT AIR SPACE TO ALLOW FOR POSSIBLE EXPANSION OF THE LIQUID (APPROXIMATELY 1 INCH).
   9. IMMEDIATELY RESEAL THE TRANSFORMER AND CONTAINER TO PREVENT CONTAMINATION.
   10. VISUALLY EXAMINE THE LIQUID FOR WATER DROPLETS OR FOREIGN PARTICLES. IF PRESENT IN LIQUID, RE-SAMPLING IS REQUIRED.
      a. WHEN MAKING REPEATED SAMPLINGS, OBSERVE TRANSFORMER LIQUID LEVEL AND ADD MAKE-UP LIQUID, AS REQUIRED, BY

FILLING TO THE PROPER LEVEL INDICATED ON THE TRANSFORMER NAMEPLATE.

b. CLEAN OFF ANY EXCESS LIQUID FROM VALVE AND CONTAINER AFTER SAMPLE IS TAKEN.

11. PERFORM VARIOUS TESTS OUTLINED IN MANUAL GEK-5878, USING PORTABLE TEST SET OR BY SENDING SAMPLE TO GE, ACCORDING TO INSTRUCTIONS IN MANUAL.

C. BUSHINGS AND SURROUNDINGS
   1. INSPECT TRANSFORMER FOR UNSUAL SOUNDS AND SOUND LEVEL THAT COULD INDICATE EXCESSIVE VIBRATIONS.
   2. PERFORM A THERMAL SCAN TO MAKE SURE THAT TEMPERATURE DOESN'T EXCEED THE RATED TEMPERATURE ON THE NAMEPLATE.
      a. IF UNIT IS OVERHEATING, INSPECT OIL LEVELS AND TANK FOR SIGNS OF ANY INTERNAL OR EXTERNAL LEAKS.
      b. CHECK TO MAKE SURE ALL GASKETS ARE OPERATING PROPERLY, REPLACE IF NECESSARY WITH A PROPER REPLACEMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
      c. INSPECT SURROUNDINGS FOR ANY OTHER INSTRUMENTS OR DEBRIS THAT COULD BLOCK AIR VENTILATION.
   3. DE-ENERGIZE THE TRANSFORMER AND REMOVE FROM SERVICE.
   4. INSPECT PORCELAIN FOR CRACKS OR CHIPS. REPAIR OR REPLACE AS NECESSARY.
   5. TIGHTEN ALL EXTERNAL BOLTED CONNECTIONS.

D. FORCED AIR COOLING EQUIPMENT
   1. INSPECT FANS FOR PROPER OPERATION.
   2. CLEAN, IF NECESSARY, BUT DO NOT PAINT FAN BLADES. DOING SO COULD CAUSE THE BLADES TO BECOME DYNAMICALLY UNBALANCED THAT COULD CAUSE EXCESSIVE VIBRATION AND EVENTUAL DESTRUCTION OF THE BLADE AND OR BEARINGS.

E. SURGE ARRESTORS
   1. INSPECT ARRESTORS FOR CRACKS OR CONTAMINATION. REPAIR OR REPLACE AS NECESSARY.
   2. THEY MAY BE HOT-WASHED, SUBJECT TO THE USUAL CARE AND TECHNIQUES USED IN HOT-WASHING INSULATION TO AVOID EXTERNAL FLASHOVER.

LIQUID-FILLED TRANSFORMER SPECIAL MAINTENANCE.

A. CHECK ALL GAUGES FOR PROPER OPERATION.
   1. ONLY PERFORM THIS CHECK IF A FAILURE HAS OCCURRED, AFTER ENSURING THAT TRANSFORMER IS DE-ENERGIZED AND BEFORE RE-ENERGIZING UNIT.
   2.

DRY TYPE TRANSFORMER PREVENTIVE MAINTENANCE

!!SAFETY INFORMATION!!

1. ALWAYS ADHERE TO ESTABLISHED SAFETY PROCEDURES.
2. THOROUGHLY REVIEW MANUFACTURER'S INSTRUCTIONS AND OBSERVE WARNINGS, CAUTIONS, AND NOTES.
3. ENSURE APPROPRIATE LOCKOUT AND TAGOUT PROCEDURES ARE OBSERVED.
4. PRIOR TO PERFORMING THIS TASK, COORDINATE WITH OGG ELECTRICAL MAINTENANCE DEPARTMENT.
5. REPORT ANY CONDITIONS REQUIRING MAINTENANCE THAT ARE BEYOND THE SCOPE OF THIS PM TO MAINTENANCE SUPERVISION.

NOTE

PERIODICALLY, THIS PM WILL NEED TO BE REVIEWED AND UPDATED TO ENSURE IT CONTAINS THE MOST CURRENT/RELEVANT INFORMATION AND THAT IT CONFORMS TO LOCAL REGULATIONS, REQUIREMENTS, AND CONDITIONS.

TOOLS AND MATERIALS

1. ELECTRICAL TOOLS
2. CLEANING TOOLS AND MATERIALS
3. MEGGER
4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

DRY-TYPE TRANSFORMER ANNUAL PREVENTIVE MAINTENANCE

A. TAKE NOTE OF ANY OBJECTS OR DEBRIS THAT ARE BLOCKING THE VENTILATION AND REMOVE.
B. PERFORM A THERMAL SCAN TO INSPECT FOR SIGNS OF OVERHEATING AND LOOSE CONNECTIONS.
C. DE-ENERGIZE THE TRANSFORMER AND REMOVE COVERS.
D. TAKE NOTE OF ANY UNUSUAL SOUND LEVELS COMING FROM THE TRANSFORMER. IF SOUNDS ARE HEARD, CHECK TIGHTNESS ON VIBRATION ISOLATING MOUNTING STRUCTURE (ONLY AFTER DE-ENERGIZING THE TRANSFORMER) AND TIGHTEN IF NECESSARY.
E. SERVICE VENTILATING FANS, MOTORS, ETC. IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
F. PERFORM COMPLETE CLEANING OF THE COMPARTMENT, CORE, AND COILS. USE A VACUUM CLEANER TO REMOVE DIRT. THEN BLOW ANY REMAINING DIRT IN HARD TO REACH AREAS WITH A BLOWER THAT USES COMPRESSED AIR OR NITROGEN. THE AIR MUST BE DRY AND UNDER 25 PSI. LEADS, LEAD SUPPORTS, TAP CHANGER, TERMINAL BOARDS,

BUSHINGS, COILS, ETC. SHALL BE WIPED WITH A DRY CLOTH. DO NOT USE LIQUID CLEANERS.

G. CHECK FOR SIGNS OF OVERHEATING BY LOOKING FOR DISCOLORED COPPER AND DISCOLORED INSULATION.
H. INSPECT CORE AND COIL FOR LOOSE METAL, LOOSE COIL BLOCKING, AND CRACKED OR BROKEN INSULATION.
I. INSPECT INSULATION FOR SIGNS OF TRACKING.
J. REPLACE VENTILATING FILTERS.
K. TIGHTEN ANY LOOSE WIRING, ANCHORAGE BOLTS, MOUNTINGS, CONNECTIONS, ETC.
L. PERFORM A MEGGER OF THE TRANSFORMER. THREE SETS OF MEGGER READINGS SHALL BE TAKEN USING A 1000-VOLT MEGGER. A MINIMUM OF TWO MEGOHMS PER 1000 VOLTS OF NAMEPLATE RATING (ONE MINUTE READING AT 20 DEG. C) IS THE LOWEST ACCEPTABLE VALUE. FOR TRANSFORMERS OVER 500KVA, TURNS RATIO AND POWER FACTOR TESTS SHALL BE PERFORMED. NOTE THE RESULTS OF THESE TESTS DOWN FOR FUTURE INSPECTION. ALWAYS COMPARE RESULTS WITH PREVIOUSLY DOCUMENTED RESULTS.
M. RE-ENERGIZE THE UNIT AND RETURN TO SERVICE.

SECONDARY 480V SWITCHBOARD (480V SWITCHGEAR) ANNUAL PREVENTIVE MAINTENANCE

A. SWITCHGEAR ENCLOSURE
   1. INSPECT FOR ANY UNWARRANTED SOUNDS COMING FROM THE SWITCHGEAR.
   2. DE-ENERGIZE THE SWITCHGEAR AND REMOVE FROM SERVICE.

B. INSTRUMENTS, INSTRUMENT TRANSFORMERS AND RELAYS
   1. CHECK AND INSPECT ALL DEVICES TO ENSURE THEY ARE FUNCTIONING PROPERLY.
   2. INSPECT ALL ELECTRICAL CONNECTIONS FOR SECURITY.
   3. CHECK DEVICE MOUNTINGS.
   4. ENSURE INSTRUMENT COMPARTMENTS ARE FREE OF DIRT AND MOISTURE.

C. LOW VOLTAGE AIR CIRCUIT BREAKERS AND INSTRUMENT COMPARTMENTS
   1. WHILE IN TEST MODE, OPERATE EACH BREAKER AND CHECK ALL FUNCTIONS.
   2. DE-ENERGIZE THE SWITCHGEAR AND REMOVE FROM SERVICE. ENSURE THAT THE BREAKERS ARE PROPERLY DE-ENERGIZED BEFORE CONTINUING.
   3. MANUALLY OPERATE THE BREAKER SEVERAL TIMES, CHECKING FOR OBSTRUCTIONS OR EXCESSIVE FRICTION.
   4. VISUALLY INSPECT THE BREAKER FOR LOOSE HARDWARE. INSPECT THE COMPARTMENT FLOOR FOR ANY HARDWARE THAT MAY HAVE FALLEN FROM THE BREAKERS.
   5. INSPECT ARC CHUTES FOR SIGNS OF CORROSION OR BURNING.
   6. CHECK ELECTRO-MECHANICAL DEVICES FOR POSITIVE TRIP.
   7. CHECK INSULATING PARTS FOR SIGNS OF OVERHEATING AND CRACKS THAT MAY INDICATE EXCESSIVE THERMAL AGING.
   8. ENSURE ALL MECHANICAL PARTS ARE WELL LUBRICATED. LUBRICATE ALL MOVING CURRENT CARRYING PARTS. REMOVE ANY HARDENED GREASE AND DIRT USING KEROSENE PRIOR TO APPLYING A NEW, THIN FILM OF LUBRICANT.
   9. INSPECT THE CONTACT SURFACE OF THE DISCONNECT FINGERS FOR CLEANLINESS, SIGNS OF OVERHEATING, CORROSION, AND PROPER LUBRICATION.
   10. VERIFY THAT ALL BOLTED CONNECTIONS ARE PROPERLY TORQUED.
   11. VERIFY THAT ALL DIMENSIONS CRITICAL TO THE PROPER OPERATION OF THE CIRCUIT BREAKER ARE CORRECT, PER MANUFACTURER'S RECOMMENDATIONS.
   12. USE A HAND-HELD TEST KIT, PER MANUFACTURER'S RECOMMENDATIONS, TO CHECK FOR THE FOLLOWING VALUES AND COMPARE AGAINST MANUAL'S VALUES.

a. MINIMUM PICKUP CURRENT
b. LONG-TIME DELAY
c. SHORT-TIME PICKUP/DELAY
d. GROUND-FAULT PICKUP/DELAY
e. INSTANTANEOUS PICKUP

13. COMPARE THE RESULTS OF THE PREVIOUS TESTS AGAINST PREVIOUS RECORDINGS.
    a. ADJUST, USING THE SWITCHING PLUGS, AS NEEDED.
14. MEGGER THE BREAKER BETWEEN EACH PHASE AND FROM EACH PHASE TO GROUND USING A 1000 OR 2500 VOLT MEGGER. RECORD THE RESISTANCES OF EACH AND COMPARE WITH PREVIOUS READINGS TO UNCOVER ANY WEAKENING OF THE INSULATION. ANY VALUE BELOW 1 MEGOHM SHOULD BE INVESTIGATED.

