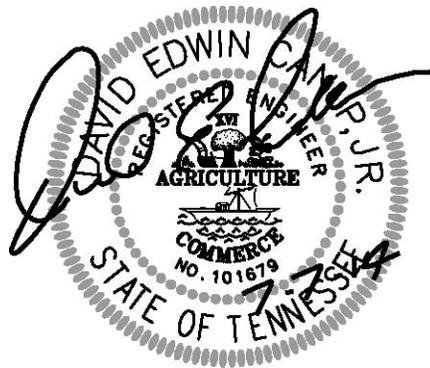


Shelby County Justice Center
Generator Replacement
Phase 2
201 Poplar Ave
Memphis, Tennessee 38103
July 7, 2014



Canup Engineering, Inc.
7953 Stage Hills Blvd., Suite 107
Bartlett, TN 38133

Phone: 901-379-9762
Fax: 901-379-9763

Bid Set No. _____

**SHELBY COUNTY JUSTICE CENTER
GENERATOR REPLACEMENT
PHASE 2
201 POPLAR
MEMPHIS, TN 38103
CE13-037**

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**SHELBY COUNTY JUSTICE CENTER
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END OF DOCUMENT



Shelby County Tennessee

Mark Luttrell, Jr., Mayor

Request for Proposal Shelby County Government Purchasing Department

160 N. Main, Suite 900
Memphis, TN 38103

Issued: July 17, 2014

Due: August 13, 2014 @ 4:00 p.m. (Central Standard Time)

RFP # 15-007-02

FURNISH AND INSTALL EMERGENCY GENERATOR, PHASE 2 SHELBY COUNTY CRIMINAL JUSTICE COMPLEX 201 POPLAR AVENUE

Shelby County Government is soliciting proposals for the provision of Construction Services to Furnish and Install an Emergency Generator, Phase 2 at Shelby County Criminal Justice Complex, 201 Poplar Avenue, Memphis, Tennessee 38103. Information regarding this RFP is located on the County's website at www.shelbycountyttn.gov. At the top of the home page, click on the links "Department," "P" for the Purchasing Department and "Bids" to locate the name of the above-described RFP. Copies of the project manual and drawing are posted at this location and can be downloaded at no cost to prospective bidders

A **MANDATORY** pre-bid conference will be held **Thursday, July 31 2014, at 9:00 A.M., at Shelby County Criminal Justice Center, 201 Poplar, Auditorium, Memphis, Tennessee 38103.**

The proposal, as submitted, should include all estimated cost related to the services requested in this RFP. If selected, you will contract with Shelby County Government pending completion of all requirements contained herein. Respondents requesting additional information or clarification are to contact, Nelson Fowler at nelson.fowler@shelbycountyttn.gov.

Proposals must be received in the office of the Administrator of Purchasing **no later than 4:00 P.M. on Wednesday, August 13, 2014.** Proposals should be addressed to:

**Nelson Fowler, Manager A
Shelby County Government
160 N. Main, Suite 900
Memphis, TN 38103**

The package containing the original proposal four (4) copies and one Digital CD must be sealed and marked with the Proposers name and **“CONFIDENTIAL, “FURNISH AND INSTALL EMERGENCY GENERATOR, PHASE 2, SHELBY COUNTY CRIMINAL JUSTICE COMPLEX”**, RFP # 15-007-02, noted on the outside.

Sincerely,

Nelson Fowler, Manager A
Purchasing Department Shelby County Government

CC: Dave Canup, Canup Engineering
Diep Tran, Support Services

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Note: Please make sure you pay close attention to Sections: I-V, IX & XI. These sections will clearly outline what information is required to properly respond and prepare your RFP response.

I. INTRODUCTION

Shelby County Government (the “County”), is seeking proposals from interested and qualified firms to Furnish and Install Emergency Generator, Phase 2 located at the Shelby County Criminal Justice Complex, 201 Poplar Avenue, Memphis, Tennessee 38103. This Request for Proposal (“RFP”) is being released to invite interested and qualified firms to prepare and submit proposals in accordance with instructions provided where the successful candidate will be selected and invited to enter into a contractual relationship with Shelby County for the Services outlined in this RFP.

II. MINIMUM PROPOSER REQUIREMENTS

All Proposers must:

1. Must submit a Bid Bond in the amount of 5% of their bid. This bond must be submitted with your bid.
2. Have or obtain prior to the execution of the final contract all appropriate licenses and certifications required in the State of Tennessee for the performance of the Services in accordance with the provisions of this RFP.
3. The successful contractor must be able to submit a performance/labor material bond separate bonds each in the amount of 100% of the amount of the contract.
4. Firms located within the boundaries of Shelby County are required to have a current Shelby County Business License or be considered exempt from the license requirement by the Shelby County Clerks Office.
5. Also see Item # I, page 23 for forms to be submitted with your bid.
6. Prime and LOSB contractors must **apply** and **qualify** for an Equal Opportunity Compliance (EOC) certification number through our EOC Administration prior to submitting your response.
7. Independent contractors (sole proprietors) must adhere to State of Tennessee Public Chapter No. 436, know as the “Tennessee Lawful Employment Act (effective date of 1/1/2012). Proof and documentation of employment eligibility must be included with the proposal.
8. The contractor shall submit documentation showing that his company has installed a 500 kw or larger (two or more units) paralleled generator system complete with paralleling switchgear in an existing occupied facility within the last five years. The contractor shall include contact names and numbers for the qualifying installations.

Please Note: As a part of doing business with Shelby County, each individual, company, or organization is required to obtain an “Equal Opportunity Compliance” certification number prior to submitting your response.

You can access the online applications to receive the numbers indicated above at www.shelblycountyttn.gov. To obtain a vendor number and an EOC number, please follow the instructions below:

Vendor Number (Purchasing Department)

At the top of the home page, click on the links “Department”, “P” for the Purchasing Department and “Conducting Business with Shelby County”. The “Vendor Registration” link is at the bottom of the drop down box. Please download the application instructions and read thoroughly prior to accessing the application. (*Applications for a vendor number are accepted online only.*)

Equal Opportunity Compliance (EOC) Number (EOC Administration Office)

At the top of the home page, click on the links “Department”, “E” for the Equal Opportunity Compliance and “Contract Compliance Program”. The “Contract Compliance Packet” link is in the middle of the page. Please print the packet and mail or fax the completed packet to the EOC office. The mailing address is 160 N. Main Street, Suite 200, Memphis, TN 38103. The fax number is 901-222-1101.

Note: Because of the length of time it takes to apply and receive an EOC number, vendors who apply prior to the RFP due date, bid will be accepted pending EOC approval of their application.

If you have any questions regarding the application, you may contact Purchasing at (901)222-2250 or the EOC Administration at (901) 222-1100.

III. CORRESPONDENCE

All correspondence, proposals and questions concerning the RFP are to be submitted to:

**Nelson Fowler, Manager A
Shelby County Government
160 N. Main St. Suite 900
Memphis, TN 38103
(901) 222-2250**

Respondents requesting additional information or clarification are to contact Nelson Fowler in writing at nelson.fowler@shelbycountyttn.gov or at the address listed above. Questions should reference the section of the RFP to which the question pertains and all contact information for the person submitting the questions.

IN ORDER TO PREVENT AN UNFAIR ADVANTAGE TO ANY RESPONDENT, VERBAL QUESTIONS WILL NOT BE ANSWERED. The deadline for submitting questions will be Friday, August 8, 2014 at 12:00 p.m.

Individual vendor questions will be answered by e-mail as received before the cut-off date. All written questions submitted by the deadline indicated above will be answered and posted on the County’s website at www.shelbycountyttn.gov within forty eight (48) hours of the above cut-off date.

Please be aware that contact with any other personnel (other than the person clearly identified in this document) within Shelby County regarding this RFP may disqualify your company from further consideration.

These guidelines for communication; have been established to ensure a fair and equitable process for all respondents. Please be aware that contact with any other personnel (other than the person clearly identified in this document) within Shelby County or its benefit administrators regarding this RFP may disqualify your company from further consideration.

IV. PROPOSAL SUBMISSION DEADLINE

All proposals must be received at the address listed above no later than **4:00 PM on Wednesday, August 13, 2014**. Facsimile or electronically transmitted proposals will not be accepted since they do not contain original signatures. Postmarks will not be accepted in lieu of actual receipt. Late or incomplete proposals may not be opened and considered. Under no circumstances, regardless of weather conditions, transportation delays, or any other circumstance, will this deadline be extended.

V. PROPOSAL TIMELINE

Shelby County reserves the right to modify this timeline at any time. If the due date for proposals is changed, all prospective Proposers shall be notified.

Request for Proposals Released	Thursday, July 17, 2014
Pre-Bid Conference	Thursday, July 31, 2014 at 9:00 AM
Proposal Due Date	4:00 p.m., Wednesday, August 13, 2014
Notification of Award	September, 2014

The County may reproduce any of the Proposers proposal and supporting documents for internal use or for any other purpose required by law.

VI. PROPOSAL CONDITIONS

A. Contingencies

This RFP does not commit the County to award a contract. The County reserves the right to accept or reject any or all proposals if the County determines it is in the best interest of the County to do so. The County will notify all Proposers, in writing, if the County rejects all proposals.

B. Modifications

The County reserves the right to issue addenda or amendments to this RFP.

C. Proposal Submission

To be considered, all proposals must be submitted in the manner set forth in this RFP. It is the Proposers responsibility to ensure that its proposals arrive on or before the specified time.

D. Incurred Costs

This RFP does not commit the County to pay any costs incurred in the preparation of a proposal in response to this RFP and Proposers agree that all costs incurred in developing this RFP are the Proposers responsibility.

E. Final Authority

The final authority to award a contract rests solely with the Shelby County Purchasing Department.

F. Proposal Validity.

Proposals submitted hereunder will be firm for one hundred twenty (120) calendar days from the due date unless otherwise qualified.

G. LOSB

**SHELBY COUNTY GOVERNMENT
LOCALLY OWNED SMALL BUSINESS (LOS B) PROGRAM
FOR CONSTRUCTION SERVICES**

**FURNISH AND INSTALL
EMERGENCY GENERATOR
PHASE 2**

General

Shelby County Government is committed to a policy of non-discrimination pursuant to the Equal Protection provisions of the United States Constitution. It is further the policy of Shelby County that it's purchasing and contracting practices encourage the use of Locally-Owned Small Businesses (LOS B's) in all solicitations. In furtherance of these policy objectives, Shelby County seeks to afford all citizens equal opportunities to do business on county contracts and to ensure that all bidders, proposers, or Contractors doing business with Shelby County provide to LOS B's, maximum practicable opportunities, commensurate with availability, price and capabilities required, to participate on contracts which are paid for, in whole or in part, with monetary appropriations from Shelby County.

Shelby County seeks to prevent discrimination against any person or business in pursuit of these opportunities on the basis of race or gender. Shelby County will conduct its contracting and purchasing programs so as to discourage any discrimination and will actively seek to resolve all

claims of discrimination brought against Shelby County or any Contractors involved in such contracting and purchasing programs.