D. BREAKER COMPARTMENTS INTERIOR
1. THOROUGHLY CLEAN THE INTERIOR OF THE COMPARTMENTS USING A VACUUM CLEANER AND CLEAN RAGS.
    a. DO NOT USE STEEL WOOL OR OXIDE PAPERS. COMPRESSED AIR IS ALSO NOT RECOMMENDED.
2. INSPECT INDICATING DEVICES, MECHANICAL AND KEY INTERLOCKS.
3. INSPECT PRIMARY AND SECONDARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
    a. ENSURE THAT PROTECTIVE CASING FOR SECONDARY DISCONNECTING DEVICE IS NOT CRACKED OR DAMAGED IN ANY WAY.
4. CLEAN AND LUBRICATE THE RACKING MECHANISM.
5. BEFORE REPLACING THE BREAKER, CLEAN AND APPLY A THIN LAYER OF LUBRICANT TO THE PRIMARY AND SECONDARY DISCONNECTING DEVICE AND STUDS.

E. RELAYS
1. AUXILIARY RELAYS
    a. PERFORM “AS FOUND” TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
        i. MAKE A NOTE OF PROPER OR IMPROPER OPERATIONS OF RELAYS.
    b. MANUALLY OPERATE RELAY CONTACTS TO ENSURE ALL DEVICES OPERATED BY THE RELAY FUNCTION FREELY AND PROPERLY. CHECK THE BREAKER TIP COILS AND OTHER DEVICES OPERATED BY THE RELAYS TO ENSURE PROPER OPERATION.
    c. PERFORM A VISUAL INSPECTION OF ANY RELAYS. REMOVE COVERS AND REMOVE ALL EXCESS DUST.
        i. CHECK FOR LOOSE CONNECTIONS, BROKEN STUDS, BURNED INSULATION, AND DIRTY CONTACTS.

ii. CHECK EACH RELAY FOR PROPER SETTINGS. CHECK THE SETTINGS FROM PRIOR DOCUMENTED TESTS.

d. CHECK THAT ALL CONNECTIONS ARE TIGHT.
e. INSPECT FOR PROPER COIL AND RESISTANCE AS RECOMMENDED BY THE MANUFACTURER.
f. CHECK THAT ALL GAPS ARE FREE OF FOREIGN MATERIAL.
g. CHECK FOR FOREIGN MATERIAL BETWEEN THE MAGNETS AND ROTATING DISC.
h. ENSURE COIL IS CONNECTED PROPERLY USING BOTH COIL CONTACTS FOR DOUBLE BREAK ACTION.
i. ENSURE EACH COIL HAS A MINIMUM ¼ INCH CONTACT GAP WHEN OPEN.
j. ENSURE ROLLERS SPIN FREELY ON LATCHING ASSEMBLY.
k. INSPECT WIRING TO ENSURE IT DOES NOT INTERFERE WITH THE LATCHING MECHANISM AND WIRES ARE WITHIN OUTER EDGES OF BARRIERS.
l. INSPECT TIE BOLTS FOR SECURITY (25 INCH POUNDS).
m. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING OF NECESSARY.
n. MEASURE CONTACTS FOR ALIGNMENT AND WIPE ACCORDING TO MANUFACTURER'S MANUAL.

2. TIME OVERCURRENT RELAYS
    a. PERFORM AN "AS FOUND" TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
        i. MAKE A NOTE OF PROPER OR IMPROPER OPERATIONS OF RELAYS.
    b. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING, IF NECESSARY.
    c. PERFORM AN OVERALL FUNCTIONAL SYSTEM TEST.
    d. CLEAN CLEAR LEXAN COVER WITH A SOFT CLOTH AND WATER ONLY.
    e. PERFORM PICK-UP TEST FOR THE TAP SETTING IN SERVICE, AS RECOMMENDED BY THE MANUFACTURER.
    f. PERFORM THE TIME TESTS AS RECOMMENDED BY THE MANUFACTURER.
3. HIGH-SEISMIC INSTANTANEOUS UNIT
    a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
4. HIGH-SEISMIC TARGET AND SEAL-IN UNIT
    a. CHECK THAT THE UNIT PICKS UP AT THE VALUES RECOMMENDED BY THE MANUFACTURER.
    b. CHECK THAT THE UNIT DROPS OUT AT 25% OR MORE OF THE TAP VALUE.

5. UNDERVOLTAGE RELAYS
    a. PERFORM AN “AS FOUND” TEST. TEST THE RELAY FOR OPERATION PRIOR TO ANY WORK DONE.
        i. MAKE NOTE OF PROPER OR IMPROPER OPERATION OF RELAYS.
    b. CHECK THE GAP ON THE NORMALLY OPEN CONTACTS. GAPS SHOULD BE BETWEEN 0.010-0.015 INCHES.
    c. OBSERVE THE WIPE ON EACH NORMALLY CLOSED CONTACT BY DEFLECTING THE STATIONARY CONTACT MEMBER TOWARDS THE FRAME. WHICH SHOULD BE APPROXIMATELY 0.005 INCH.
    d. CHECK THE WIPE ON EACH NORMALLY OPEN CONTACT BY INSERTING A 0.005-INCH-THICK SHIM BETWEEN THE RESIDUAL SCREW AND THE POLE PIECE AND OPERATING THE ARMATURE BY HAND. THE CONTACTS SHOULD MAKE CONTACT BEFORE THE RESIDUAL SCREW STRIKES THE SHIM.
    e. CONNECT A VARIABLE SOURCE OF VOLTAGE (AT RATED FREQUENCY) TO THE COIL STUDS AND CHECK THE PICK-UP AND DROPOUT VOLTAGES. USE A VARIABLE RHEOSTAT TO THE RELAY AND IF NECESSARY, THE RESIDUAL SCREW TO ADJUST TO THE VALUES REQUIRED.
    f. CHECK THE PICK-UP AMPERES BY CONNECTING VARIABLE DC SOURCE TO THE TARGET CIRCUITS.
    g. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING, IF NECESSARY.

F. CABLE AND BUSWAY COMPARTMENT
    1. INSPECT ALL POWER AND BUSWAY CONNECTIONS FOR SIGNS OF OVERHEATING.
    2. INSPECT ALL CONNECTIONS FOR SECURITY.
    3. INSPECT ALL BOLTS THAT HOLD CABLE TERMINALS TO THE CONNECTION BAR FOR SECURITY.
    4. INSPECT THE NEUTRAL AND GROUND BUSES AND MOUNTING BOLTS FOR SECURITY.
    5. INSPECT ALL SECONDARY CONTROL WIRING CONNECTIONS FOR SECURITY AND ENSURE THAT ALL CONTROL CABLING IS INTACT.
    6. ENSURE THAT COMPARTMENT IS FREE OF DUST AND MOISTURE.
G. CIRCUIT BREAKER LIFTING MECHANISM
    1. INSPECT CABLE FOR SIGNS OF DETERIORATION OR BROKEN STRANDS. REPLACE IF FOUND TO BE DEFECTIVE IN ANY WAY.
H. OVERALL SWITCHGEAR
    1. USING A VACUUM CLEANER, REMOVE DIRT AND DUST FROM THE SWITCHGEAR. COMPRESSED-DRY AIR OR NITROGEN (UNDER 25 PSI) CAN BE USED TO REMOVE DIRT FROM HARD TO REACH AREAS. CARE

MUST BE TAKEN WHEN USING COMPRESSED-DRY AIR TO NOT BLOW DIRT INTO AREAS THAT CANNOT BE REACHED.

2. WIPE CLEAN THE BUSES AND SUPPORTS.
3. TEST ALL DOORS FOR EASE OF ACCESS AND LUBRICATE AS NECESSARY.
4. INSPECT ALL CONNECTIONS/WIRING FOR SECURITY AND SIGNS OF CORROSION OR OVERHEATING.
5. CLEAN AND INSPECT ALL PAINTED SURFACES. REMOVE CORROSION AND REPAINT, AS REQUIRED.
6. INSPECT ALL ANCHOR AND STRUCTURAL BOLTS FOR SECURITY.
7. INSPECT HEATERS FOR PROPER OPERATION, AS APPLICABLE.
8. REMOVE ANY EXTERIOR VENT FILTERS AND CLEAN USING A WARM, SOAPY, WATER SOLUTION OR REPLACE AS NEEDED.

OVERALL UNIT SUBSTATION ANNUAL PREVENTIVE MAINTENANCE

A. ENSURE ALL NAMEPLATES ARE CLEAN, USING A LINT-FREE DRY CLOTH. DO NOT USE ABRASIVE MATERIALS. USE CAUTION WHEN USING LIQUID CLEANERS AS SOME CLEANERS MAY CAUSE CORROSION OF NAMEPLATES.
B. CHECK THAT ALL RELAYS, TRANSFORMERS, BREAKERS, FUSES, AND METERS ARE LABELED PROPERLY.
C. RE-ENERGIZE BOTH SWITCHGEAR SECTIONS AND TRANSFORMER SECTION AND RETURN TO SERVICE.
D. IF NO DEFICIENCIES EXIST, AFFIX INSPECTION LABEL, INDICATING THE SERVICE DATE, NAME OF SERVICE COMPANY, AND TECHNICIAN OR ELECTRICIAN.
E. MAKE A REPORT ON EACH INDIVIDUAL BREAKER, INDICATING DATA OF EQUIPMENT (UNIT/CIRCUIT IDENTIFICATION, TYPE, MODEL, MANUFACTURER, SERIAL NO., VOLTAGE/CURRENT RATINGS, AND VAULT LOCATION), INSPECTION CHECKS PERFORMED AND BOTH "AS FOUND" AND "AS LEFT" DATA. ALSO MAKE A SUMMARY REPORT OF ALL DEFICIENCIES FOUND, RECOMMENDED CORRECTIVE ACTIONS, AND DATE.
F. INFRARED THERMOGRAPHIC ELECTRICAL SYSTEMS SURVEY
    1. USING STATE-OF-THE-ART THERMOGRAPHIC EQUIPMENT AND TECHNOLOGY, SCAN ALL SWITCHGEARS, INCLUDING BUT NOT LIMITED TO; VIEWABLE BUS; BUS JOINTS AND CONNECTIONS; FEEDER CONNECTIONS AND TERMINATIONS; POWER STABS; AND CONTACTS AT VARIOUS ELECTRICAL VAULTS AS LISTED IN APPENDIX "B".
    2. PROVIDE A REPORT PER ELECTRICAL VAULT, DETAILING ASSESSMENT OF THE FINDINGS WITH ACCOMPANYING THERMOGRAMS AND DIGITAL COLOR PHOTOS OF EACH PIECE OF EQUIPMENT EVALUATED AT VARIOUS ELECTRICAL VAULTS.
    3. CATEGORIZE THE DEFICIENCIES FOUND (THOSE TO BE OPERATING AT TEMPERATURES EXCEEDING ACCEPTABLE INDUSTRY STANDARDS) AS TO:
        a. CRITICAL-COMPONENT FAILURE REPRESENTS POTENTIAL PERSONNEL HAZARD.
        b. SEVERE-FAILURE IS IMMINENT BUT SHOULD HAVE RELATIVE MINOR IMPACT ON OPERATION.
        c. ALERT-FAILURE IS OF A ROUTINE NATURE AND REPAIRS CAN BE EASILY MADE.

SUBDISTRIBUTION PANELBOARDS PREVENTIVE MAINTENANCE

!!SAFETY INFORMATION!!

1. ALWAYS ADHERE TO ESTABLISHED SAFETY PROCEDURES.
2. THOROUGHLY REVIEW MANUFACTURER'S INSTRUCTIONS AND OBSERVE WARNINGS, CAUTIONS, AND NOTES.
3. ENSURE APPROPRIATE LOCKOUT AND TAGOUT PROCEDURES ARE OBSERVED.
4. PRIOR TO PERFORMING THIS TASK, COORDINATE WITH OGG ELECTRICAL MAINTENANCE DEPARTMENT.
5. REPORT ANY CONDITIONS REQUIRING MAINTENANCE THAT ARE BEYOND THE SCOPE OF THIS PM TO MAINTENANCE SUPERVISION.

NOTE

PERIODICALLY, THIS PM WILL NEED TO BE REVIEWED AND UPDATED TO ENSURE IT CONTAINS THE MOST CURRENT/RELEVANT INFORMATION AND THAT IT CONFORMS TO LOCAL REGULATIONS, REQUIREMENTS, AND CONDITIONS.

TOOLS AND MATERIALS:

1. ELECTRICAL TOOL KIT
2. POWER SOURCES (AS DESCRIBED IN PREVENTIVE MAINTENANCE INSTRUCTIONS BELOW)
3. LUBRICANT (AS PER MANUFACTURER'S REQUIREMENTS)
4. STOP WATCH
5. VACUUM CLEANER
6. CLEANING TOOLS AND MATERIALS
7. BURNISHING TOOL
8. MEGGER
9. PERSONAL PROTECTIVE EQUIPMENT (PPE)

SUBDISTRIBUTION PANELBOARD ANNUAL PREVENTIVE MAINTENANCE

A. PANELBOARD
   1. TIGHTEN ALL MOUNTING BOLTS.
   2. CLEAN THE COVER USING A VACUUM CLEANER TO REMOVE DUST AND DIRT. DO NOT USE COMPRESSED-DRY AIR.

B. THERMAL MAGNETIC CIRCUIT BREAKER
   1. VERIFY CIRCUIT BREAKER APPLICATION AND RATINGS COMPARED TO DRAWINGS.
   2. VERIFY BREAKERS ARE LABELED WITH THE PROPER VOLTAGE/AMPERAGE RATINGS.
   3. INSPECT MOLDED CASE FOR ANY CRACKS OR CHIPS.
      a. BREAKER MUST BE REPLACED IF MOLDED CASE IS DAMAGED.

4. DE-ENERGIZE THE UNIT AND REMOVE FROM SERVICE.
5. IF MOLDED CASE CANNOT BE OPENED, MAKE SURE THAT IT HAS NOT BEEN FORCEFULLY OPENED.
    a. BREAKER MUST BE REPLACED IF MOLDED CASE HAS BEEN FORCEFULLY OPENED.
6. IF MOLDED CASE CAN BE OPENED, PERFORM A VISUAL CHECK OF INTERNAL BREAKER TO INSPECT FOR SIGNS OF OVERHEATING, IMPROPER CONTACTING, ETC.
    a. MAKE SURE THAT ALL MOVING PARTS IN THE MOLDED CASE OPERATE SMOOTHLY.
    b. APPLY LUBRICANT AS NECESSARY.
7. CHECK WIRES AND CONNECTIONS FOR DISCOLORATION AND SIGNS OF OVERHEATING.
8. REMOVE DUST AND OTHER FOREIGN MATERIAL FROM THE BREAKERS USING A VACUUM CLEANER OR A LINT-FREE DRY CLOTH. DO NOT USE COMPRESSED-DRY AIR. EXTRA PRECAUTION MUST BE USED WHEN USING LIQUID CLEANERS OR ABRASIVE MATERIALS AS THESE MAY WEAR OUT THE NAMEPLATE OR CAUSE CORROSION.
9. CLEAN CONTACT SURFACES OF TERMINALS AND TERMINAL PADS WITH A NONABRASIVE CLEANER.
10. CHECK TO MAKE SURE ALL CONNECTORS AND BOLTS ARE PROPERLY TORQUED AND ALL CONNECTIONS ARE TIGHTENED.
11. ENSURE OPERATION OF THE BREAKER HANDLE BY TOGGLING SEVERAL TIMES.
12. PERFORM AN INSTANTANEOOUS MAGNETIC TRIP TEST ON ALL POLES OF THE BREAKER.
    a. IF APPLICABLE, SET THE CIRCUIT BREAKER INSTANTANEOUS (MAGNETIC) TRIP ADJUSTMENT TO THE HIGH SETTING. TESTS CONDUCTED AT THE HIGH SETTING ENSURE INSTANTANEOUS TRIP PROTECTION EXISTS AT ALL LOWER SETTINGS.
    b. APPLY 10-CYCLE PULSES OF 70% OF THE RATED CURRENT USING A LOW VOLTAGE POWER SOURCE WITH A TRUE SINUSOIDAL OUTPUT AND A TRUE RMS AMMETER. THE PULSE METHOD REQUIRES THAT THE TEST EQUIPMENT HAVE A CONTROLLED CLOSING AND A POINTER-STOP AMMETER, A CALIBRATED IMAGE-RETAINING OSCILLOSCOPE, OR A HIGH-SPEED SAMPLING-RATE DIGITAL AMMETER.
    c. ENSURE THAT WIRES EXITING THE BREAKER REMAIN PARALLEL TO THE CURRENT PASSING THROUGH THE BREAKER, SO AS NOT TO CREATE AN INTERFERING MAGNETIC FIELD.
    d. SLOWLY RAISE THE CURRENT LEVEL UNTIL THE BREAKER TRIPS AND RECORD THE VALUE AT WHICH THE BREAKER TRIPPED.

        i. DO NOT EXCEED MORE THAN 125% OF THE RATED CURRENT. IF THE BREAKER DOESN'T TRIP BY THIS POINT, REPLACE THE BREAKER.
    e. AFTER EACH PULSE, MOVE THE CIRCUIT BREAKER HANDLE TO THE FULL RESET POSITION AND THEN TO THE ON POSITION.
    f. REPEAT TO RECHECK THE POLE WITH THE CURRENT SETTING AT ONE LEVEL BELOW THE RECORDED TRIP LEVEL.
13. PERFORM AN INVERSE-TIME OVERCURRENT TRIP TEST ON EACH POLE OF THE BREAKER.
    a. TEST SHOULD BE CONDUCTED AT AMBIENT TEMPERATUR ACCORDING TO MANUFACTURER.
    b. APPLY 300% OF THE RATED CURRENT UNTIL THE BREAKER TRIPS. DO NOT EXCEED ONE (1) MINUTE OF APPLYING THIS TEST CURRENT.
    c. SIZE THE CABLES ACCORDING TO THE NATIONAL ELECTRICAL CODE WITH A MINIMUM OF FOUR (4) FEET ON EACH CABLE CONNECTION.
    d. USE A HIGH CURRENT LOW VOLTAGE POWER SUPPLY OF LESS THAN 24 VOLTS.
    e. RECORD THE TIME IT TOOK FOR THE BREAKER TO TRIP AND THE TIME IT TAKES FOR THE BREAKER TO RETURN TO NORMAL.
14. PERFORM A MILLIVOLT DROP TEST
    a. APPLY A DC VOLTAGE OF 50 AMPERES OR 100 AMPERES FOR LARGE BREAKERS OR THE RATED CURRENT OR BELOW FOR SMALL BREAKERS ACROSS THE LINE AND LOAD TERMINALS OF EACH POLE.
    b. PERFORM THIS TEST 3 TIMES FOR EACH POLE. RECORD THE RESULTS OF THESE TESTS.
15. PERFORM A MEGGER TEST BETWEEN EACH PHASE, FROM EACH PHASE TO GROUND, AND BETWEEN THE LOAD AND LINE TERMINALS.
    a. THE RESISTANCE SHOULD BE AT LEAST 1 MEGAOHM. IF FOUND TO BE SLIGHTLY LESS, CLEAN THE CONTACTS BEFORE TESTING AGAIN.
    b. IF THE RESISTANCE STILL ISN'T AT LEAST 1 MEGAOHM, REPLACE THE BREAKER.
16. FOR DC RATED BREAKERS PERFORM THIS TEST INSTEAD OF THE INSTANTANEOUS MAGNETIC TRIP TEST, INVERSE TIME OVERCURRENT TRIP TEST, AND THE MILLIVOLT DROP TEST.
    a. ENSURE THAT THE BREAKER IS TESTED AT AMBIENT TEMPERATURE ACCORDING TO THE MANUFACTURER.
    b. REMOVE CIRCUIT BREAKER FROM ENCLOSURE.

c. USE CORRECTLY SIZED CABLE (PER NATIONAL ELECTRICAL CODE) WITH A MINIMUM OF FOUR FEET OF CABLE PER CONNECTION.
d. CONNECT A DC POWER SUPPLY TO THE CIRCUIT BREAKER WITH ALL POLES CONNECTED IN SERIES.
e. APPLY A DC TEST CURRENT TO THE CIRCUIT BREAKER AT 70% OF THE RATED VALUE. IF THE CIRCUIT BREAKER DOESN'T TRIP, INCREASE THE TEST CURRENT ON SUCCESSIVE TRIALS UNTIL IT DOES TRIP. WHEN THE BREAKER TRIPS, RESET AND CLOSE THE CIRCUIT BREAKER, REAPPLY THE DC TEST CURRENT TO RETEST THE CIRCUIT BREAKER AGAIN, AND RECORD THE CURRENT AND COMPARE TO MANUFACTURER'S MANUAL.

17. CHECK ALL OF THE RECORDED VALUES FROM THESE TESTS AGAINST THE MANUFACTURER'S MANUAL. IF ANY BREAKER DOESN'T MEET THE STANDARDS SET BY THE MANUAL, THE BREAKER MUST BE REPLACED.

C. BUS AREA
1. USING A 1000 OR 2500 VOLT MEGGER, RECORD THE RESISTANCE OF EACH PHASE TO GROUND AND BETWEEN PHASES OF THE INSULATION OF BUSES AND CONNECTIONS. RECORD RESULTS FOR COMPARISON WITH PREVIOUS READINGS TO UNCOVER ANY WEAKENING OF THE INSULATION.
   a. IF POSSIBLE, READINGS SHOULD BE TAKEN UNDER CONDITIONS SIMILAR TO PREVIOUS READINGS.
2. CLEAN RACKING MECHANISM AND LUBRICATE JACK SCREWS AND GEARS.
3. CHECK PRIMARY DISCONNECTING DEVICE CONTACTS FOR SIGNS OF ABNORMAL WEAR OR OVERHEATING.
4. INSPECT CONTACTS FOR CLEANLINESS. USE A FLEXIBLE, BURNISHING TOOL FOR CLEANING, IF NECESSARY.

D. ENCLOSURE
1. WIPE CLEAN THE EXTERNAL OF THE PANELBOARD WITH WATER. DO NOT WET INSIDE OF PANELBOARD.
2. RE-ENERGIZE UNIT AND RETURN TO SERVICE.
3. PERFORM A THERMAL SCAN OF THE PANELBOARD AND THE THERMAL MAGNETIC CIRCUIT BREAKERS. CHECK THAT THE TEMPERATURE OF THE BREAKERS ARE RELATIVELY THE SAME AND DO NOT EXCEED THE RATED TEMPERATURE PER MANUFACTURER'S MANUAL. ALSO PERFORM A THERMAL SCAN OF ALL CONNECTIONS AND BUS AREAS AND PREPARE A REPORT OF ANY DEFICIENCIES FOUND AND CORRECTIVE ACTIONS THAT NEED TO BE TAKEN.

THERMAL MAGNETIC CIRCUIT BREAKER SPECIAL MAINTENANCE (ONLY TO BE PERFORMED IF THE CIRCUIT BREAKER HAS BEEN NUISANCE TRIPPING.

A. THERMAL MAGNETIC CIRCUIT BREAKER
   1. DE-ENERGIZE BREAKERS AND REMOVE FROM SERVICE.
   2. PERFORM A RATED CURRENT HOLD-IN TEST.
      a. THIS TEST SHOULD ONLY BE PERFORMED ON CIRCUIT BREAKERS THAT HAVE BEEN NUISANCE TRIPPING UNDER NORMAL CONDITIONS.
      b. CONDUCT THIS TEST AT AMBIENT TEMPERATURE, ACCORDING TO MANUFACTURER, USING A HIGH-CURRENT, LOW-VOLTAGE AC POWER SUPPLY.
      c. CONNECT ALL POLES OF THE CIRCUIT BREAKER IN SERIES USING CABLES AT LEAST FOUR (4) FEET PER TERMINAL OR 8 (EIGHT) FEET BETWEEN POLES WITH THE PROPER AMPACITY FOR THIS TEST.
      d. ENSURE THAT ALL CONNECTIONS ARE TORQUED PROPERLY FOR THIS TEST.
      e. APPLY 100% OF THE CIRCUIT BREAKER'S RATED CURRENT.
         i. THE BREAKER SHOULDN'T TRIP FOR ONE (1) HOUR, FOR BREAKERS RATED LESS THAN 100A, OR TWO (2) HOURS FOR CIRCUIT BREAKERS RATED MORE THAN 100A.
         ii. IF THE CIRCUIT BREAKER TRIPS, RESET AND MOVE THE HANDLE FROM THE "OFF" POSITION TO THE "ON" POSITION SEVERAL TIMES WHILE UNDER LOAD, THEN REPEAT THE TEST. IF TRIPPING CONTINUES, REPLACE THE BREAKER.
   3. CHECK ALL OF THE RECORDED VALUES FROM THIS TEST AGAINST THE MANUFACTURER'S MANUAL. IF ANY BREAKER DOESN'T MEET THE STANDARDS SET BY THE MANUAL, THE BREAKER MUST BE REPLACED.
   4. RETURN ANY BREAKERS THAT DO NOT NEED TO BE REPLACED TO SERVICE.