Shelby County has determined that **10%** of the contract sum will be contracted with LOSB vendors. For assistance and information regarding LOSB participation, Bidders shall contact:

Ms. Carolyn Griffin
Office of Equal Opportunity Compliance
Board of Commissioners of Shelby County
160 North Main Street, Suite 200
Memphis, Tennessee 38103
Phone: 901-222-1100
Fax: 901-222-1101
E-mail: carolyn.griffin@shelbycountyttn.gov

Definitions

The definitions used in this document are as follows:

1. **“Bidder”** or **“Proposers”** means any person, firm, partnership, association, or joint venture seeking to be awarded a contract or subcontract to provide goods, commodities or services.
2. **“Certification”** or **“Certified”** means a Business that is certified by Shelby County Government under the LOSB program.
3. **“Commercially useful function”** means being responsible for the management and performance of a distinct element of the total work.
4. **“Contractor”** shall mean any person or business enterprise that submits a bid or proposal to provide labor, goods or services to Shelby County by contract for profit in the area of construction or construction-related activities; and, any person or firm who supplies or provides labor, goods or services to Shelby County by contract for profit.
5. **“Efforts to Achieve LOSB Participation”** means that the Contractor will solicit LOSB Participation with respect to the procurement and will consider all sub-bids and quotations received from LOSB’s. When a subcontract is not awarded to the LOSB, the Contractor must document the reason(s) the award was not made and substantiate that documentation in writing pursuant to the provisions of this Program.
6. **“Locally Owned Small Business (LOS B)”** means a business whose home office is located in Shelby County, whose annual revenues do not exceed \$5,000,000 and who has been certified by Shelby County Office of Equal Opportunity Compliance.
7. **“Non-LOS B”** means a business which is not certified as a LOSB.
8. **“Unavailable”** means either that: (1) there is no LOSB providing goods or services requested; or, (2) no LOSB submitted a bid.

Requirements and Compliance

All firms or entities seeking to become Contractors as outlined herein are required to make good faith efforts to achieve LOSB participation when submitting a proposal or bidding on Shelby

County procurements. Bidders and Proposers shall not discriminate on the basis of race or gender when soliciting bids in the performance of Shelby County's procurements. Discrimination complaints brought to the attention of Shelby County Office of Equal Opportunity Compliance (or its designee) will be reviewed and investigated to the extent necessary to determine the validity of such complaints and what actions, if any, should be taken by Shelby County.

Policies and Procedures

Shelby County may adopt policies and procedures as necessary to carry out and implement its powers and duties with regard to the LOSB Program. It is the goal of Shelby County to encourage participation by LOSB's and to adopt rules and regulations which achieve to the greatest extent possible a level of participation by LOSB's taking into account the total number of all Contractors and suppliers. Therefore, Shelby County will review each procurement request to determine the maximum potential for utilization of LOSB's. This review is based on the availability of qualified LOSB's providing goods or services as it relates to the scope of the bid or procurement process. The following procedures may be utilized during the procurement process.

1. Pre-Bid Activity

a. Bid Language

Shelby County may insert language into each bid specification describing the LOSB Program to assure that all prospective bidders are aware of the requirements to make efforts to utilize LOSB's.

b. Notification

Shelby County may provide written notification to Contractors and LOSB's regarding: pre-bid conferences; technical assistance to LOSB's; LOSB Program procedures and required documentation; and, provide a list of LOSB's who have expressed an interest in competing for the bid or in performing as a subcontractor.

2. Contractor's Responsibilities

a. Efforts to Achieve LOSB Participation

All entities seeking to become Contractors are required to make efforts to achieve maximum LOSB participation, as outlined in this LOSB Program, when submitting a response to a bid or negotiated proposal in response to a Shelby County procurement opportunity. Such Efforts should be documented on **LOS Form "A"**.

b. Utilization

Contractors are required to utilize legitimate LOSB's in order to receive credit for the utilization of a LOSB. Contractors must document all LOSB's to be utilized, the percentage of utilization and the intended scope of work. Such information should be submitted on **LOS Form "B"**. This documentation must be submitted with the bid or negotiated proposal document.

- c. **Commercially Useful Functions**
All LOSB's identified on **LOS Form "C"** or **LOS Form "D"** shall perform a Commercially Useful Function.
- d. **Unavailability**
If a potential Contractor's efforts to obtain LOSB participation are unsuccessful due to the unavailability of a LOSB, the Contractor will submit a statement of unavailability. **LOS Form "A."**
- e. **Pre-Work Conference**
Any Contractor who is the successful bidder shall be required to attend a conference with Shelby County prior to beginning the work. The primary purpose of this conference is to review the project scope and review LOSB participation as outlined in **LOS Form "B"**. Shelby County will also review the Statement of Intent to Perform as a Subcontractor or Provide Supplies or Services as documented on **LOS Form "C"**.
- f. **Post-Award Change**
Any Contractor who determines that a LOSB identified on **LOS Form "B"** cannot perform shall request approval from Shelby County to contract with an alternate subcontractor pursuant to this LOSB Program. Such request will be reviewed and approved only after adequate documentation for the proposed change is presented.
- g. **LOS Certification**
Each month the Contractor shall submit **LOS Form "D"** certifying all payments made to LOSB's.

3. LOSB Responsibilities

- a. **Commercially Useful Function**
It is the responsibility of each LOSB providing subcontracted goods and/or services to submit **LOS Form "C"** certifying that it is performing the work and that it is a Commercially Useful Function.

Written Agreement

Shelby County policies and procedures on LOSB participation are designed to create contractual relationships between Contractors and LOSB's. Therefore, a Contractor may utilize the services of a LOSB in estimating and satisfying the scope of work, provided that a written contract/agreement is executed between the Contractor and the LOSB.

Certification

To ensure that the ownership and control over decision-making and day-to-day operations of a Certified LOSB is legitimate, Shelby County reserves the right to verify the ownership and control of each LOSB utilized.

Monitoring LOSB Utilization

Shelby County intends to monitor and enforce this LOSB Program. Shelby County reserves the right to conduct random audits of each of its Contractor's LOSB's. Shelby County reserves the right to reevaluate a LOSB's certification at any time.

Efforts to Achieve LOSB Participation

The Contractor shall consider all bids and/or quotations received from LOSB's. When a subcontract is not awarded by a Contractor to any of the competing LOSB's, the Contractor must document the reason(s) the award was not made to the LOSB's. It is the responsibility of the Contractor to prove that it employed Efforts to Achieve LOSB participation. Evidence supporting the Contractor's Efforts must be documented on **LOSB Form "A"**, which must include, but is not limited to, the following:

1. Contractor must submit proof that it solicited LOSB participation through reasonable and available means including, but not limited to:
 - a. Written notices to LOSB's who have the capability to perform the work of the contract or provide the service;
 - b. Direct mailing, electronic mailing, facsimile or telephone requests.
2. Contractor must submit proof that it provided interested LOSB's with adequate information about plans, requirements and specifications of the contract in a timely manner to assist them in responding to a solicitation.
3. Contractor must submit proof that it made Efforts to Achieve LOSB Participation including, but not limited to, proof that it made opportunities available to LOSB suppliers and identified opportunities commensurate with opportunities made available and identified to Non LOSB's. Such proof will include the names of businesses, contact person(s), addresses, telephone numbers, and, a description of the specifications for the work selected for subcontracting.
4. Contractor must submit proof that it allowed LOSB's the opportunity to review bid specifications, blue prints and all other bid related items at no charge. The Contractor must allow sufficient time for review prior to the bid deadline.
5. Contractor must submit proof that it made Efforts to Achieve LOSB Participation by not rejecting a LOSB as unqualified or unacceptable without sound reasons based on a thorough investigation of their capabilities. Contractor must submit proof of the basis for rejecting any LOSB deemed unqualified or unacceptable by the Contractor. The Contractor will not impose unrealistic conditions of performance on LOSB's seeking subcontracting opportunities.

The Contractor must fully cooperate with Shelby County in its post-contract award LOSB Program audit and compliance efforts.

Substitution of LOSB's after Contract Award

In order to make a substitution of a LOSB, a Contractor must make a request to Shelby County. This request must be submitted in writing to Shelby County. Shelby County reserves the right to approve any substitution of a LOSB. The Contractor has the responsibility to provide Shelby

County with a reasonable basis for the substitution. If the Contractor desires to substitute the LOSB with a Non-LOSB, then the Contractor must comply with the Effort to Achieve LOSB Participation provisions set forth herein.

Noncompliance with LOSB Program

Any of the following reasons, individually or collectively, may result in suspension from bidding, prohibition from contracting, or cancellation of contracts:

1. The failure to perform according to contract provisions relating to this LOSB Program;
2. Violation of, circumvention of, or failure to comply with the LOSB Program; and/or,
3. Other reasons deemed appropriate by Shelby County.

Questions and Information

Questions regarding this LOSB Program and requests for information should be directed to:

Ms. Carolyn Griffin
Office of Equal Opportunity Compliance
Board of Commissioners of Shelby County
160 North Main Street, Suite 200
Memphis, Tennessee 38103
Phone: 901-222-1100
Fax: 901-222-1101
E-mail: carolyn.griffin@shelbycountyttn.gov

Construction

This LOSB Program is consistent with Shelby County Policies and Procedures. Wherever conflicts exist, the provision in the Shelby County Policies and Procedures will prevail.

LOSB Program Forms Description

- **LOSB Form A -- Certification of Efforts**

Contractors are required to submit **LOSB Form "A"** with proposals as evidence and documentation of efforts that have been made to contact LOSB's for participation as subcontractors, joint venture partners or suppliers of goods and services. Contractors are required to contact LOSB's and solicit quotes for goods and services. All responses to the Contractor's solicitation should be recorded and reported.

- **LOSB Form B -- LOSB Utilization Plan**

A Contractor is required to submit **LOSB Form "B"** with its Proposal in order to identify all LOSB's they propose to utilize in providing the goods and services included in the Proposal. Contractors may only include a proposed provider of goods or services on

LOS B Form “B”, if the entity is a legitimate LOSB. Additionally, if such entity will provide services, Contractors may only list LOSB’s on **LOS B Form “B”** if the entity will perform a Commercially Useful Function. The Successful Contractor will be required to finalize and submit **LOS B Form “B”** prior to award of a contract. **LOS B Form “B”** will be incorporated into the contract and will become a contractual obligation of the Successful Contractor. **LOS B Form “B”** shall not be changed or altered after award of a contract without approval from Shelby County. The Contractor is required to provide written notice describing the reasons for any proposed change to Shelby County and to obtain approval from Shelby County of any changes to **LOS B Form “B”**.

- **LOS B Form C** –Statement of Intent to Perform as a Subcontractor or Provide Supplies or Services

Contractors are required to have each subcontracted LOSB providing services complete **LOS B Form “C”** certifying that it is performing the work and that it is a Commercially Useful Function.

- **LOS B Form D** – Statement of Payments to LOSB’s

Contractors are required to record and maintain information regarding the utilization of LOSB’s and all other information during the performance of awarded contracts. This information shall be recorded and maintained on **LOS B Form “D”**. The form is required to be submitted to Shelby County each month. **LOS B Form “D”** must be completed in its entirety with information regarding the types of goods purchased from LOSB’s or the types of services rendered by LOSB’s and dollars amounts paid for their goods or services.

**Shelby County
 LOSB Program**

LOS B FORM A

CERTIFICATION OF EFFORTS TO ACHIEVE LOSB PARTICIPATION

(To Be Submitted with the Bid/Proposal)

Company Name: _____

Bid No.: _____

I certify that the following efforts were made to achieve LOSB participation:

		YES	NO
A	Provided written notices to LOSB's who have the capability to perform the work of the contract or provide the service		
B	Direct mailing, electronic mailing, facsimile or telephone requests		
C	Provided interested LOSB's with adequate information about plans, requirements and specifications of the contract in a timely manner to assist them in responding to a solicitation		
D	Allowed LOSB's the opportunity to review bid specifications, blue prints and all other bid/RFP related items at no charge, and allowed sufficient time for review prior to the bid deadline		
E	Acted in good faith with interested LOSB's, and did not reject LOSB's as unqualified or unacceptable without sound reasons based on a thorough investigation of their capabilities		
F	Did not impose unrealistic conditions of performance on LOSB's seeking subcontracting opportunities		

Additionally, I contacted the referenced LOSB's and requested a bid/proposal. The responses I received were as follows:

Name and Address of LOSB	Type of Work And Contract Items, Supplies or Services to be Performed	Response	Reason for Not Accepting Bid/Proposal

(If additional space is required this form maybe duplicated)

If applicable, please complete the following:

I hereby certify that LOSB's were "Unavailable" as defined in the LOSB Program to submit bids to provide goods and services for this RFP/Bid's purpose.