ANNUAL LOAD BANK TESTING

RESISTIVE LOAD BANK TESTING WILL BE REQUIRED ANNUALLY ON ALL EMERGENCY GENERATORS.

A. TEST THE PERFORMANCE OF A GENERATOR SET FOR A MINIMUM OF ONE (1) HOUR AT ITS 100% KW NAMEPLATE RATING.
B. TEST AND ADJUST THE ENGINE SPEED GOVERNOR AT VARYING LOADS.
C. TEST AND/OR TROUBLESHOOT THE VOLTAGE REGULATOR AND OTHER ELECTRICAL COMPONENTS OF THE GENERATOR SET.
D. TEST AND/OR TROUBLESHOOT THE ENGINE PERFORMANCE AND ENGINE SYSTEMS, SUCH AS IGNITION OR FUEL SYSTEMS.
E. ALLOW OPTIMUM SETTLING OF ENGINE TUNABLE ADJUSTMENTS.
F. PROVIDE DETAILED LOAD BANK TEST REPORTS WITH RECORDED PERFORMANCE READING EVERY 15 MINUTES DURING THE RESISTIVE LOAD BANK TEST.
G. LOAD BANK SHOULD BE PROPERLY GROUNDED PRIOR TO CONNECTING ANY ELECTRICAL POWER.
H. ENSURE THAT CONDUCTORS USED TO CONNECT THE LOAD BANK ARE PROPERLY SIZED FOR THE CURRENT AT WHICH THE UNIT WILL BE OPERATED AND THAT ALL CONNECTIONS ARE OF THE PROPER TYPE AND APPROVED FOR THE CONNECTION AND CABLE.
I. VERIFY THAT THERE IS NO POSSIBILITY OF SHORT CIRCUIT BETWEEN CONNECTIONS OR THE GENERATOR/LOAD BANK FRAMES. ASSURE PROPER VENTILATION FOR THE HOT AIR DISCHARGED DURING THE OPERATION OF THE LOAD BANK TEST (IF THE GENERATOR AREA AMBIENT TEMPERATURE IS INCREASED THE PERFORMANCE OF THE GENERATOR WILL BE REDUCED OR, IN EXTREME CASES, DAMAGE TO THE GENERATOR MAY OCCUR).
J. KEEP ALL PERSONAL AND OTHER ITEMS CLEAR OF THE LOAD BANK DISCHARGE AREAS.
K. NEVER LEAVE AN OPERATING LOAD BANK UNATTENDED UNLESS IT IS SPECIFICALLY DESIGNED FOR UNATTENDED OPERATION AND IS EQUIPPED WITH THE PROPER SENSORS AND SAFETY DEVICES.
L. TRAINED PERSONNEL SHOULD ONLY PERFORM LOAD BANK TESTS.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

A P P E N D I X B

APPENDIX B – EQUIPMENT LIST

Kahului Airport

2 ea. Automatic Transfer Switch w/ BP/IS, Located at Room B-106, TSA SWGR Room (Refer to Appendix A-1)

Primary Switchgear (12.47 kV), Located at Room A-103 (2 ea.), D-123 (2 ea.) (Refer to Appendix A-5)

Secondary Switchgear (480V), Located at Room A-103 (2 ea.), D-123 (2 ea.), TSA SWGR Room (1 ea.) (Refer to Appendix A-11)

Unit Substation, Located at Room B-106 (2 ea.) (Refer to Appendix A-17)

Dry-Type Transformers (36 ea.) (Refer to Appendix A-30)

Sub-distribution Panelboards, Located at Room C-132 (3 ea.) (Refer to Appendix A-32)

1 ea. Emergency Generator – Cat model #, 2 MW, Main Terminal.

2 ea. Emergency Generator – Cat model 275 34088, 275 kW, Main Terminal.

Molokai Airport

1 ea. Emergency Generator - United States Motors Engine Generator Set, Model S60D18, Serial No. 340285, with Cummins 6BT5.9G Diesel, 40KW (Located at Terminal Building)

1 ea. Emergency Generator – Cummins Power Generation Model No. DSGAB-6421613, Serial No. A110184611, 125KW (Located at new ARFF Station)

1 ea. Emergency Generator – Kohler model 80R0ZJ81, Serial No. 323902, 66KW (Located at Maintenance Baseyard)

Lanai Airport

1 ea. Emergency Generator - Cummins Power Generation, Model DSGAB-10456855, Serial No. B120304638, 125 kW (Located at ARFF Station)

1 ea. Emergency Generator – ONAN, Model 350DFCC, Serial No. C930501534, 315 kW (Located in Cargo Building)

Dillingham Airfield

1 ea. Emergency Generator - Generac Model SD0080-G364.5D18HBSYC, 80 kW Rating

Kalaeloa Airport

1 ea. Emergency Generator – International Model GA305, Serial No. WJ1307N1172449 (Located at ARRF Station)

1 ea. Emergency Generator – CAT Model 3412, Serial No. 38S06340 (Located at Main Terminal Bldg.)

1 ea. Emergency Generator – Model D100-6, Serial No. D4B00688 (Located next to Hanger 110 outside)

1 ea. 15 kV Switchgear for Main Terminal (Located in front of Hanger 110)

1 ea. 15 kV Switchgear for Hanger 110

1 ea. 1500 kVA Pad Mounted Transformer (Located in front of Hanger 110)

1 ea. 1000 kVA Pad Mounted Transformer (Runway side of Building 4)

1 ea. 150 kVA Pad Mounted Transformer (Admin. Building, Storage Room)

4 ea. 480V Breakers (Located in front of Hanger 110)

Daniel K. Inouye Honolulu International Airport

1 ea. Emergency Generator – Caterpillar Model 3412, Serial No. PA878/BK04677, 625 KVA/500 KW (located in Vault X, airfield)

1 ea. Emergency Generator – Caterpillar Model C27, Serial No. Pending, 875 KVA/700 KW (located in Vault Z, airfield)

1 ea. Emergency Generator – Caterpillar Model A256750000, Serial No. 99580, 1375 KVA/ 1100 KW (located next to the Lei Stands)

1 ea. Emergency Generator – Cummins Model DFEK, Serial No. D190554653 500 kW (Located at Mauka Concourse)

1 ea. Emergency Generator – Caterpillar Model XQ1750, Serial No. 25Z06700 1.75 MW (Located at OST/Vault IB)

1 ea. Emergency Generator – Caterpillar Model XQ2000, Serial No. BPD01013 1.75 MW (Located at Diamond Head EXT/Vault 1G)

1 ea. Emergency Generator – Caterpillar Model XQ600, Serial No. BPG02488 600 kW (Located at Ewa Concourse/Vault IE)

1 ea. Emergency Generator – Caterpillar Model XQ1750, Serial No. 25Z05929 1750 kW (Located at Inter-Island Terminal (IIT))

1 ea. Emergency Generator – Caterpillar Model XQ600, 600 kW (Located at Vault 1D)

1 ea. Emergency Generator – Caterpillar Model XQ600, 600 kW (Located at Vault Y)

Lihue Airport

1 ea. Emergency Generator – Kohler Model #180ROZJ81, Serial No.340665, 180 kW (Located at ARFF Station)

2 ea. Emergency Generator – Cat Model SR-4, Serial No.6FA0370, 600 kW (Located at Terminal Bldg.)

1 ea. Emergency Generator – ONAN Model DGFB-4478293, Serial No.C000080593, 125 kW (Located at Airfield)

1 ea. Emergency Generator – Cat Model LC5, Serial No.G5A00607, 300 kW (Located at Base Yard)

Hilo International Airport

1 ea. Emergency Generator – Cat Model C32 Acert/SR4B HV, Serial No.G3R00113, 900KW (Located in Terminal Building)

1 ea. Emergency Generator - Cat Model C-15 350, Serial No. FTE02425, 350 KW (Located in the ARFF Station)

1 ea. Emergency Generator – Cat D100-4, Serial No. CAT00C44VNCE00538, 100 kW (Located at the Maintenance Baseyard)

1 ea. Emergency Generator – ONAN Model 100DGDB, Serial No. L940564689, 100 kW (Located in the Old ARFF Station)

Kona International Airport

1 ea. Emergency Generator – 175 kW (Located in North side Terminal)

1 ea. Emergency Generator - 175 kW (Located in South side Terminal)

1 ea. Emergency Generator – Cat Model No. C15, 500 kW (Located at the ARFF Station)

1 ea. Emergency Generator – SEL Model No. 700G, 1500 kW/12KV (Located near rental car areas)

1 ea. Emergency Generator –500 kW (Located at Wastewater Treatment Plant)

1 ea. Emergency Generator – Perkins Model No. D125P1, Serial No. NAT00535, 125 kW (Located at Wastewater Treatment Plant)

Waimea Airport

1 ea. Emergency Generator – Onan Model No.20DKAE, Serial No. D960604180, 20 kW

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

A P P E N D I X C

GENERATOR AND TRANSFER SWITCH MAINTENANCE
SCOPE OF WORK

Annual Maintenance Items	Inspection	Full Service PM
Flush cooling system (Year 1 of contract)		X
Install new coolant (Year 1 of contract)		X
Install new coolant hoses and clamps (Year 1 of contract)		X
Install new spark plugs, ignition cables, distributor cap, rotor, points and condenser during year three of this contract		X
Perform one (1) hour resistive load bank test at 100% rated load for each generator set during year three of this contract and provide reports		X

Annual Maintenance Items	Inspection	Full Service PM
Change oil filters		X
Change primary and secondary fuel filters		X
Change engine oil		X
Legally and professionally dispose of waste oil and filters		X
Lubricate fan drive with OEM bearing lubricant for high speed applications and temperatures: -30 degree F to 325 degree F		X
Replace inlet filter for day tank		X

Cooling System Semi-Annual Maintenance Items	Inspection	Full Service PM
Analyze coolant for proper antifreeze percentage	X	X
Analyze coolant conditioner level and add additional supplemental coolant additive as needed (up to 2 quarts)	X	X
Tighten hose clamps as needed	X	X
Inspect pulleys for excessive wear	X	X
Visual inspection of radiator/heater exchanger for leaks, damage and obstruction	X	X
Add coolant (up to 1 gallons) to bring the coolant to correct level	X	X
Inspect condition of radiator cap, gasket, and sealing surface	X	X
Visual inspection of water pump and cooling system gaskets for leaks	X	X
Inspect belts for cracking and fraying	X	X
Check jacket water heater(s) for proper operation and adjust thermostat setting as needed	X	X
Check belt tension	X	X
Inspect flexible water connections for cracking, leaks and pliability	X	X

Lubrication System Semi-Annual Maintenance Items	Inspection	Full Service PM
Clean crankcase breather, inspect hose and connections	X	X
Take oil sample for analysis provide report (after operational checks)	X	
Add crankcase oil (up to 1 gallons) to bring the oil to correct level	X	
Inspect oil heater for proper operation and leaks	X	X
Check for excessive crankcase blow-by with engine running	X	X
Visual inspection of front and rear crankshaft seals and lubrication system gaskets for leaks	X	X
Fuel System Semi-Annual Maintenance Items	Inspection	Full Service PM
Clean primary fuel filter (if screen type)	X	
Drain water and sediment from day tank (if accessible)	X	
Test day tank alarms	X	
Inspection of steel fuel lines for cracks, leaks and proper line bracket support	X	
Inspect flexible fuel lines for cracking, leaks and pliability	X	X
Test day tank pump for proper operation and level	X	X
Operate fuel priming pump and check for proper operation and leaks	X	X
Drain water from water separator	X	X
Check fuel system for leaks	X	X
Check governor oil level and add oil as needed	X	X
Record fuel level in main fuel tank	X	X
Starting System Semi-Annual Maintenance Items	Inspection	Full Service PM
Test and record batter cells' electrolyte specific gravity	X	X
Check and record battery voltage dip level during overcrank test for minimum voltage required to maintain controls during start-up	X	X
Clean and apply corrosion inhibitor to the terminals of lead acid batteries as needed	X	X
Tighten battery cable connections as needed	X	X
Inspect and tighten starter motor(s), connections and wiring	X	X
Top off electrolyte level	X	X
Check and record battery charger amperage and cranking voltage	X	X
Check battery charger and adjust float rate for optimum batter performance and life	X	X
Check and record alternator for proper charge rate with engine running	X	X
Check for proper cranking termination upon starting	X	X

Exhaust System Semi-Annual Maintenance Items	Inspection	Full Service PM
Inspect flexible exhaust copuling for cracks and excessive leakage	X	X
Check for abnormal exhaust characteristics with engine running (signs of wet stacking)	X	X
Inspect exterior of exhaust manifolds for oil/fuel slobbering (signs of wet stacking)	X	X
Inspect exhaust rain protection and exhaust outlet screening	X	X
Drain water in exhaust moisture traps	X	X
Inspect exhaust manifold(s) for broken or missing hardware	X	X
Air Intake System Semi-Annual Maintenance Items	Inspection	Full Service PM
Inspection of air cleaner seal for pliability and sealing	X	X
Inspection of turbocharger for excessive end play clearance (if accessible) and seal leakage	X	X
Inspect air filters for plugging and deterioration	X	X
Test air cleaner indicator	X	X
Check all air intake piping for damage and loose connections	X	X
Operational Semi-Annual Maintenance Items	Inspection	Full Service PM
Make walk around inspection of complete installation	X	X
Cold start engine	X	X
Record amps, volts, oil pressure, water temp, fuel pressure, frequency and KW output	X	X
Inspect generator set vibration isolators	X	X
Check for unit on-line capability in less than 10 seconds	X	X
Check for abnormal noise or vibration	X	X
Re-check oil level with engine running	X	X
Re-check for leaks with engine running	X	X
Check for proper operation of remote fan motors, thermostats, circulation pumps and solenoid valves	X	X
Check inlet and discharge louvers for proper operation with engine running and stopped	X	X

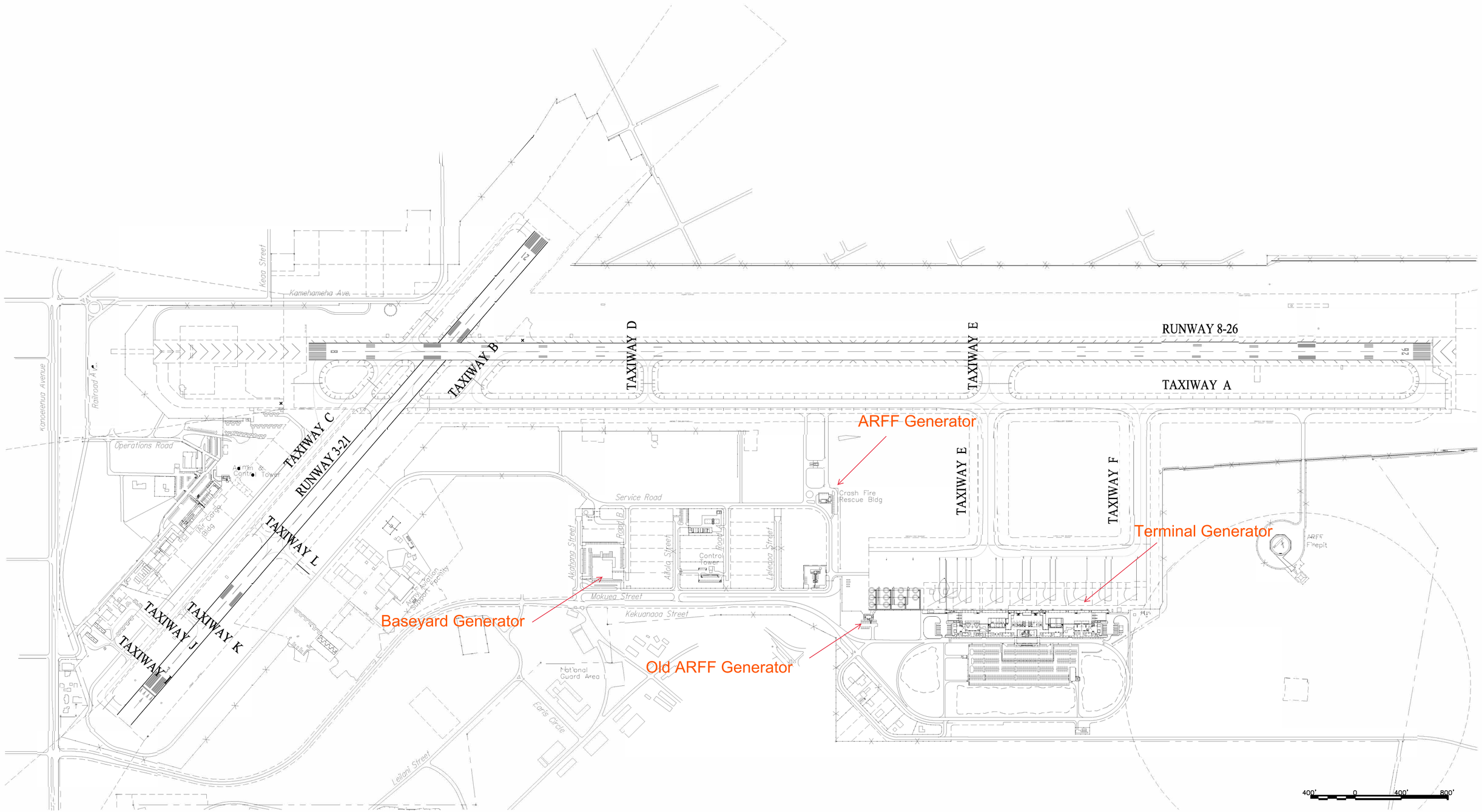
Control Panel Semi-Annual Maintenance Items	Inspection	Full Service PM
Check for and tighten loose terminals on the generator set and the generator control panel	X	X
Check tightness of relays in the generator control panel	X	X
Inspect for excessive dirt accumulation and clean as needed	X	X
Test auto-start system	X	X
Test safeties and prealarms on control and annunciator panels	X	X
Operational check of safety devices and illumination of safety lamps	X	X
Check proper operation of engine and generator instruments with generator running	X	X
Adjust governor control for optimum performance and frequency	X	X
Adjust voltage regulator for proper voltage	X	X
Verify operation of exerciser switch/timer if equipped	X	X
Generator & Regulator Semi-Annual Maintenance Items	Inspection	Full Service PM
Check rotor air for correct clearance	X	X
Inspection of rotor and stator for damage and excessive oil or dirt build-up	X	X
Inspection of coupling and guards for loose or missing parts	X	X
Check tightness of generator leads and voltage regulator control wiring	X	X
Inspect brushes and slip rings or rotating rectifier	X	X
Clean and adjust voltage droop potentiometer	X	X
Inspect exciter field	X	X
Completion of Services Semi-Annual Maintenance Items	Inspection	Full Service PM
Reset all controls to automatic	X	X
Set circuit breaker to correct position	X	X
Check fuel valves for correct position	X	X
Check voltage regulator is ON and NOT tripped	X	X
Check battery charger is ON	X	X
Check day tank controls are ON	X	X
Louver controls are ON	X	X
Jacket water heater(s) are ON	X	X
Remote radiator fan controls are ON	X	X
Auxiliary water pump controls are ON	X	X

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

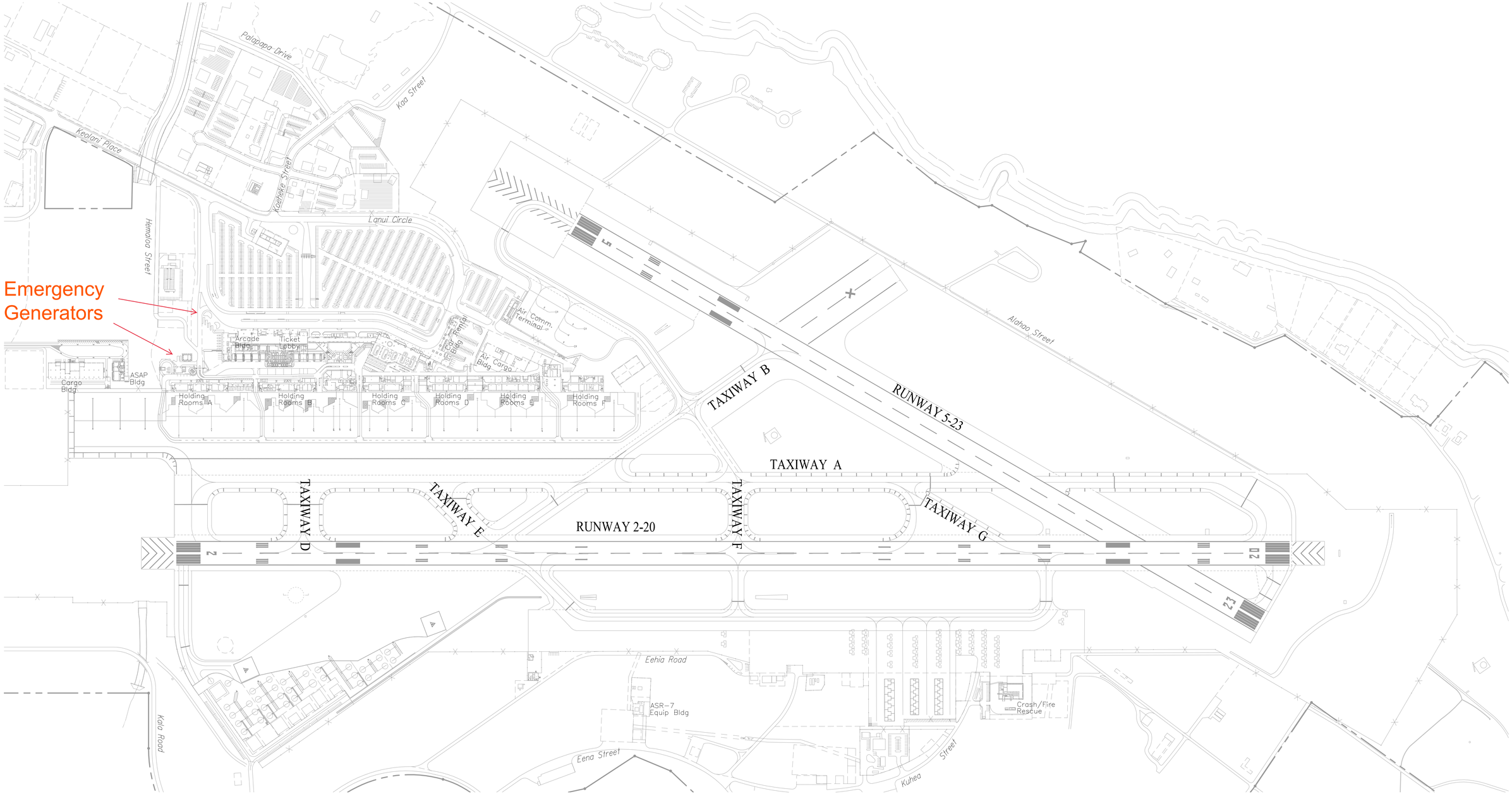
A P P E N D I X D



NORTH

HILO AIRPORT LAYOUT PLAN

SCALE: 1" = 400'



NORTH

KAHULUI AIRPORT LAYOUT PLAN

SCALE: 1" = 200'

RUNWAY 17-35

15

17

TAXIWAY A SOUTH

TAXIWAY C

TAXIWAY A

TAXIWAY H

TAXIWAY G

TAXIWAY A NORTH

Emergency Generators

ARFF Generator

WWTP Generator

Emergency Generator

Bravo Ramp South

Ramp L

Ramp K

U'u Street

Crash Fire Rescue

Federal Inspection Facility

Kupipi Street (Periphery Road)