Reasons for the "Unavailability":

Submitted by:

 Authorized Representative Signature

 Title

 Date

**Shelby County
 LOSB Program
LOS B FORM B**

LOS B UTILIZATION PLAN
 (To Be Submitted with the Bid/Proposal)

Company: _____
Bid No.: _____

I, _____, do certify that on the following procurement opportunity,

(Contractor)

_____, the following LOSB's will be utilized as sub-contractors, suppliers,

(Opportunity)

or to provide professional services:

Name	Description of Work	Contract Value	LOS B Number

(If additional space is needed this form may be duplicated)

TOTAL CONTRACT VALUE: _____

TOTAL % OF LOSB PARTICIPATION: _____

The successful bidder/proposer is required to finalize and submit this form prior to award of a contract. Joint Venture Agreements, partnering agreements and all pertinent information must be presented prior to contract award. This information will be incorporated into the contract and will become a contractual obligation of the successful bidder/proposer. The finalized LOSB Form B shall not be changed or altered after award of a contract without approval from Shelby County. The successful bidder/proposer is required to provide written notice describing the reasons for the change to Shelby County to obtain approval of any changes to LOSB Form B.

Submitted by:

 Authorized Representative Signature

Title

Date

**Shelby County
LOS B Program**

LOS B FORM C

**STATEMENT OF INTENT TO PERFORM AS A SUBCONTRACTOR OR
PROVIDE SUPPLIES OR SERVICES**

(To Be Submitted Prior to Contract Award)

Company Name: _____

Bid No.: _____

I, _____, intend to provide supplies or services in connection with the
(Subcontractor/Provider)
above **bid/proposal** request as a LOSB.

I am prepared to perform a “**Commercially Useful Function**” in connection with the above project.

The following are the work items to be performed:

at the following price: \$_____.

If applicable, please complete the following:

I have or will enter into a formal agreement with _____ for the above-
(Company)
described scope of work, supplies or services conditioned upon the execution of a contract
with Shelby County.

I hereby certify that this statement is true and correct:

Business Information: Submitted by:

Business: _____
Authorized Representative (Print)

Address: _____
Title

Authorized Representative's Signature

Phone: _____
Date

Facsimile: _____

**Shelby County
 LOSB Program**

LOS B FORM D

STATEMENT OF PAYMENTS TO LOSB'S
 (To Be Submitted Monthly and with Final Payment Request)

Company Name: _____

Name/Contract No.: _____

Payment Request Number: _____

Name of Firm	Description of work	Total Amount Due This Month	Total Dollars Paid To Date	% of Contract Completed	Start Date of Contract	End Date of Contract

(If additional space is needed this form may be duplicated)

I hereby certify that this statement is true and that above payments have been made.

Business Information:

Submitted by:

Business: _____

Address: _____

Authorized Representative (Print)

Title

Phone: _____

Authorized Representative's Signature

Facsimile: _____

Date

**LOCALLY OWNED SMALL BUSINESS PURCHASING PROGRAM
RULES AND REGULATIONS:**

(i) The Administrator of Purchasing in conjunction with the Administrator of EOC shall identify certain goods and services required by the County to be set aside for special purchasing procedures for locally owned small businesses.

(ii) Only certified locally owned small businesses will be allowed to submit competitive bids on the goods or services identified under paragraph (i) above.

(iii) The Administrator of Purchasing shall, in conjunction with the Administrator of EOC, annually review the Shelby County Capital Improvement Program to determine those projects with a construction cost of \$250,000 or more. Contracts amounting to at least ten (10%) of the construction costs of such project shall be awarded to locally owned small businesses as defined herein, except as set forth in sub-paragraph (vi) of this section, either as part of the conditions of the solicitation for general contractors bidding on these projects, or as separate bids issued by the County for subcontracts that may be assigned to general contractors.

(iv) After adhering to all other bidding and purchasing requirements of the County, not inconsistent with this part, if no bids are received from locally owned small businesses, then the County may solicit bids for the goods or services from all other sources.

(v) On all purchases and/or contracts entered into by the County, the Purchasing Administrator or his or her designee shall have the right to negotiate with any supplier of goods or services to the County for the inclusion of locally owned small business subcontractors and/or suppliers in the contract award.

(vi) Failure by a supplier or contractor to include locally owned small business sub-contractors or suppliers in its bid or contract may be grounds for rejection of said bid or contract unless the supplier or contractor can show documented evidence of good cause why none were included.

(vii) Any locally owned small business awarded a contract or purchase order under this section shall not sublet, subcontract or assign any work or services awarded to it without the prior written consent of the Mayor or the Purchasing Administrator.

(viii) As to those purchases below the requirement for a formal bid solicitation (currently, under \$15,000) and not included in the locally owned small business set aside, the Administrator of Purchasing shall determine if any locally owned small business offers that product or service. If so, at least one such eligible locally owned small business should be included in the vendors

contacted for an opportunity to bid, and the Administrator of Purchasing may, at his discretion, designate in a purchase order the purchase of such goods and services from the identified locally owned small business.

(ix) In those situations where a locally owned small business as defined herein, engages in open competitive bidding for County contracts, the Administrator of Purchasing shall provide for a preference for the locally owned small business where responsibility and quality are equal. Said preferences shall not exceed five percent (5%) of the lowest possible bidder meeting specifications. The preference shall be applied on a sliding scale in the following manner:

a. A preference of up to five percent (5%) shall be allowed for contracts up to \$500,000.00;

b. A preference of up to three and five-tenths percent (3.5%) shall be allowed for contracts up to \$750,000.00;

c. A preference of two and one-half percent (2.5%) shall be allowed for contracts up to \$1,000,000.00;

d. A preference of two percent (2%) shall be allowed for contracts that exceed \$1,000,000.00.

(x) For construction contracts over \$2,000,000.00, the Administrator of Purchasing shall provide for a preference of two percent (2%) to general contractors meeting the requirements of Section 1, Subparagraph B, if fifty percent (50%) or more of the total work comprising the bid has been or will be awarded to certified locally owned small businesses. The fifty percent subcontracting threshold must be met prior to contract execution.

(xi) The Administrator of Purchasing may divide a single bid package for any purchase of goods and services into two or more smaller bid packages in any case that the Administrator of Purchasing reasonably believes that the smaller bid packages will result in a greater number of bids by locally owned small businesses.

(xii) The Administrator of Purchasing, upon approval of the County Mayor, may establish special insurance and bonding requirements for certified locally owned small businesses so long as they are not in conflict with the laws of the State of Tennessee.

(xiii) The Administrator of Purchasing, with the approval of the County Mayor, shall adopt and promulgate, and may from time to time, amend rules and regulations not inconsistent with the provisions of this ordinance, governing the purchase of goods and services from locally owned small business concerns to effectuate and implement the Locally Owned Small Business

Purchasing Program within the intent of this ordinance.

(xiv) The Administrator of EOC shall, in conjunction with the Administrator of Purchasing, provide a written quarterly report to the Mayor and Board of Commissioners which shall include a summary of the purchases selected for this program, a listing of the contracts awarded to locally owned small businesses for the period, and the dollar amounts of each such contract, and the percentage which such contracts bear to the total amount of purchases for the period.

H.

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with _____ County government to provide construction services, here states under oath as follows:

1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the *Tennessee Code Annotated*.
3. The Company is in compliance with T.C.A. § 50-9-113. Further affiant saith not.

Principal Officer

STATE OF _____

COUNTY OF _____

Before me personally appeared _____ with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____ 20

Notary Public

My commission expires:

I. FORMS TO BE SUBMITTED

LOSB FORM A: MUST BE COMPLETED AND SUBMITTED IN YOUR BID ENVELOPE

LOSB FORM B: MUST BE COMPLETED, SUBMITTED WITH YOUR BID DOCUMENTING ALL LOSB'S TO BE UTILIZED, THE PERCENTAGE OF UTILIZATION AND THE INTENDED SCOPE OF THE WORK.

LOSB FORM C- MUST BE COMPLETED AND SUBMITTED BY EACH LOSB PROVIDING SUBCONTRACTED GOODS AND OR SERVICES CERTIFYING THAT THEY ARE PERFORMING THE WORK AND THAT IT IS A COMMERCIALY USEFUL FUNCTION.

LOSB FORM D-MUST BE COMPLETED AND SUBMITTED BY THE SUCCESSFUL CONTRACTOR EACH MONTH CERTIFYING ALL PAYMENTS MADE TO LOSB'S.

DRUG FREE WORKPLACE AFFIDAVIT-MUST IS COMPLETED AND SUBMITTED WITH YOUR BID.

BID BOND- ALL BIDS MUST BE ACCOMPANIED BY A BANK CERTIFIED CHECK OF BANK DRAFT, LETTER OF CREDIT ISSUED BY ANY NATIONAL BANK OR APPROVED BID BOND FOR NOT LESS THAN 5% (PERCENT) OF THE AMOUNT OF THE BID. ALL PROPOSAL GUARANTEES SHALL BE MADE OUT TO THE COUNTY OF SHELBY.

NOTE: LOSB FORM C AND D WILL BE SUBMITTED BY THE SUCCESSFUL CONTRACTOR.

FAILURE TO SUBMIT THE REQUIRED FORMS MAY RESULT IN YOUR BID BEING REJECTED AS BEING IN NON-COMPLIANCE WITH BID REQUIREMENTS.

VII. GENERAL REQUIREMENTS

A. Scope of Contract

The County wishes to engage in a contractual relationship with the lowest responsive Contractor selected through a low bid process.

B. Time Frame

The successful Contractor will complete all obligations and conditions included in this RFP to be eligible provide these services within ten (10) business days of receipt of the Notice of Award. Failure to complete these obligations and conditions and formalize the contractual agreement will result in cancellation of the award.

C. Reservation of Rights

The County reserves the right, for any reason to accept or reject any one or more proposals, to modify any part of the RFP, or to issue a new RFP.

VIII. AWARD OF CONTRACT

Proposers are advised that the lowest responsive proposal will be awarded the contract.

IX. GRATUITY DISCLOSURE FORM

INSTRUCTIONS: This form is for all persons receiving any Shelby County Government contract, land use approval or financial grant money to report any gratuity that has been given, directly or indirectly, to any elected official, employee or appointee (including their spouses and immediate family members) who is involved in the decision regarding the contract, land use approval, or financial grant of money. Please note that the information listed on this statement is subject to being posted on the Shelby County Government’s website.

1. NAME

2. DATE OF GRATUITY

3. NATURE AND PURPOSE OF THE GRATUITY

4. NAME OF THE OFFICIAL, EMPLOYEE, APPOINTEE, OR FAMILY MEMBER WHO RECEIVED THE GRATUITY

5. NAME OF THE PERSON OR ENTITY THAT PROVIDED THE GRATUITY

6. ADDRESS OF THE PERSON OR ENTITY THAT PROVIDED THE GRATUITY

7. DESCRIPTION OF THE GRATUITY

8. COST OF THE GRATUITY (If cost is unknown and not reasonably discernible by the person giving the gratuity, then the person giving the gratuity shall report a good faith estimate of the cost of the gratuity.)

9. AFFIDAVIT

The information contained in this Gratuity Disclosure Form, and any supporting documentation or materials referenced herein or submitted herewith, is true and correct to the best of my knowledge, information and belief and affirm that I have not given, directly or indirectly, any gratuity to any elected official, employee or appointee (including spouse and immediate family members) that has not been disclosed and I affirm that I have not violated the provisions of the Shelby County Government Code of Ethics.

Signature

Date

Print Name

Sworn to and subscribed before me this _____ day of _____ in _____ County, Tennessee:

Signature of Notary

Affix Notary Seal Here

Notary Registration No.