Hapu'upu'u Street

Wastewater Pump Station

WWTP

United States Postal Service

Pao'o Street

Keahole Street

Au Lepo Street

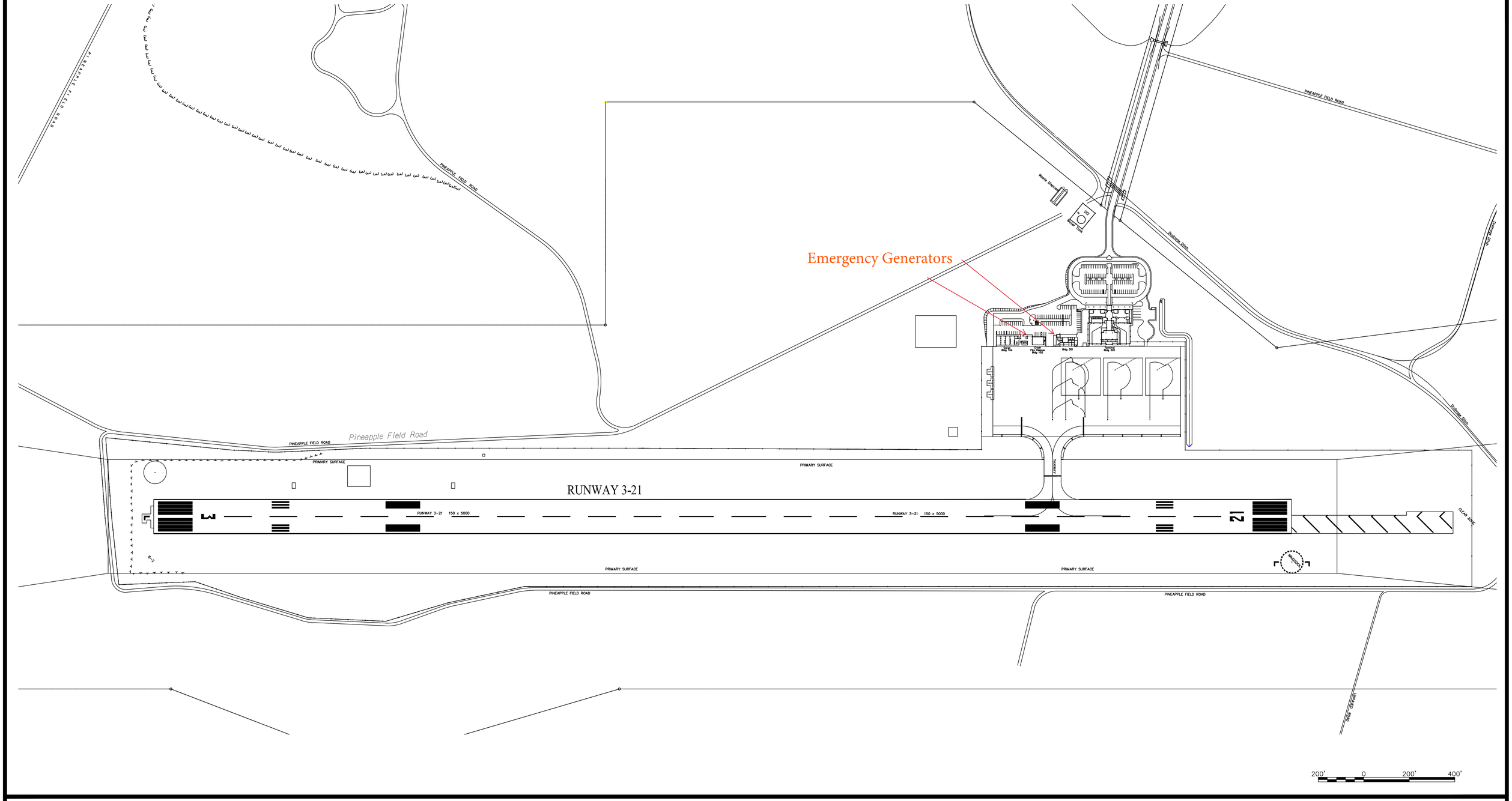
Service Road

400' 0 400' 800'

NORTH

KONA AIRPORT LAYOUT PLAN

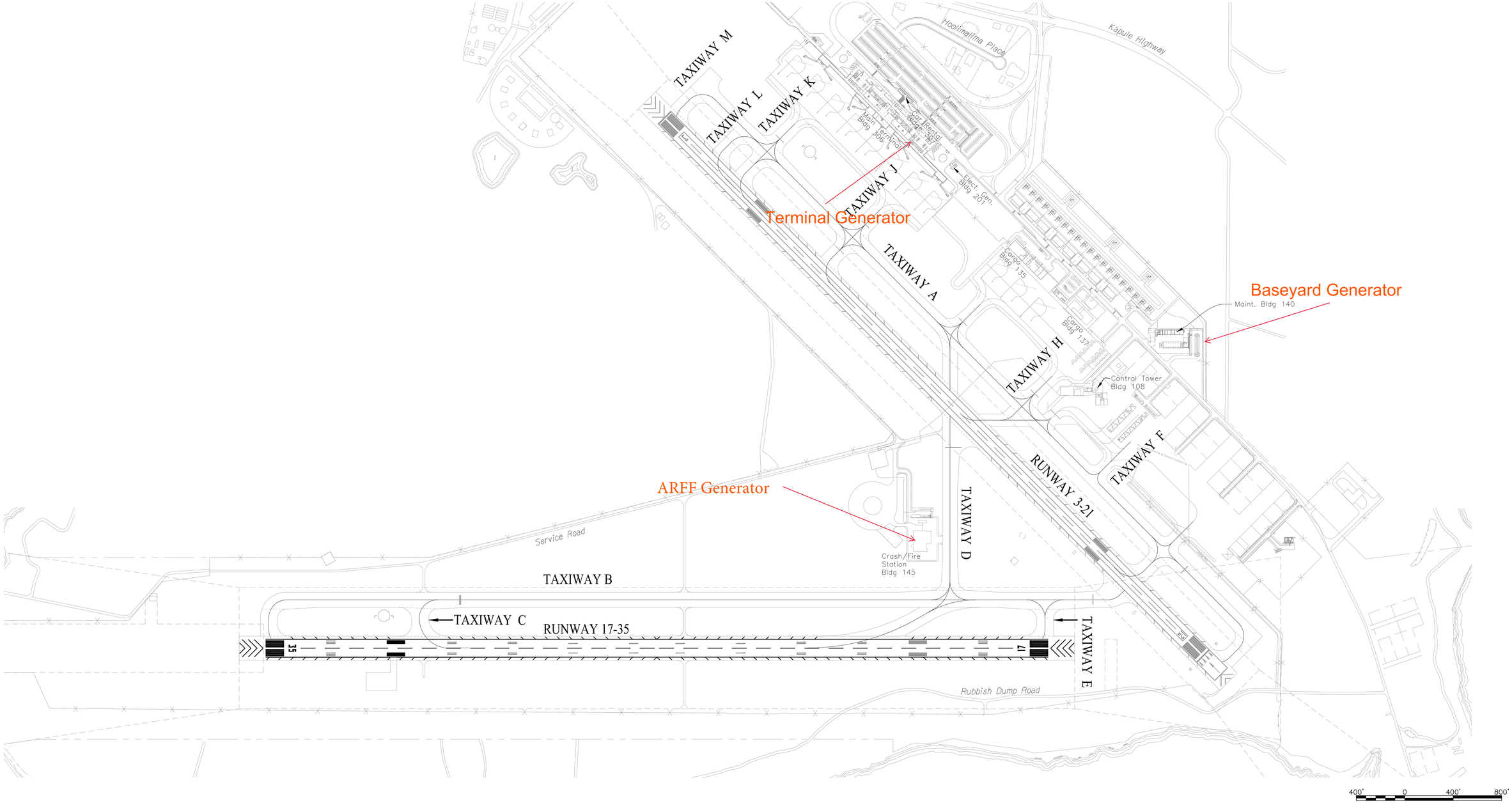
SCALE: 1" = 400'



NORTH

LANAI AIRPORT LAYOUT PLAN

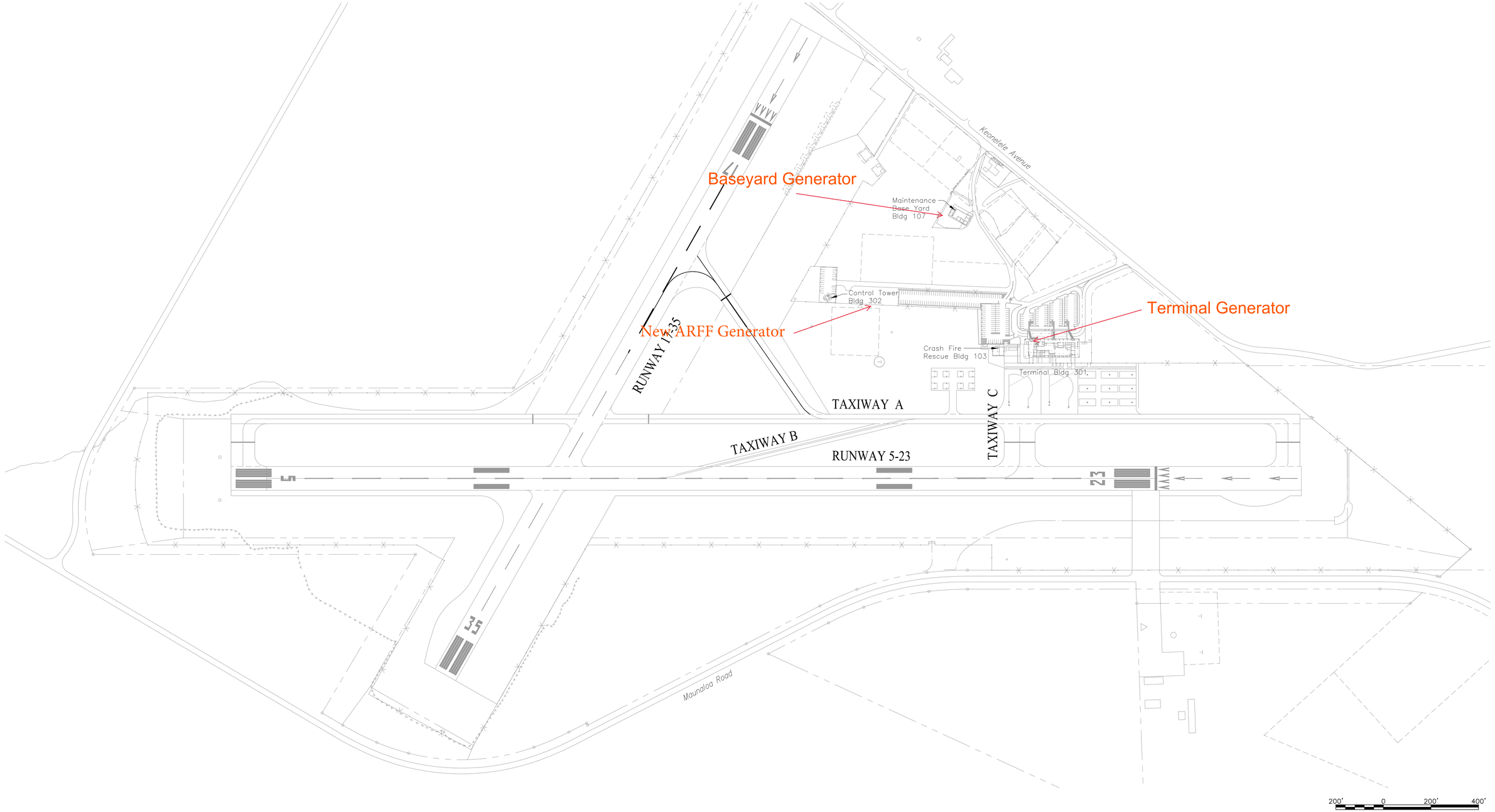
SCALE: 1" = 200'