X. NOTICE TO BIDDERS

1. **THIS IS NOT A PUBLIC BID OPENINGS:**
Sealed bids for the improvements described herein will be received at, **THE OFFICE OF THE SHELBY COUNTY ADMINISTRATOR OF PURCHASING, SUITE 900, SHELBY COUNTY ADMINISTRATION BUILDING, 160 NORTH MAIN, MEMPHIS, TENNESSEE 38103, until WEDNESDAY, AUGUST 13, 2014 at 4:00 P.M.**

2. Description of Work:
 - (a) The proposed work is officially known as: **FURNISH AND INSTALL EMERGENCY GENERATOR, PHASE 2, SHELBY COUNTY CRIMINAL JUSTICE COMPLEX**

3. Pre-Bid Meeting:

All interested bidders must attend a mandatory pre-bid meeting to be held on **Thursday, July 31, 2014 @ 9:00 A.M. at Shelby County Criminal Justice Complex, Auditorium, 201 Poplar Avenue , Memphis, Tennessee 38103.**

4. Instruction to Bidders:
 - (a) Information regarding this RFP is located on the County's website at www.shelbycountyttn.gov. At the top of the home page, click on the links "Department," "P" for the Purchasing Department and "Bids" to locate the name of the above-described RFP. Copies of the project manual and drawing are posted at this location and can be downloaded at no cost to prospective bidders
 - (b) All bids must be accompanied by a bank cashier's check or bank draft, letter of credit issued by any national bank or certificate of deposit therein, duly assigned, or certified check or approved bid bond for not less than (5) percent of the amount of the bid. All proposal guarantees shall be made out to the COUNTY OF SHELBY.
 - (c) The successful bidder must be licensed by the Tennessee State Board of Licensing General Contractors before execution of the contract. Evidence of this license must be submitted to the purchasing department by submitting the RFP number, Contractor's name, license number, expiration date thereof, and license classification of the contractor(s) bidding for the prime contract and for the electrical, plumbing, heating, ventilation and air conditioning subcontracts in accordance with TCA 62-6-119. Lacking all of this information, the bid shall be rejected and the bid bond will be forfeited.

5. EOC Requirements

- (a) As a condition precedent to bidding, **Prime Contractors** and **LOSB Contractors** must have received a current “Equal Opportunity Compliance Eligibility Number” and Vendors Number prior to the submission of their bid which must be attached to each bid submission. To receive an E.O.C. Eligibility Number, specific information must be received by the E.O.C. Department at least 48 hours prior to the bid opening. To verify your E.O.C. Number or to receive information for obtaining a number, contact the E.O.C. Department, 222-1100. Information regarding a vendors number please contact Nelson Fowler, Shelby County Purchasing at 901-222-2250.
- (b) Use of Locally Owned Small Business (LOSB) participation on this County project is required.
- (c) Bidders are encouraged to contact County-Certified LOSB firms from our LOSB listing that can be obtained from our EOC department. Please call Carolyn Griffin at 901-222-1100 for a listing of current LOSB contractors. Bidders may also provide the names of firms they believe would qualify as LOSB firms, by notifying the E.O.C. Department and filing the required forms at least five (5) working days prior to the bid opening. Bidders choosing to utilize non-certified subcontractors may submit their bid with the understanding that they must provide certification documents to the E.O.C. department within five (5) days after the bid opening in order to be considered for contract award.
- (d) A Locally Owned Small Business is defined as a sole proprietorship, corporation, partnership, or joint venture located within Shelby County and at least 51% owned, operated and managed by a Shelby County resident and having an average annual sale of \$5,000,000.00 or less over the past three (3) years.

6. Rejection of Bids:

The COUNTY OF SHELBY reserves the right to reject any and all proposals and to waive technicalities in any proposal.

BY ORDER OF:

CLIFTON DAVIS

PURCHASING ADMINISTRATOR
SHELBY COUNTY GOVERNMENT

_____, 2014

**FURNISH AND INSTALL EMERGENCY GENERATOR
SHELBY COUNTY CRIMINAL JUSTICE CENTER COMPLEX
201 POPLAR AVE.
MEMPHIS, TN 38103**

RFP 14-011-23

(Submit As Your Bid)

In compliance with your Invitation for Bids for:

Furnish and Install Emergency Generator, Shelby County Criminal Justice Complex, 201 Poplar Ave.

Project Location: 201 Poplar Ave
 Memphis, TN 38103

The undersigned bidder: (Check one)

- A corporation organized and existing under Tennessee laws:
- A partnership consisting of _____;
- An individual trading as _____;

of the city of _____ having examined the attached Contract Documents and being fully advised as to the extent and character of the work to be performed, and the equipment to be furnished, proposes to furnish and pay for all labor, tools, material, utility fees, federal, state and local taxes and equipment necessary for implementation of the contract requirements.

The bid amounts shall incorporate an allowance for unidentified work as a contingency. Contingency funds may only be applied toward work that is not identified by the contract documents and is approved by the Owner. Any unused funds will be deducted from the contract by deductive change order at contract close-out. The following contingency amounts are incorporated in the Bid amounts:

Bid Package #1 = \$10,000.00 contingency

Bid Package #2 = \$30,000.00 contingency

The undersigned further proposes to perform all work and furnish and pay for all equipment in accordance with the Project Manual and Contract stipulations thereof, with the limit specified, for the following lump sum price if any or all are awarded by the Owner: Enter "NO BID" if you are not offering a Bid on a specific package(s).

Base-Bid Amount – Phase 1

in figures \$ _____

in words _____

Additive Alternate No. 1 – Bid Amount – Phase 2 and 3

in figures \$ _____

in words _____

**FURNISH AND INSTALL EMERGENCY GENERATOR
SHELBY COUNTY CRIMINAL JUSTICE CENTER COMPLEX
201 POPLAR AVE.
MEMPHIS, TN 38103**

The Bidder agrees that if he is awarded this Contract, he will commence construction within 14 calendar days after receipt of signed contract and will be substantially complete with all work under phase 1 and two this project in 72 weeks from the date that a Notice To Proceed is issued. Additionally the following milestone dates are established and liquidated damages are applied to any milestone date that is not met by the following weeks after a notice to proceed is issued. Milestone dates after the date notice to proceed is issued:

Phase 1 complete.....36 Weeks
Phase 2 complete.....36 Weeks

The Bidder agrees that all request for extensions of time shall be in writing and that only such extensions of time as are granted by the Owner in writing shall be considered in computing that total Contract time. Owner furnished equipment will be available to the Contractor when the notice to proceed is issued.

Should the Contractor neglect, refuse, or fail to complete the work to be done under the Contract within the time herein specified, after all extension of time granted by the Owner have been added, then in that event the Owner shall have and is hereby given the right to deduct and retain out of such monies which may then be due, or which may become due and payable to the Contractor for the work to be done under this Contract, an agreed upon sum equal to Three Hundred Dollars (\$300.00) per calendar day for each and every day that the work is delayed in its completion beyond the specified milestone and substantial completion time. The said \$300.00 per day shall be held by the Owner under a mutual understanding between the Contractor, Contractor's Surety and the Owner. If necessary the Owner shall collect any monies directly from the Contractor or the Contractor's Surety.

Enclosed herewith is a (Certified Check) (Cashier's Check) or a solvent bank (Bidder's Bond) in the amount of _____ DOLLARS (\$_____), Made payable to the Owner as a guarantee of good faith and which the undersigned hereby agrees shall be retained as liquidated damages by the Owner should the Contractor fail to furnish a Performance Bond written by good solvent in a surety company doing business in the State of Tennessee and acceptable to the Owner. The Performance Bond shall be in a amount equal to the gross amount of said Contract, and the Performance Bond shall be made and contract shall be signed within 1 week after date of Notice To Proceed from the Owner of award of Contract, and the check shall be returned to the undersigned upon the signing of the Contract and delivery of the required number of copies of approved Performance Bond to the Owner.

In submitting this bid, it is understood that the right is reserved by the Owner to reject any and all bids and it is understood that this bid may not be withdrawn for a period of 120 days after the scheduled time for receipt of bids.

The undersigned declares that _____ is the only person, firm or corporation interested in this proposal, and that no other person, firm, or corporation than the one herein named has any interest herein or in the Contract proposed to be taken; that it is made without any connection with any person, firm or corporation making proposal for the same work, and that it is in all respects fair as to the work bid upon and without collusion or fraud; also that no officer or employee of Shelby County Government who is exclude by law from participating therein, is directly or indirectly interested

**FURNISH AND INSTALL EMERGENCY GENERATOR
SHELBY COUNTY CRIMINAL JUSTICE CENTER COMPLEX
201 POPLAR AVE.
MEMPHIS, TN 38103**

herein, or in furnishing of the supplies or doing the work to which it relates, or in furnishing surety, or in any portion of the profits thereof.

Receipt of the following addenda is hereby acknowledged: _____.
(Insert numbers of all addenda received; if no addenda received, insert "None").

Bidder _____
Signature _____ Printed Name _____

Business Address

Full name and residence of all persons interested in the foregoing as principle are:

(Name) _____ (Address)

(Name) _____ (Address)

(Name of President if a Corporation) _____ (Name of Secretary if a Corporation)

END OF SECTION

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we

(Here insert full name and address or legal title of Contractor>

as Principal, hereinafter called the Principal, and

(Here insert full name and address or legal title of Surety>

a corporation duly organized under the laws of the State of
as Surety, hereinafter called the Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called the Obligee, in the sum of

Dollars (\$ _____),

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

(Here insert full name, address and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this

day of

19

(Principal)

(Seal)

(Witness)

(Title)
(Surety)

(Seal)

(Witness)

(Title)

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Performance Bond



KNOW ALL MEN BY THESE PRESENTS: that

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Contractor, and,

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, in the amount of

Dollars (\$ _____),

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated _____
(Here insert full name, address and description of project)

19 _____ entered into a contract with Owner for

in accordance with Drawings and Specifications prepared by

(Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of

defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this

day of

20

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A311

Labor and Material Payment Bond

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS: that _____ (Here insert full name and address or legal title or contractor)

as Principal, hereinafter called Principal, and, _____ (Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto _____ (Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the

amount of _____ (Here insert a sum equal to at least one-half of the contract price)

Dollars (\$

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated _____ 19 _____ entered into a contract with Owner for _____ (Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by _____ (Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

LABOR AND MATERIAL PAYMENT BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimants work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial

Signed and sealed this

(Winc-s)
(Vvilms)

day of

accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

	19
<i>(Principal)</i>	
<i>(Tillt)</i>	
<i>(Surt'ty)</i>	
	(Seal)

THIS IS A DRAFT ONLY!! ORIGINAL DOCUMENTS IN EXECUTED FORM ARE REQUIRED PRIOR TO COUNTY SIGNATURE. IT IS A MANDATORY REQUIREMENT THAT ALL DOCUMENTS WHICH ARE REQUIRED TO BE ATTACHED TO THIS AGREEMENT BE ATTACHED BEFORE SUBMITTAL TO SHELBY COUNTY FOR SIGNATURE. IF NOT, THE AGREEMENT WILL BE RETURNED FOR COMPLETION.

COUNTY/CONTRACTOR AGREEMENT

OWNER: SHELBY COUNTY GOVERNMENT
160 N. MAIN ST.
MEMPHIS, TN 38103

CONTRACTOR:

**ARCHITECT\
ENGINEER:**

THIS CONTRACT made and entered into this _____ day of _____, 20__, by and between SHELBY COUNTY GOVERNMENT, through its governing body and authorized representative, party of the first part, hereinafter referred to as "COUNTY," and _____, party of the second part, hereinafter referred to as "CONTRACTOR."

WITNESSETH

WHEREAS, the COUNTY issued RFP No. _____ for _____, hereinafter in this Contract referred to as "PROJECT".

WHEREAS, the said CONTRACTOR submitted a bid/proposal in accordance with bid specifications, a copy of which is attached hereto as Exhibit "A" and incorporated herein by reference, which bid was accepted by COUNTY.

NOW, THEREFORE, CONTRACTOR agrees and undertakes to **(describe work to be done)** in accordance with the Bid Specifications which are on file in the Shelby County Purchasing Department and which are incorporated herein by reference, and at the price quoted for said PROJECT by CONTRACTOR. Further, the parties agree that they will be governed by the Shelby County General Conditions of the Contract for work to be performed. The Contractor acknowledges that it has read and is familiar with the contents of said General Conditions, agrees to be bound thereby and has executed a copy of same at the place indicated thereon. A copy of said General Conditions is attached hereto as Exhibit "B" and incorporated fully herein by reference.