NORTH

LIHUE AIRPORT LAYOUT PLAN

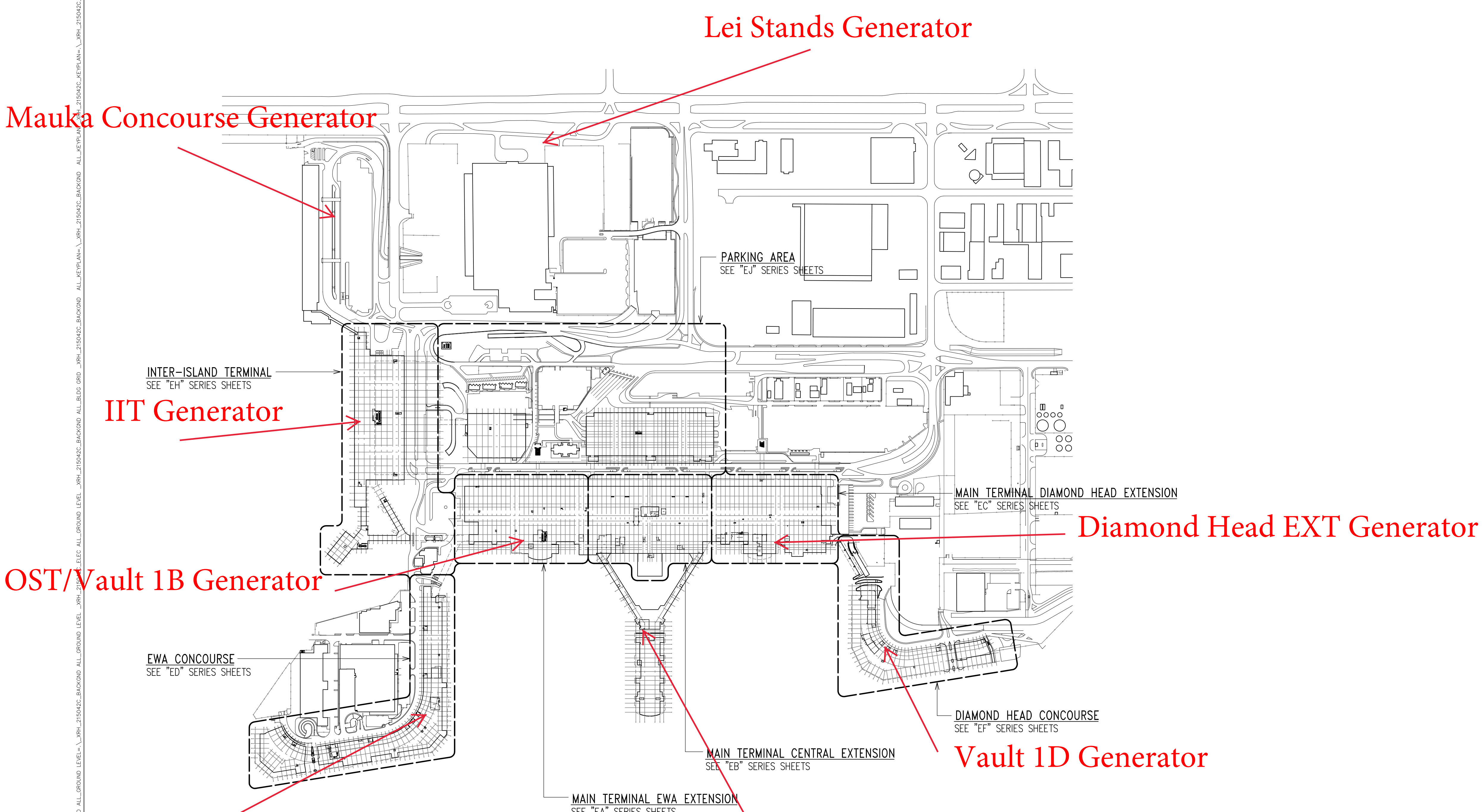
SCALE: 1" = 400'



NORTH

MOLOKAI AIRPORT LAYOUT PLAN

SCALE: 1" = 200'



* OFFSITE (NOT SHOWN)
SEE "EK" SERIES SHEETS

HONOLULU AIRPORT

A / E0.0.01 OVERALL ELECTRICAL DISTRIBUTION PLAN
SCALE: 1"=300'

RUNWAY 8L–26R

GENERAL LOCATION OF EXST CKT HIK–B1

T/W "B"

REPLACE ALL EXST PRIMARY CABLES UNLESS NOTED

VAULT "X"

Vault X Generator

LOCATION OF NEW DUCTLINE AND BACKUP CABLES FOR CKT X–1 BETWEEN VAULTS X AND Z

Vault Z Generator

NEW VAULT "Z"

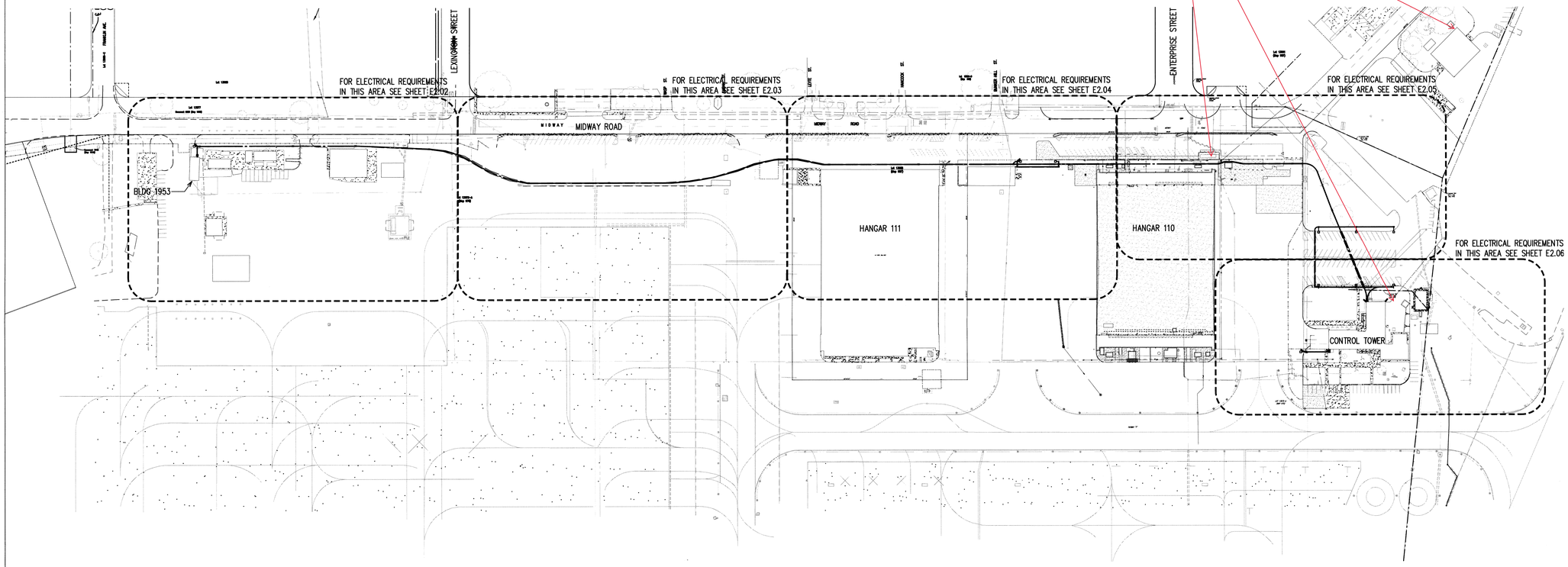
HONOLULU AIRPORT

NORTH

AIRFIELD LIGHTING CIRCUIT PLAN - CIRCUIT X-1

SCALE: 1" = 500'

Emergency Generator



NORTH

OVERALL ELECTRICAL SITE PLAN
SCALE: 1"=100'

KALAELOA AIRPORT

100' 50' 0 100'
SCALE:
GRAPHIC SCALE

DILLINGHAM AIRPORT

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

P R O P O S A L

PROPOSAL TO THE STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

PROJECT:	Emergency Generator and Miscellaneous Electrical Equipment Maintenance Services Statewide Airports State of Hawaii
PROJECT NUMBER:	BS1323-53
TERM OF CONTRACT:	Contract is for a term of three (3) years commencing from the date indicated in the Notice to Proceed from the State.
LIQUIDATED DAMAGES:	One hundred dollars ($100.00) per three hour increment, or fraction thereof, will be deducted from the State's payment to the Contractor for failure to respond to trouble call requests as specified in Section 10.8.

PROJECT MANAGER:	Name:	Reid Miyasato
	Address:	400 Rodgers Blvd, Suite 700 Honolulu, Hawaii 96819
	Phone No:	(808) 838-8891
	Fax No:	(808) 838-8017

NOTE: BID, PERFORMANCE, AND PAYMENT BONDS ARE NOT REQUIRED FOR THIS PROJECT.

Director of Transportation
Aliiaimoku Hale
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.

2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.

3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e. an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

The undersigned bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.

2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.

3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.

5. Agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.

6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

Receipt is hereby acknowledged and complete examination is hereby expressly guaranteed of the following listed items: the specifications, the notice to bidders, the special provisions, if any, the proposal, the plans, if any, and the contract form.

The undersigned acknowledges receipt of any addendum, issued by recording in the space below the date of receipt.

Addendum No. 1_____ Addendum No. 3_____

Addendum No. 2_____ Addendum No. 4_____

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct, final and are net prices.

_____
Bidder (Company Name)

By_____
Authorized Signature

_____
Print Name and Title

_____

_____
Business Address

_____ _____
Business Telephone Email

_____
Date

_____
Contact Person (If different from above)

Phone:_____ Email:_____

*Hawaii General Excise Tax License No. _____

NOTE:

If bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts on behalf of the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign on behalf of the corporation.

If bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above with the signature(s) of the general partner(s) authorized to sign contracts on behalf of the partnership. Please attach to this page current (not more than six months old) evidence of the authority of the partner(s) to sign on behalf of the partnership.

If bidder is an INDIVIDUAL, the bidder's signature shall be placed in the space provided therefore on page PF-4.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department prior to the opening of bids or submitted with the bid; otherwise, the bid may be rejected as irregular and unauthorized.

*Bidder will be considered an out-of-state vendor if Hawaii General Excise Tax License No. is not indicated. See Section 2.8 Out-of-State Bidders of the Specifications.

EMERGENCY GENERATOR AND MISCELLANEOUS
ELECTRICAL EQUIPMENT MAINTENANCE SERVICES
STATEWIDE AIRPORTS
STATE PROJECT NO. BS1323-53