SECTION 1. CONTRACTOR'S RESPONSIBILITIES

1. CONTRACTOR shall perform all necessary work required by the contract documents for the satisfactory completion in full of the PROJECT.
2. CONTRACTOR shall coordinate all work with COUNTY through _____. Work shall be scheduled on a regular basis in as timely and orderly a manner as possible.
3. The CONTRACTOR shall give a Performance Bond and Labor and Material Bond, each equal to 100% of the amount of the Contract, with surety to be approved by the COUNTY, conditioned upon the full and faithful performance of all the terms and conditions of the Contract with special reference to paying in full in lawful money of the United States, all just and valid claims for material and labor entered into for the said work covered by this Contract. That further, this Contract shall not take effect until these Bonds have been executed and approved by the County.
4. The CONTRACTOR further agrees to provide insurance coverage of the type and in the amounts as required in section III, Specific Provision, paragraph 31.
5. The COUNTY shall pay the CONTRACTOR for the performance of the Contract _____ (\$)Dollars, subject to additions and deductions as provided in the contract documents.

6. The CONTRACTOR shall execute the entire work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, within _____ (__) calendar days from the actual start date as specified in the written "Notice to Proceed."
7. All work by CONTRACTOR is to be performed in a manner satisfactory to COUNTY, and in accordance with the established customs, practices and procedures of COUNTY. CONTRACTOR is to periodically request sufficient conferences to insure that the work is being done by CONTRACTOR in a satisfactory manner in accordance with the wishes of COUNTY.

SECTION II. METHOD OF PAYMENT

1. CONTRACTOR shall provide an Application for Payment to be received by the Architect/Engineer not later than the 25th day of each month. COUNTY shall make payment to the CONTRACTOR not later than the 20th day of the following month. If an Application for Payment is received by the Architect/Engineer after the application date fixed above, payment shall be made by COUNTY not later than forty-five (45) days after receipt of the Application for Payment. If the CONTRACTOR submits an incorrect Application for Payment, payment date will be extended thirty (30) days from the date of correction.
2. Application for payment shall indicate the percentage of completion of each portion of the work as of the end of the period covered by the Application for Payment.
3. Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:
 - a. Take that portion of the contract sum properly allocable to completed work as determined by multiplying the percentage completion of each portion of the work by the total Contract Sum less retainage of five (5%) percent;
 - b. Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by COUNTY, suitably stored off the site at a location agreed upon in writing), less retainage of five (5%) percent;

- c. Subtract the aggregate of previous payments made by the COUNTY; and
 - d. Subtract amounts, if any, for which the Architect/Engineer has withheld or nullified a Certificate of Payment as provided in the General Conditions to Construction Contracts.
4. When all work embraced in this Contract has been fully and completely performed on the part of the CONTRACTOR, and accepted by the COUNTY, there shall be a statement by CONTRACTOR of the work done according to the terms herein, and the balance appearing to be due the CONTRACTOR out of funds applicable for payment for this work, excepting there from any sum that may be lawfully retained under the provisions of this Contract, Specifications, and General Conditions to Construction Contracts and all such funds as may be due the COUNTY.
 5. The COUNTY shall have the right, at its option, to discharge the CONTRACTOR for any breach of any provision of this Contract, and such discharge shall not affect the right of the COUNTY against sureties on the Bonds provided.
 6. It is further mutually agreed between the parties hereto that if at any time after the execution of this Contract and the Surety Bonds attached hereto for its faithful performance, the COUNTY shall deem the surety or sureties upon such bond inadequate to cover the performance of the work, the CONTRACTOR shall, at its expense, within five (5) days after the receipt of notice from the COUNTY so to do, furnish as additional bond or bonds, in satisfactory amount to the COUNTY. In such event, no further payment to the CONTRACTOR shall be deemed due under this Contract until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the COUNTY.
 7. CONTRACTOR further agrees to provide COUNTY an amount equal to _____ (\$) Dollars per day for liquidated damages for each consecutive calendar day required for the completion of the contract beyond the time stipulated. **(NOTE: If this paragraph is inapplicable, then N/A [not applicable] should be inserted in the applicable space.)**
 8. Other contract provisions, including but not limited to

insurance provisions may be required to enter into a contract with Shelby County Government.

SECTION III. SPECIFIC PROVISIONS

The parties further agree as follows:

1. CONTROL

All Services by the CONTRACTOR will be performed in a manner satisfactory to the COUNTY, and in accordance with the generally accepted business practices and procedures of the COUNTY.

2. CONTRACTOR'S PERSONNEL

The CONTRACTOR certifies that it presently has adequate qualified personnel to perform all Services required under this Contract. All work performed during the Term of this Contract will be supervised by the CONTRACTOR. The CONTRACTOR further certifies that all of its employees assigned to serve the COUNTY have such knowledge and experience as required to perform the duties assigned to them. Any employee of the CONTRACTOR who, in the opinion of the COUNTY, is incompetent, or whose conduct becomes detrimental to the work, shall immediately be removed from association with the Services under this Contract.

3. INDEPENDENT STATUS

a. Nothing in this Contract shall be deemed to represent that the CONTRACTOR, or any of the Contractor's employees or agents, are the agents, representatives, or employees of the COUNTY. The CONTRACTOR will be an independent CONTRACTOR over the details and means for performing the Services under this Contract. Anything in this Contract which may appear to give the COUNTY the right to direct the CONTRACTOR as to the details of the performance of the Services under this Contract or to exercise a measure of control over the CONTRACTOR is solely for purposes of compliance with local, state and federal regulations and means that the CONTRACTOR will follow the desires of the COUNTY only as to the intended results of the scope of this Contract.

- b. It is further expressly agreed and understood by CONTRACTOR that neither it nor its employees or agents are entitled to any benefits which normally accrue to employees of the COUNTY; that CONTRACTOR has been retained by the COUNTY to perform the Services specified herein (not hired) and that the remuneration specified herein is considered fees for the Services performed (not wages) and that invoices submitted to the COUNTY by CONTRACTOR for the Services performed shall be on the Contractor's letterhead.

4. REPORTS

CONTRACTOR shall prepare and submit quarterly reports of its activities, funded under this Contract, to the originating department and the Contract Administration Department of the COUNTY. The reports shall include an itemization of the use of County's funds, inclusive of specific Services delivered. Any such reports provided to the COUNTY shall be prepared with the understanding that the COUNTY may make such reports available to the public. The quarterly reports and all books of account and financial records that are specific to the work performed in accordance with this Contract may be subject to audit by the Director of the Division of Administration and Finance of the COUNTY. The COUNTY shall have the right to withhold future disbursement of funds under this Contract and any future Contracts until this provision has been met.

5. TERMINATION OR ABANDONMENT

- a. It shall be cause for the immediate termination of this Contract if, after its execution, the COUNTY determines that:
 - i) Either the CONTRACTOR or any of its principals, partners or corporate officers, if a corporation, including the corporation itself, has plead nolo contendere, or has plead or been found guilty of a criminal violation, whether state or federal, involving, but not limited to, governmental sales or purchases, including but not limited to the rigging of bids, price fixing, or any other collusive and illegal activity pertaining to bidding and governmental contracting; or
 - ii) CONTRACTOR has subcontracted, assigned, delegated, transferred its rights, obligations or interests

under this Contract without the County's consent or approval; or

iii) CONTRACTOR has filed bankruptcy, become insolvent or made an assignment for the benefit of creditors, or a receiver, or similar officer has been appointed to take charge of all or part of CONTRACTOR assets.

b. The COUNTY may terminate the Contract upon five (5) days written notice by the COUNTY or its authorized agent to the CONTRACTOR for Contractor's failure to provide the Services specified under this Contract.

c. This Contract may be terminated by either party by giving thirty (30) days written notice to the other, before the effective date of termination (the "Termination Date"). In the event of such termination, the CONTRACTOR shall be paid for all Services rendered prior to the Termination Date, provided the CONTRACTOR shall have delivered to COUNTY such statements, accounts, reports and other materials as required under this Contract; however, CONTRACTOR shall not be compensated for any anticipatory profits that have not been earned as of the date of the Termination Date. All Services completed by CONTRACTOR prior to the Termination Date shall be documented and tangible work documents shall be transferred to and become the sole property of the COUNTY prior to payment for the Services rendered.

d. Notwithstanding the above or any section herein to the contrary, CONTRACTOR shall not be relieved of liability to the COUNTY for damages sustained by the COUNTY by virtue of any breach of the Contract by CONTRACTOR and the COUNTY may withhold any payments to CONTRACTOR for the purpose of setoff until such time as the exact amount of damages due the COUNTY from CONTRACTOR is determined.

6. COMPENSATION FOR CORRECTIONS

No compensation shall be due or payable to CONTRACTOR pursuant to this Contract for any Contractor's Services performed by the CONTRACTOR in connection with effecting of corrections to the design of the Services, when such corrections are required as a direct result of negligence by the CONTRACTOR to properly fulfill any of his obligations as set forth in this Contract.

7. SUBCONTRACTING, ASSIGNMENT OR TRANSFER

- a. Any subcontracting, assignment, delegation or transfer of all or part of the rights, responsibilities, or interest of either party to this Contract is prohibited unless by written consent of the other party. No subcontracting, assignment, delegation or transfer shall relieve the CONTRACTOR from performance of the Services under this Contract. The COUNTY shall not be responsible for the fulfillment of the Contractor's obligations to its transferors or subcontractors.
- b. Upon the request of the other party, the subcontracting, assigning, delegating or transferring party shall provide all documents evidencing the subcontract, assignment, delegation or transfer.

8. CONFLICT OF INTEREST

The CONTRACTOR covenants that it has no public or private interest, and will not acquire directly or indirectly any interest, which would conflict in any manner with the performance of the Services. The CONTRACTOR warrants that no part of the total Contract Fee shall be paid directly or indirectly to any officer or employee of the COUNTY as wages, compensation, or gifts in exchange for acting as officer, agent, employee, subcontractor or consultant to the CONTRACTOR in connection with any work contemplated or performed relative to this Contract.

9. CONTINGENT FEES

The CONTRACTOR warrants that it has not employed or retained any company or person other than a bona fide employee working solely for the CONTRACTOR, to solicit or secure this Contract, and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for the CONTRACTOR any fee, commission, percentage, brokerage fee, gift, or any other consideration contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, the COUNTY will have the right to recover the full amount of such fee, commission, percentage, brokerage fee, gift, or other consideration.

10. EMPLOYMENT OF COUNTY WORKERS

The CONTRACTOR will not engage, on a full, part-time, or any other basis during the Term of the Contract, any professional or technical personnel who are or have been at any time during

the Term of the Contract in the employ of the COUNTY.

11. ACCESS TO RECORDS

During all phases of the work and Services to be provided hereunder, CONTRACTOR agrees to permit duly authorized agents and employees of the COUNTY to enter Contractor's offices for the purpose of inspections, reviews, and audits during normal working hours. Reviews may also be accomplished at meetings that are arranged at mutually agreeable times and places. The CONTRACTOR will maintain all books, documents, papers, accounting records, and other evidence pertaining to the Fee paid under this Contract and make such materials available at their offices at all reasonable times during the Term of this Contract and for three (3) years from the date of payment under this Contract for inspection by the COUNTY or by any other governmental entity or agency participating in the funding of this Contract, or any authorized agents thereof. Copies of said records shall be furnished to the COUNTY upon request.

12. ARBITRATION

Any dispute concerning a question of fact in connection with the work not disposed of by agreement between the CONTRACTOR and the COUNTY will be referred to the Shelby County Contract Administrator or its duly authorized representative, whose decision regarding same will be final.

13. RESPONSIBILITIES FOR CLAIMS AND LIABILITIES

a. CONTRACTOR shall indemnify, defend, save and hold harmless the COUNTY, and its elected officials, officers, employees, agents, assigns, and instrumentalities from and against any and all claims, liability, losses or damages—including but not limited to Title VII and 42 USC 1983 prohibited acts—arising out of or resulting from any conduct; whether actions or omissions; whether intentional, unintentional, or negligent; whether legal or illegal; or otherwise that occur in connection with or in breach of this Contract or in the performance of the Services hereunder, whether performed by the CONTRACTOR its subcontractors, agents, employees or assigns. This indemnification shall survive the termination or conclusion of this Contract.

b. CONTRACTOR expressly understands and agrees that any insurance protection required by this Contract or

otherwise provided by the CONTRACTOR shall in no way limit the responsibility to indemnify, defend, save and hold harmless the COUNTY or its elected officials, officers, employees, agents, assigns, and instrumentalities as herein provided.

- c. The COUNTY has no obligation to provide legal counsel or defense to CONTRACTOR or its subcontractors in the event that a suit, claim or action of any character is brought by any person not a party to this agreement against CONTRACTOR as a result of or relating to performance of the Services under this Contract.
- d. Except as expressly provided herein, the COUNTY has no obligation for the payment of any judgment or the settlement of any claims against CONTRACTOR as a result of or relating to performance of the Services under this Contract.
- e. CONTRACTOR shall immediately notify the COUNTY of any claim or suit made or filed against CONTRACTOR or its subcontractors regarding any matter resulting from or relating to Contractor's performance of the Services under this Contract and will cooperate, assist and consult with the COUNTY in the defense or investigation thereof.

14. GENERAL COMPLIANCE WITH LAWS

- a. The CONTRACTOR certifies that it is qualified or will take steps necessary to qualify to do business in the State of Tennessee and that it will take such action as, from time to time, may be necessary to remain so qualified and it shall obtain, at its expense all licenses, permits, insurance, and governmental approvals, if any, necessary to the performance of the Services under this Contract.
- b. The CONTRACTOR is assumed to be familiar with and agrees that at all times it will observe and comply with all federal, state, and local laws, ordinances, and regulations in any manner affecting the performance of the Services. The preceding shall include, but is not limited to, compliance with all Equal Employment Opportunity laws, the Fair Labor Standards Act, Occupational Safety and Health Administration (OSHA) requirements, and the Americans with Disabilities Act (ADA).

- c. This Contract will be interpreted in accordance with the laws of the State of Tennessee. By execution of this Contract, the CONTRACTOR agrees that all actions, whether sounding in contract or in tort, relating to the validity, construction, interpretation and enforcement of this Contract will be instituted and litigated in the courts of the State of Tennessee, located in Shelby County, Tennessee, and in no other. In accordance herewith, the parties to this Contract submit to the jurisdiction of the courts of the State of Tennessee located in Shelby County, Tennessee.

15. NON-DISCRIMINATION

The CONTRACTOR hereby agrees, warrants, and assures compliance with the provisions of Title VI and VII of the Civil Rights Act of 1964 and all other federal statutory laws which provide in whole or in part that no person shall be excluded from participation or be denied benefits of or be otherwise subjected to discrimination in the performance of this Contract or in the employment practices of the CONTRACTOR on the grounds of handicap and/or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal, Tennessee State Constitutional or statutory law. The CONTRACTOR shall upon request show proof of such non-discrimination and shall post in conspicuous places available to all employees and applicants notices of non-discrimination.

16. ENTIRE AGREEMENT

This Contract represents the entire and integrated agreement between the parties and supersedes all prior negotiations, representations or agreements, whether oral or written.

17. AMENDMENT

This Contract may be modified or amended only by written instrument signed by both parties.

18. SEVERABILITY

If any provision of this Contract is held to be unlawful, invalid or unenforceable under any present or future laws, such provision shall be fully severable; and this Contract shall then be construed and enforced as if such unlawful, invalid or unenforceable provision had not been a part hereof. The remaining provisions of this Contract shall remain in full

force and effect and shall not be affected by such unlawful, invalid or unenforceable provision or by its severance here from. Furthermore, in lieu of such unlawful, invalid, or unenforceable provision, there shall be added automatically as a part of this Contract a legal, valid and enforceable provision as similar in terms to such unlawful, invalid or unenforceable provision as possible.

19. NO WAIVER OF CONTRACTUAL RIGHT

No waiver of any term, condition, default, or breach of this Contract, or of any document executed pursuant hereto, shall be effective unless in writing and executed by the party making such waiver; and no such waiver shall operate as a waiver of either (a) such term, condition, default, or breach on any other occasion or (b) any other term, condition, default, or breach of this Contract or of such document. No delay or failure to enforce any provision in this Contract or in any document executed pursuant hereto shall operate as a waiver of such provision or any other provision herein or in any document related hereto. The enforcement by any party of any right or remedy it may have under this Contract or applicable law shall not be deemed an election of remedies or otherwise prevent such party from enforcement of one or more other remedies at any time.

20. MATTER TO BE DISREGARDED

This title of the several sections, subsections, and paragraphs set forth in this Contract are inserted for convenience of reference only and shall be disregarded in construing or interpreting any of the provisions of this Contract.

21. SUBJECT TO FUNDING

This Contract is subject to annual appropriations of funds by the Shelby County Government. In the event sufficient funds for this Contract are not appropriated by Shelby County Government for any of its fiscal period during the Term hereof, then this Contract will be terminated. In the event of such termination, the CONTRACTOR shall be entitled to receive just and equitable compensation for any satisfactory work performed as of the Termination Date.

22. TRAVEL EXPENSES (If Applicable)

All travel expenses payable under this Contract shall be in

accordance with the County Travel Policy and Procedures. This includes advance written travel authorization, submission of travel claims, documentation requirements, and reimbursement rates. No travel advances will be made by the County.

23. PERFORMANCE AND LABOR AND MATERIALS BONDS

CONTRACTOR will provide COUNTY within ten (10) days from inception date of this Contract a Performance and Labor and Materials Bond each in the amount of 100% of the Contract price for each year that this contract is in effect. Said Bonds may be pro-rated for the initial year in the event that this period of time is less than a full twelve (12) month period.

24. NON-LIABILITY FOR CONTRACTOR EMPLOYEE TAXES

Neither CONTRACTOR nor its personnel are County's employees, and COUNTY shall not take any action or provide Contractor's personnel with any benefits and shall have no liability for the following:

- a. Withholding FICA (Social Security) from Contractor's payments;
- b. Making state or federal unemployment insurance contributions on behalf of CONTRACTOR or its personnel;
- c. Withholding state and federal income tax from payment to CONTRACTOR;
- d. Making disability insurance contributions on behalf of CONTRACTOR;
- e. Obtaining workers' compensation insurance on behalf of CONTRACTOR or Contractor's personnel.

25. INCORPORATION OF OTHER DOCUMENTS

- a. CONTRACTOR shall provide Services pursuant to this Contract in accordance with the terms and conditions set forth within the Shelby County Request for Proposals/Bids as well as the Response of CONTRACTOR thereto, all of which are maintained on file within the Shelby County Purchasing Department and incorporated herein by reference.
- b. It is understood and agreed between the parties that in

the event of a variance between the terms and conditions of this Contract and any amendment thereto and the terms and conditions contained either within the Request for Proposals/Bids or the Response thereto, the terms and conditions of this Contract as well as any amendment shall take precedence and control the relationship and understanding of the parties.

26. CONTRACTING WITH LOCALLY OWNED SMALL BUSINESSES

The CONTRACTOR shall take affirmative action to assure that Locally Owned Small Businesses that have been certified by the COUNTY are utilized when possible as sources of supplies and equipment, construction and services.

27. RIGHT TO REQUEST REMOVAL OF Contractor's EMPLOYEES

The COUNTY may interview the personnel CONTRACTOR assigns to County's work. COUNTY shall have the right, at any time, to request removal of any employee(s) of CONTRACTOR, whom COUNTY deems to be unsatisfactory for any reason. Upon such request, CONTRACTOR shall use all reasonable efforts to promptly replace such employee(s) with substitute employee(s) having appropriate skills and training.

28. INCORPORATION OF WHEREAS CLAUSES

The foregoing whereas clauses are hereby incorporated into this Contract and made a part hereof.

29. DISCLOSURE OF REPORTS, DATA OR OTHER INFORMATION

Notwithstanding anything to the contrary contained herein or within any other document supplied to COUNTY by CONTRACTOR, CONTRACTOR understands and acknowledges that COUNTY is a governmental entity subject to the laws of the State of Tennessee and that any reports, data or other information supplied to COUNTY by CONTRACTOR due to Services performed pursuant to this Contract is subject to being disclosed as a public record in accordance with the laws of the State of Tennessee.

30. ORGANIZATION STATUS AND AUTHORITY

a. CONTRACTOR represents and warrants that it is a corporation, limited liability company, partnership, or other entity duly organized, validly existing and in good standing under the laws of the state of Tennessee; it has

the power and authority to own its properties and assets and is duly qualified to carry on its business in every jurisdiction wherein such qualification is necessary.

- b. The execution, delivery and performance of this Contract by the CONTRACTOR has been duly authorized by all requisite action and will not violate any provision of law, any order of any court or other agency of government, the organizational documents of CONTRACTOR, any provision of any indenture, agreement or other instrument to which CONTRACTOR is a party, or by which Contractor's respective properties or assets are bound, or be in conflict with, result in a breach of, or constitute (with due notice or lapse of time or both) a default under any such indenture, agreement or other instrument, or result in the creation or imposition of any lien , charge or encumbrance of any nature whatsoever upon any of the properties or assets.

31. INSURANCE REQUIREMENTS

- a. The CONTRACTOR shall purchase and maintain, in a company or companies licensed to do business in the State of Tennessee, such insurance as will protect the County from claims which may arise out of or result from the Contractor's operations under the Contract, whether such operations are performed by himself or by any subcontractors or by anyone directly or indirectly employed by any of them, or by anyone for whose acts the CONTRACTOR or subcontractor may be liable.
- b. The insurance required shall be written for not less than any limits of liability specified or required by law, whichever is greater. Shelby County Government, its elected officials, appointees and employees will be named as additional insured. All policies will provide for thirty (30) days written notice to COUNTY of cancellation or material change in coverage provided. The Contractor shall immediately notify Shelby county Government, Contract Administration, 160 N. Main Street, Suite 550, Memphis, Tennessee of cancellation or changes in any of the insurance coverage required. The CONTRACTOR will maintain throughout the life of this Contract insurance, through insurers rated A- or better by A.M. Best, in the following minimum requirements:

- i) Commercial General Liability Insurance- \$1,000,000.00 limit per occurrence for bodily injury and property damage/\$1,000,000.00 personal and advertising injury/\$2,000,000.00 General Aggregate/\$2,000,000.00 Products-Completed Operations Aggregate. Shelby County Government, its elected officials, appointees, employees, volunteers, and members of boards, agencies, and commissions will be listed as additional insured regarding operations under this program. The insurance shall include coverage for the following:
 - a) Premises/Operations
 - b) Products/Completed Operations
 - c) Personal Injury
 - d) XCU coverage, where applicable
 - e) Contractual Liability
 - f) Independent Contractors
 - g) Broad Form Property Damage
 - h) When contract is awarded, the Contractor will be required to provide the County with a copy of the additional insured endorsement.

- ii) Business Automobile Liability Insurance - \$1,000,000.00 each accident for bodily injury and property damage. Coverage is to be provided on all:
 - a) Owned/Leased Autos
 - b) Non-owned Autos
 - c) Hired Autos

- iii) Workers Compensation and Employer's liability Insurance - All owners, sole proprietors, partners, and officers will elect to be covered by workers compensation coverage, regardless of requirement by Tennessee state status. Policy is to be specifically endorsed to include these individuals for coverage. Coverage is to include:
 - a. Employers Liability Coverage for \$1,000,000 per accident;
 - b. Employers Liability Disease each employee \$1,000,000; and
 - c. Employers Liability Disease Policy Limit \$1,000,000

Note: The Contractor's workers compensation policy will include the following endorsement: WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT: (form WC 00 03 13) A completed copy of this form will be included in documents provided to Shelby County Government by Provider's insurance company.