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
A. Daniel K. Inouye International Airport				
A.1.	Emergency Generator (500kW) Annual Service	2 each	$_____	$_____
A.2.	Annual Load Bank test Emergency Generator (500kW)	2 each	$_____	$_____
A.3.	Emergency Generator (1.75MW) Annual Service	3 each	$_____	$_____
A.4.	Annual Load Bank test Emergency Generator (1.75MW)	3 each	$_____	$_____
A.5.	Emergency Generator (600kW) Annual Service	3 each	$_____	$_____
A.6.	Annual Load Bank test Emergency Generator (600 kW)	3 each	$_____	$_____
A.7.	Emergency Generator (700kW) Annual Service	1 each	$_____	$_____
A.8.	Annual Load Bank test Emergency Generator (700 kW)	1 each	$_____	$_____
A.9.	Emergency Generator (1100kW) Annual Service	1 each	$_____	$_____
A.10.	Annual Load Bank test Emergency Generator (1100 kW)	1 each	$_____	$_____
	Subtotal Honolulu Airport			$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
B. Kalaeloa Airport				
B.1.	Switchgear (15kV) for Main Terminal - Annual	1 each	$_____	$_____
B.2.	Switchgear (15kV) for Hanger 110 – Annual	1 each	$_____	$_____
B.3.	1500 kVA Pad Mounted Transformer Annual Maintenance	1 each	$_____	$_____
B.4.	1000 kVA Pad Mounted Transformer Annual Maintenance	1 each	$_____	$_____
B.5.	150 kVA Pad Mounted Transformer Annual Maintenance	1 each	$_____	$_____
B.6.	480V Breaker Service	4 each	$_____	$_____
B.7.	Emergency Generator & Transfer Switch Annual Service	3 each	$_____	$_____
B.8.	Annual Load Bank test Emergency Generator	3 each	$_____	$_____
		Subtotal Kalaeloa Airport		$_____
C. Dillingham Airfield				
C.1.	Emergency Generator (80kW0 & Transfer Switch Annual Service	1 each	$_____	$_____
C.2.	Annual Load Bank test Emergency Generator (80kW)	1 each	$_____	$_____
		Subtotal Dillingham Airfield		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
D. Kahului Airport				
D.1.	Primary (12.47kV) Switchgear Annual Preventive Maintenance	4 each	$_____	$_____
D.2.	Secondary (480V) Switchgear Annual Preventive Maintenance	5 each	$_____	$_____
D.3.	Unit Substation Annual Preventive Maintenance	2 each	$_____	$_____
D.4.	Dry-Type Transformer Annual Preventive Maintenance	36 each	$_____	$_____
D.5.	Sub-distribution Panelboards Annual Preventive Maintenance	3 each	$_____	$_____
D.6.	Emergency Generator (2MW) & Transfer Switch Annual Service	1 each	$_____	$_____
D.7.	Annual Load bank testing 2 MW emergency generator	1 each	$_____	$_____
D.8.	Emergency Generator (275kW) & Transfer Switch Annual Service	2 each	$_____	$_____
D.9.	Annual Load bank testing 275 kW generators	2 each	$_____	$_____
		Subtotal Kahului Airport		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
E. Molokai Airport				
E.1.	Emergency Generator (40kW) Annual Service	1 each	$_____	$_____
E.2.	Annual Load Bank test Emergency Generator (40 kW)	1 each	$_____	$_____
E.3.	Emergency Generator (66kW) Annual Service	1 each	$_____	$_____
E.4.	Annual Load Bank test Emergency Generator (66 kW)	1 each	$_____	$_____
E.5.	125 KW Emergency Generator Annual Service	1 each	$_____	$_____
E.6.	Annual Load Bank test Emergency Generator – 125 kW	1 each	$_____	$_____
E.7.	Annual Maintenance of Terminal Electrical Vault – Low Voltage Molded Case Circuit Breakers	1 each	$_____	$_____
E.8.	Annual Maintenance of Terminal Electrical Vault – Medium Voltage Molded Case Circuit Breakers	1 each	$_____	$_____
		Molokai Airport Subtotal		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
F. Lanai Airport				
F.1.	Emergency Generator (125kW) & Transfer Switch Annual Service	1 each	$_____	$_____
F.2.	Annual Load Bank test Emergency Generator (125 kW)	1 each	$_____	$_____
F.3.	Emergency Generator (315kW) & Transfer Switch Annual Service	1 each	$_____	$_____
F.4.	Annual Load Bank test Emergency Generator (315 kW)	1 each	$_____	$_____
F.5.	Annual Maintenance of Terminal Bldg. Electrical Panels – Low Voltage Molded Case Circuit Breakers	1 each	$_____	$_____
F.6.	Annual Maintenance of Emergency Generator Electrical Vault Medium Voltage Molded Case Circuit Breakers	1 Lot	$_____	$_____
F.7.	Dry-Type Transformer Annual Preventive Maintenance (80 kVA & 150 kVA)	2 each	$_____	$_____
F.8	Annual Maintenance of low Voltage Circuit Breakers Terminal Bldg. and Emergency Generator Room	1 Lot	$_____	$_____
		Lanai Airport Subtotal		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
G. Hilo Airport				
G.1.	Emergency Generator (900kW) & Transfer Switch Annual Service	1 each	$_____	$_____
G.2.	Annual Load Bank test Emergency Generator (900 kW)	1 each	$_____	$_____
G.3.	Emergency Generator (350kW) & Transfer Switch Annual Service	1 each	$_____	$_____
G.4.	Annual Load Bank test Emergency Generator (350 kW)	1 each	$_____	$_____
G.5.	Emergency Generator (100kW) & Transfer Switch Annual Service	2 each	$_____	$_____
G.6.	Annual Load Bank test Emergency Generator (100 kW)	2 each	$_____	$_____
		Hilo Airport Subtotal		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
H. Kona Airport				
H.1.	Emergency Generator (175kW) & Transfer Switch Annual Service	2 each	$_____	$_____
H.2.	Annual Load Bank test Emergency Generator (175 kW)	1 each	$_____	$_____
H.3.	Emergency Generator (500kW) & Transfer Switch Annual Service	1 each	$_____	$_____
H.4.	Annual Load Bank test Emergency Generator (500 kW)	1 each	$_____	$_____
H.5.	Emergency Generator (1500kW) Annual Service	1 each	$_____	$_____
H.6.	Annual Load Bank test Emergency Generator (1500 kW)	1 each	$_____	$_____
H.7.	Emergency Generator (500kW) Annual Service	1 each	$_____	$_____
H.8.	Annual Load Bank test Emergency Generator (500 kW)	1 each	$_____	$_____
H.9.	Emergency Generator (125kW) Annual Service	1 each	$_____	$_____
H.10.	Annual Load Bank test Emergency Generator (125 kW)	1 each	$_____	$_____
		Kona Airport Subtotal		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
I. Waimea Airport				
I.1.	Emergency Generator (20kW) Annual Service	1 each	$_____	$_____
I.2.	Annual Load Bank test Emergency Generator (20 kW)	1 each	$_____	$_____
I.3.	Annual Maintenance of Emergency Generator Electrical Vault – Low Voltage Molded Case Circuit Breakers	1 each	$_____	$_____
I.4.	Annual Maintenance of Emergency Generator Electrical Vault Medium Voltage Molded Case Circuit Breakers	1 Lot	$_____	$_____
		Waimea Airport Subtotal		$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
J. Lihue Airport				
J.1.	Emergency Generator (600kW) & Transfer Switch Annual Service	2 each	$_____	$_____
J.2.	Annual Load Bank test Emergency Generator (600 kW)	2 each	$_____	$_____
J.3.	Emergency Generator (180kW) & Transfer Switch Annual Service	1 each	$_____	$_____
J.4.	Annual Load Bank test Emergency Generator (180 kW)	1 each	$_____	$_____
J.5.	Emergency Generator (125kW) & Transfer Switch Annual Service	1 each	$_____	$_____
J.6.	Annual Load Bank test Emergency Generator (125 kW)	1 each	$_____	$_____
J.7.	Emergency Generator (300kW) & Transfer Switch Annual Service	1 each	$_____	$_____
J.8.	Annual Load Bank test Emergency Generator (300 kW)	1 each	$_____	$_____
			Lihue Airport Subtotal	$_____

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity (a)	Unit Price (b)	Total (a x b)
K.	Regular working hours trouble calls repair work – per man - hour	250 hours	$_____/hour	$_____
L	Parts Replacement		Allow	$50,000.00
M.	Trouble call travel		Allow	$25,000.00

Subtotal for Each Airport:

Daniel K. Inouye International Airport	$_____
Dillingham Airport	$_____
Kalaeloa Airport	$_____
Kahului Airport	$_____
Molokai Airport	$_____
Lanai Airport	$_____
Hilo International Airport	$_____
Ellison Onizuka Kona International Airport	$_____
Lihue Airport	$_____

TOTAL AMOUNT FOR COMPARISON OF BIDS $ _____
(For comparison of bids, sum of items A thru M)

The hourly rates payable to the CONTRACTOR set forth in the Proposal Schedule shall be inclusive of direct labor, overhead, profit, and all other expenses not deemed direct reimbursable costs by the STATE, in its sole discretion, and these rates shall be held fixed for the term of this Contract.

Note 1: Bids shall include all Federal, State, County and other applicable taxes and fees.

Note 2: The TOTAL AMOUNT FOR COMPARISON OF BIDS will be used to determine the lowest responsible bidder.

Note 3: Bidders must complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.

Note 4: If a discrepancy occurs between unit price and the bid price, the unit bid price shall govern.

Note 5: The State reserves the right to reject any or all Proposals and to waive any defects in the best interest of the State.

Note 6: Submission of a Proposal is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.

Note 7: Bidder shall be paid for actual work performed as directed by the Engineer for allowance items. Bidder will not be paid overhead and profit for unused allowance funds.

Note 8: Payments to the Contractor will be made on the basis of actual number of performances and the unit bid price.

Note 9: If the project exceeds the funds available, the State reserves the right to negotiate with the lowest responsible bidders as permitted under Section 103D-302, Hawaii Revised Statutes, to further reduce the scope of work and award a contract thereafter.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

A T T A C H M E N T S

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

F O R M S

Contents:

CONTRACT

THIS AGREEMENT, made this day _____, by and between the STATE OF HAWAII, by its Director of Transportation, hereinafter referred to as "STATE", and «CONTRACTOR», «STATE_OF_INCORPORATON» whose business/post office address is «ADDRESS», hereinafter referred to as "CONTRACTOR";

WITNESSETH: That for and in consideration of the payments hereinafter mentioned, the CONTRACTOR hereby covenants and agrees with the STATE to furnish, perform and/or deliver and pay for all labor, supplies, materials, equipment and services called for in "EMERGENCY GENERATOR AND MISCELLANEOUS ELECTRICAL EQUIPMENT MAINTENANCE SERVICES PROJECT NO.BS1323-53", or such a part thereof as shall be required by the STATE, the total amount of which labor, supplies, materials, equipment and services shall be computed at the unit and/or lump sum prices set forth in the attached proposal schedule and shall be the sum of «BASIC»-----DOLLARS ($«BASIC_NUMERIC») as follows:

Total Amount for Comparison of Bids……..……..…$«BASIC_NUMERIC»

which sum shall be provided from State funds, all in accordance with the specifications, the special provisions, if any, the notice to bidders, the instructions to bidders, the proposal and plans, if any, for «PROJECT_NO_ONLY», on file in the office of the Director of Transportation. These documents, together with all alterations, amendments, and additions thereto and deductions therefrom, are attached hereto or incorporated herein by reference and made a part of this contract.

The CONTRACTOR hereby covenants and agrees to furnish, perform and/or deliver all labor, supplies, materials, equipment and services as provided herein for a period of THREE (3) YEARS from the date indicated in the Notice to Proceed from the State. The total term of this contract shall not exceed THIRTY SIX (36) MONTHS.

For and in consideration of the covenants, undertakings and agreements of the CONTRACTOR herein set forth and upon the full and faithful performance thereof by the CONTRACTOR, the STATE hereby agrees to pay the CONTRACTOR the sum of «BASIC»-----DOLLARS ($«BASIC_NUMERIC») in lawful money, such payment to be made, subject to such additions hereto or deductions therefrom heretofore or hereafter made, in the manner and at the time prescribed in the specifications and this contract.

An additional sum of «EXTRAS»-----DOLLARS ($«EXTRA_NUMERIC») is hereby provided for extra work and shall be provided from State funds.

All words used herein in the singular shall extend to and include the plural. All words used in the plural shall extend to and include the singular. The use of any gender shall extend to and include all genders.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed the day and year first above written.

STATE OF HAWAII

_____
Director of Transportation

«CONTRACTOR»

_____
Signature

_____Pr
int name

_____
Print Title

_____
Date

CERTIFICATE FOR PERFORMANCE OF SERVICES

The undersigned bidder does hereby certify that in performing the services required for «PROJECT_NAME_AND_NO», it will fulfill the following conditions:

1. All applicable laws of the Federal and State governments relating to workers' compensation, unemployment compensation, payment of wages, and safety will be fully complied with; and

2. The services to be rendered shall be performed by employees paid at wages or salaries not less than the wages paid to public officers and employees for similar work, with the exception of professional, managerial, supervisory, and clerical personnel who are not covered by Section 103-55, HRS.

I understand that failure to comply with the above conditions during the period of the contract shall result in cancellation of the contract, unless such noncompliance is corrected within a reasonable period as determined by the Director of Transportation. Payment in the final settlement of the contract or the release of bonds, if applicable, or both shall not be made unless the Director of Transportation has determined that the noncompliance has been corrected; and

I further understand that all payments required by Federal and State laws to be made by employers for the benefit of their employees are to be paid in addition to the base wage required by Section 103-55, HRS.

DATED at Honolulu, Hawaii, this _____ day of _____, 2022.

«CONTRACTOR»
Name of Corporation, Partnership, or Individual

_____
Signature and Title of Signer

Notary Seal
NOTARY ACKNOWLEDGEMENT

Subscribed and sworn before me this
_____day of_____
Notary signature_____
Notary public, State of _____
My Commission Expires:_____

Notary Seal
NOTARY CERTIFICATION

Doc. Date: _____ #Pages: ____
Notary Name: _____ _____Circuit
Doc. Description: _____
_____
Notary signature_____
Date _____