- iv) Builders Risk Insurance or Installation Floater (as applicable) for project. - All risk coverage in the amount of replacement cost of the structure/equipment, which is to be built or installed.

- c. CONTRACTOR shall provide County with a current copy of the Certificate of Insurance at the time of contracting and shall maintain said insurance during the entire Contract period as well as provide renewal copies on each anniversary date. The certificate holder is to read:

Shelby County Government
Purchasing Department
160 N. Main, Suite 550
Memphis, TN 38103

- d. Self insured retentions or deductibles of \$25,000 or over per loss or claims must be reviewed and agreed to by Shelby County Government prior to commencement of work under this program.

All policies will provide for 30 day written notice to Shelby County of cancellation of coverage provided. Ten (10) days notice applicable to non-payment of premium. If insurer is not required by the policy terms and conditions to provide written notice of cancellation to Shelby County, the Contractor//Contractor will provide immediate notice to Shelby County.

32. NOTICE

Any notices required or permitted to be given under the provisions of this Contract shall be effective only if in writing and delivered either in person to the County's authorized agent or by First Class or U.S. Mail to the addresses set forth in the Contract, or to such other person or address as either party may designate in writing and deliver as herein provided.

33. HIPAA (If applicable)

CONTRACTOR warrants to the COUNTY and State that it is familiar with the requirements of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and its accompanying regulations, and will comply with all applicable HIPAA requirements in the course of this Contract. CONTRACTOR warrants that it will cooperate with the COUNTY and State in the course of performance of the Contract so that all parties will be in compliance with HIPAA, including cooperation and coordination with COUNTY and State privacy officials and other compliance officers required by HIPAA and its regulations. CONTRACTOR will sign any documents that are reasonably necessary to keep the State and the COUNTY in compliance with HIPAA, including, but not limited to, business associate agreements.

It is agreed that the following documents are made a part of and incorporated fully into this construction Contract:

1. Performance Bond
2. Labor and Material Bond
3. Insurance Certificate
4. Bid Specifications (SB #_____, _____)
5. Contractor's Bid/Proposal (Exhibit "A")
6. General Conditions to Contract (Exhibit "B")
7. List of subcontractors who will be performing work on project with attached required information per Exhibit "C"

NOTE: THE ABOVE DOCUMENTS MUST BE ATTACHED BEFORE EXECUTION OF THIS AGREEMENT BY SHELBY COUNTY.

**SHELBY COUNTY GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION**

Rev. 5/24/99

constcnd.doc

**GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION**

**ARTICLE I
CONTRACT DOCUMENTS**

1.1 Definitions

1.1.1 The Contract Documents

The Contract Documents consist of the Owner-Contractor Agreement, the conditions of the Contract (General, Supplementary and other conditions), the Drawings, the Specifications, and all Addenda issued prior to and all modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Architect pursuant to Subparagraph 2.2.8, or (4) a written order for a minor change in the Work issued by the Architect pursuant to Paragraph 12.3. The Contract Documents include Bidding Documents such as the Advertisement or invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid, or portions of Addenda relating to any of these, and other documents specifically enumerated in the Owner-Contractor Agreement.

1.1.2 The Contract

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect and the Contractor, but the Architect shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Architect or any Subcontractor or sub-subcontractor.

1.1.3 The Work

The Work comprises the completed construction required by the contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

Initial _____

1.1.4 The Project

The Project is the total construction of which the Work performed under these Contract Documents may be the whole or a part.

1.2 Execution Correlation and Intent

1.2.1 The Contract Documents shall be signed in not less than four originals by the Owner and Contractor. If either Owner or Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Architect shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not specifically set forth in the Contract Documents will not be required unless it is consistent with work that is specifically set forth in the Contract Documents or is reasonably inferable from the Contract Documents as being necessary to produce the intended results. Words and abbreviations, which have well-known technical or trade meanings, are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections, and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Sub-contractors or in establishing the extent of Work to be performed by any trade.

1.3 Ownership and Use of Documents

1.3.1 All Drawings, Specifications, and copies thereof furnished by the Architect are the property of the Owner. They are to be used only with respect to this Project and are not to be used on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Architect on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's common law copyright or other reserved rights. The Architect will furnish, free of charge, to

Initial _____

the Contractor sufficient sets of Contract Documents to execute the Work not to exceed ten (10). The Contractor may purchase additional sets by paying reproduction costs.

ARTICLE II ARCHITECT

2.1 Definition

2.1.1 The Architect is the person lawfully licensed to practice Architecture, or any entity lawfully practicing Architecting identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect or his authorized representative.

2.2 Administration of the Contract

2.2.1 The Architect will provide administration of the Contract as hereinafter described.

2.2.2 The Architect will be the Owner's representative during construction and until final payment is due. The Architect will advise and consult with the Owner. The Owner's instructions to the Contractor shall be forwarded through the Architect. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument signed by the Owner.

2.2.3 The Architect will visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of his on-site observations as an Architect, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

2.2.4 The Architect will not be responsible for and will not have control or charge of construction means, methods, techniques or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

Initial _____

2.2.5 The Architect shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Architect may perform his functions under the contract documents.

2.2.6 Based on the Architects observations and an evaluation of the Contractor's Applications for Payment, the Architect will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts as provided in Paragraph 9.4.

2.2.7 The Architect will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon so as to cause no delay the Project. Either party to the Contract may make written request to the Architect for such interpretations.

2.2.8 All interpretations and decisions of the Architect shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings.

2.2.9 The Architects decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents. The Architect shall rule on all claims and disputes that relate to the interpretation of the Contract Documents.

2.2.10 The Architect will have authority to reject Work, which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.7.2 whether or not such Work is then fabricated, installed or completed. In the event the Architect determines that any Work deleted by the Contractor should have been performed by the Contractor under the Contract Documents, he shall issue a final determination that the Contractor shall proceed with the Work as directed by the Architect, and the Contractor shall proceed with the Work even if he is in disagreement with the decision of the Architect.

2.2.11 The Architect will review and approve or take other appropriate action under Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Architects approval of a specific item shall not indicate approval of an assembly of which the item is a component.

Initial _____

2.2.12 The Architect will prepare Change Orders in accordance with Article 12 and will have the authority to order minor changes in the Work as provided in Subparagraph 12.3.

2.2.13 The Architect will conduct inspections to determine the dates of Substantial Completion and completion will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a Final Certificate for Payment upon compliance with the requirements of Paragraph 9.8.

ARTICLE III
OWNER

3.1 **Definition**

3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner, or his authorized representative.

3.2 **Information and Services Required of the Owner**

3.2.1 The Owner or Architect shall furnish all surveys describing the physical characteristics, legal limitations, and utility locations for the site of the Project, and a legal description of the site.

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

3.2.3 Information or services under the Owner control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.4 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the Work.

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

Initial _____

3.3 Owner's Right to Stop the Work

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. Any such order to the Contractor shall be in writing.

3.4 Owner's Right to Carry Out the Work

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within two (2) days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedy it may have, make good and correct such deficiencies with its own forces or with the forces of another contractor. In such case, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect additional services made necessary by such default, neglect, or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

3.4.2 The Owner shall have access to the Project at all times.

ARTICLE IV **CONTRACTOR**

4.1 Definition

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 Review of Contract Documents

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect any error, inconsistency or omission he may discover.

4.3 Supervision and Construction Procedures

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents by either the activities or duties of the Architect in his administration of the Contract, or by inspection, tests, or approvals required or performed under Paragraph 7.7 by persons other than the Contractor.

4.4 Labor and Materials

4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

4.4.3 When a material, equipment, or system is specified or approved in an addendum, by the name of one or more manufacturers, such material, equipment, or system shall form the basis of the contract. If Contractor desires to use another material, equipment, or system in lieu thereof, he shall request approval in writing and shall submit samples and data as required for the Architect's consideration. The Architect and Owner will be the final judge for the acceptance or the substitution. No Substitution shall be made without authority in writing from the Architect.

4.4.4 By making requests for substitutions based on Subparagraph 4.4.3 above, the Contractor:

Initial _____

- .1 represents that he has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 represents that he will provide the same warranty for the substitute that is required by the Contract Documents for that specified.
- .3 certifies that the cost data presented is complete and includes all related costs and excludes the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently became apparent; and
- .4 will coordinate the installation of the accepted substitute, making such changes at no additional cost to Owner as may be required for the Work to be complete in all respects.

4.4.5 The General Contractor shall disclose the existence and extent of financial interests, whether direct or indirect, he has in subcontractors and material suppliers, which he may propose for this Project.

4.5 **Warranty**

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this Contract will be new unless otherwise specified, and all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved and requirements including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence. This warranty is not limited by the provisions of Paragraph 13.2.

4.6 **Taxes**

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

Initial _____

4.7 Permits, Fees, and Notices

4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution of the Contract.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the performance of the Work.

4.7.3 If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, he shall assume full responsibility therefore and shall bear all costs attributable thereto.

4.8 Allowances and Owner Furnished Equipment, Fixtures or Labor

4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.8.2 Unless otherwise provided in the Contract Documents:

- .1 these allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and applicable taxes;
- .2 the Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance;
- .3 whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

Initial _____

4.8.3 The Owner may directly furnish any or all of the equipment, fixtures, or labor required for the Project. In the event the Owner elects to do so, the Contract Price for such equipment, fixtures, or labor will be reduced by the amount for equipment of labor being furnished by Owner. A Change Order reducing the Contract Price for that item of work shall be executed by Owner and Contractor to reflect a reduction in the Contract Price for that item, equipment, fixtures or work that the Owner is to furnish. The Contractor shall assume responsibility for and be fully responsible for the care, custody, and control of all Owner furnished equipment and/or fixtures once said equipment or fixtures arrive on the job site or in any approved off site storage facility.

4.9 Superintendent

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor and shall be confirmed in writing.

4.10 Documents and Samples at the Site

4.10.1 The Contractor shall maintain at the site for the Owner, one record copy of all Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record all changes made during construction and approved Shop Drawings, Product Data and Samples. These shall be available to the Architect and shall be delivered to him for the Owner upon completion of the Work.

4.11 Shop Drawings, Product Data, and Samples

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

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

Initial _____

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

4.11.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

4.11.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and the Contract Documents.

4.11.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architects approval of Shop Drawings, Product Data or Samples under Subparagraph 2.2.11, unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data, or Samples by the Architect approval thereof.

4.11.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, or Samples, to revisions other than those requested by the Architect on previous submittals.

4.11.8 No portion of the Work requiring submission of a Shop Drawing, Product Data, or Sample shall be commenced until the submittal has been approved by the Architect as provided in Subparagraph 2.2.11. All such portions of the Work shall be in accordance with approved submittals.

4.12 Use of Site

4.12.1 The Contractor shall confine operations at the site to areas permitted by law, ordinance, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

4.13 Cutting and Patching of Work

4.13.1 The Contractor shall be responsible for all cutting,

Initial _____

fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

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

4.14 Cleaning Up

4.14.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work, he shall remove all his waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials.

4.14.2 If the Contractor fails to clean up at the completion of the Work, the Owner may do so as provided in Paragraph 3.4 and the cost thereof will be charged to the Contractor.

4.15 Royalties, Patents, and Records

4.15.1 The Contractor shall pay all royalties and license fees. He shall defend all suits and claims for infringement of any patent rights and shall save Owner and Architect harmless from loss on account thereof.

4.15.2 The Contractor shall not discriminate against any subcontractor, employee, or applicant for employment on the grounds of race, color, national origin, or sex.

4.15.3 The Contractor and all subcontractors under the general contract shall maintain copies of every sub-payroll period for the life of the construction contract and for a period of three (3) years after final release and payment is made by the Owner to the Contractor.

4.15.4 Each Contractor request for payment, including final payment and each partial payment, if permitted by the contract, shall contain a certification by the Contractor that performance by the Contractor and his subcontractor for the period of work covered by the payment request has been in accordance with the contract clauses and requirements with respect to nondiscrimination.

4.15.5 Representatives of Shelby County, as designated by the Mayor, shall have the right to inspect the Contractor's facilities and payroll records during the term of the construction contract and for a period of three (3) years after final release and final payment by the Owner for the purposes of verifying nondiscrimination in employment.

4.15.6 The Contractor shall incorporate the same requirements set forth in Subparagraph 5.3.1 in all Subcontracts awarded by him with the further requirement that each Subcontract include identical requirements to be included in any lower tier Subcontracts together with the requirement to include it in any further subcontracts that might be made.

4.16 Indemnification

4.16.1 (a) By executing this Agreement, the Contractor assumes the entire responsibility and liability for any and all claims, damage or injury of any kind or nature (including death) to all persons, whether employees of the Contractor or otherwise, and to all property (including but not limited to the replacement cost and loss of use of property), caused by, resulting from, arising out of, or occurring in connection with the performance of the Work by the Contractor, its agents, servants, employees, or subcontractors or anyone directly or indirectly employed by any of them for whose acts any of them may be liable.

(b) If any claim is made against the Owner for any damage, injury, death, or loss, whether such claim is based upon the Contractor or its agents, servants, employees, or subcontractors alleged active or passive negligence or participation in the wrong, or upon any alleged active or passive negligence or participation in the wrong, or upon any alleged breach of any statutory duty or obligation on the part of the Contractor, its agents, servants, employees or subcontractors, or in any other instance for which the Contractor has assumed responsibility in this Agreement, the Contractor shall indemnify, defend, and hold harmless the Owner, its officers, directors, agents, servants and employees from and against any and all loss, expense, judgment, damage or injury (including attorney's fees and expenses) that the Owner or its officers, directors, agents, servants or employees may sustain as the result of any such claim.

The Contractor shall assume on behalf of the Owner, its officers, directors, agents, servants and employees the defense of any action at law or in equity which may be brought against any of them upon any such claim, and shall pay on behalf of them the amount of any judgment with any costs or expenses incurred by any of them in connection with such claim.

4.16.2 Labor Indemnity

4.16.2.1 The Contractor shall indemnify, defend and hold harmless the Owner from any and all administrative and judicial actions (including reasonable attorney's fees related to any such action) incurred by the Owner in connection with any labor related activity arising from the performance of the Work of the Contractor. As used in this Agreement, labor related activity includes, but is not limited to strikes, walkouts, informational or organizational picketing, use of placards, distribution of handouts, leaflets or in the vicinity of any facility where the Owner conducts business. The Owner shall advise the contractor if any labor related activity occurs and the Contractor shall arrange for the legal representation necessary to protect the Owner, provided such representation is previously approved by the Owner.

4.16.3 Attorney's Fees

4.16.3.1 In the event it becomes necessary for Owner to employ an attorney to enforce any provision of this Agreement, then the Contractor shall be liable for all attorney's fees and litigation expense of Owner.

4.17 Progress Schedule

4.17.1 The Contractor shall, within five (5) days from receipt of the Notice to Proceed, prepare and submit for the Owner and Architect an estimated project schedule for the Work. The Progress Schedule shall be updated each month to reflect actual progress made and to forecast future progress of the Work. The Progress Schedule shall be related to the entire Project as provided by the contract Documents and shall provide for expeditious and practicable execution of the Work. The Owner reserves the right to reasonably reschedule the Work or the sequence of activities of the contractor for no additional compensation should it deem rescheduling to be in its best interest.

**ARTICLE V
SUBCONTRACTORS****5.1 Definition**

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term

Subcontractor does not include any separate contractor or his subcontractor.

Initial _____

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.2 Award of Subcontracts and Other Contracts for Portions of the Work

5.2.1 Unless otherwise required by the Contract Documents or Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Architect in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. No work shall be commenced until approval of all such Subcontractors has been given in writing by the Owner. If required, the Contractor shall furnish evidence satisfactory to the Owner, showing each proposed Subcontractor is competent to execute the Work covered by the Subcontract.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Architect has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

5.2.3 If the Owner or the Architect has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Architect has no reasonable objection. Such substitution shall in no way affect the Contract Sum.

5.2.4 The Contractor shall make no substitution for any Subcontractor, person, or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

5.2.5 The Contractor shall submit a status report with regard to Subcontractors identified on Exhibit C, which forms a part of the Contract Documents, as to any change in the subcontractors identified thereon and the reasons for same, the dollars paid to

the prior subcontractor and the amount of the new subcontract.

Initial _____

THIS REPORT SHALL BE SUBMITTED TO CONTRACTS ADMINISTRATION OF SHELBY COUNTY GOVERNMENT, 160 N. Main St., Suite 1109, Memphis, Tennessee, 38103.

5.3 Subcontractual Relations

5.3.1 By an appropriate agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Architect. Said agreement shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by the Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to any Sub-subcontractors.

ARTICLE VI WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 Owner's Right to Perform Work and to Award Separate Contracts

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract.

6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the

Contractor who executes each separate Owner-Contractor Agreement.

Initial _____

6.2 Mutual Responsibility

6.2.1 The Contractor shall afford the Owner and separate contractor's reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his Work with theirs as required by the Contract Documents.

6.2.2 If any part of the Contractor's Work depends on proper execution or results in the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Architect any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acceptance of the Owner's or separate contractor's work as fit and proper to receive his Work.

6.2.3 Should the Contractor wrongfully cause damage to the work or property of the Owner or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.

6.2.4 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings, and if any judgment or award against Owner arises there from, the Contractor shall pay or satisfy it and shall reimburse the Owner for all Attorney's fees and Court costs which the Owner has incurred.

6.3 Owner's Right to Clean Up

6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.14, the Owner may clean up and charge the cost thereof to the contractors responsible therefore as the Owner shall determine to be just.

**ARTICLE VII
MISCELLANEOUS PROVISIONS**

7.1 GENERAL COMPLIANCE WITH LAWS

7.1.1 If required, the Contractor certifies that it is

Initial _____

qualified or will take steps necessary to qualify to do business in the State of Tennessee and that it will take such action as, from time to time, may be necessary to remain so qualified and it shall obtain, at its expense all licenses, permits, insurance, and governmental approvals, if any, necessary to the performance of its obligations under this Agreement.

7.1.2 The Contractor is assumed to be familiar with and agrees that at all times it will observe and comply with all federal, state, and local laws, ordinances, and regulations in any manner affecting the conduct of the work. The preceding shall include, but is not limited to, compliance with all Equal Employment Opportunity laws, the Fair Labor Standards Act, Occupational Safety, and Health Administration (OSHA) requirements, and the Americans with Disabilities Act (ADA).

7.1.3 This Contract will be interpreted in accordance with the laws of the State of Tennessee. By execution of this contract the Contractor agrees that all actions, whether sounding in contract or in tort, relating to the validity, construction, interpretation and enforcement of this contract will be instituted and litigated in the courts of the State of Tennessee, located in Shelby County, Tennessee, and in no other. In accordance herewith, the parties to this contract submit to the jurisdiction of the courts of the State of Tennessee located in Shelby County, Tennessee.

7.2 Successors and Assigns

7.2.1 This Agreement (including without limitation, all obligations imposed by the Contract Documents) shall be binding upon and shall inure to the benefit of the parties= successors, assigns, and legal representative. The Contract shall not be assigned or sublet in whole or in part by the Contractor without the written consent of the Owner, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 Written Notice

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm, entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the

notice.

Initial _____

7.4 Claims for Damages

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party, or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 Performance Bond and Labor and Material Payment Bond

7.5.1 The Contractor shall furnish and keep in force throughout the performance of the Work a separate performance bond and separate labor and material payment bond, each in the amount of the total of the Contract (as the same may be modified from time to time) conditioned upon the faithful performance of the Work by the Contractor and payment of all obligations arising in connection with the Work by the Contractor. Said bonds shall also guarantee to the Owner that the Work shall be free of all liens upon the property of the Owner. The bonds shall name the Owner as obligee and shall be with such Surety authorized to do business in the State of Tennessee and in such form and manner as approved by Owner. Said Bond shall be subject to final approval of the Shelby County Risk Management Department. Said bonds shall be furnished to the Owner prior to the commencement of the Work, or upon written request by Owner to Contractor after the Work has commenced.

7.6 Rights and Remedies

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

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

7.7 Tests

7.7.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Architect timely notice of its readiness so the Architect may observe such inspection, testing

Initial _____
or approval. The Contractor shall bear all costs of such inspections, tests, or approvals conducted by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspections or tests.

7.7.2 If the Architect determines that any Work requires special inspection, testing, or approval, which Subparagraph 7.7.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing, or approval, and the Contractor shall give notice as provided in Subparagraph 7.7.1. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect's additional services and/or correction of the defective Work made necessary by such a failure; otherwise, the Owner shall bear such costs, and an appropriate Change Order shall be issued.

7.7.3 Required certificates of inspection, testing, or approval shall be secured by the Contractor and promptly delivered by him to the Architect.

7.7.4 If the Architect is to observe the inspection, tests or approvals required by the Contract Documents, he will do so promptly where practicable, at the source of supply.

ARTICLE VIII **TIME**

8.1 Definitions

8.1.1 Unless otherwise provided, the Contract time is the period of time allotted in the Contract Documents for Substantial Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The date of Substantial Completion of the Work or

designated portion thereof is the Date certified by the Architect when construction is sufficiently complete, in accordance with the contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

8.1.4 The term day as used in the Contract Documents shall mean ^{Initial _____} calendar day unless otherwise specifically designated.

8.2 Progress and Completion

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 Delays and Extensions of Time

8.3.1 The Contractor shall proceed with each and every part of this Agreement in a prompt and diligent manner. The Contractor, without additional compensation, shall perform the Work at such times, in such order and in such manner as the Owner may direct. The Contractor shall commence, continue, and complete its performance of the Project so as not to delay Owner or other separate contractors of the Owner or subcontractors= completion of the Work or any portions thereof, and so as to insure completion as directed by Owner. Any time specified for the completion of the Work, or portion thereof, is a material provision of this Agreement, and time is of the essence. The Contractor shall furnish sufficient forces to assure proper performance of its Work in strict compliance with all performance or progress schedules for the Project.

8.3.2 The Contractor shall, from time to time, on written demand of Owner, give adequate evidence to Owner to substantiate the planned performance and progress of the Work and the various parts thereof. The Contractor shall promptly increase its work force, accelerate its performance, work overtime, work Saturdays, Sundays and holidays, all without additional compensation, if in the opinion of the Owner, such work is necessary to maintain proper progress. The Contractor will fully cooperate and coordinate its work with any other separate contractors of Owner or subcontractors at the Project. The Contractor shall bear the costs of all damages done to other separate contractors of Owner or subcontractors and Shall be responsible for any damages caused by or resulting from acts or omissions of the Contractor in failing to make proper

progress. The liability of the Contractor shall not be deemed waived by any assent or acquiescence by Owner to the Contractor's late performance. Owner shall be entitled to terminate this Agreement due to late or threatened late performance, upon seven (7) days notice to proceed and Contractor's failure to do so.

Initial _____

8.3.3 In the event any subcontractor should damage the Contractor, the Contractor shall neither seek nor be entitled to any compensation from Owner, but will seek its damages directly from such subcontractor. Should the Contractor's performance, in whole or part, be disrupted, interfered with or delayed, or be suspended in the commencement, prosecution or completion, for reasons beyond the Contractor's control and without its fault or negligence, the Contractor shall be entitled to an extension of time in which to complete its Work; but only if it shall have notified the Owner, in writing, of the cause of delay within five (5) days of the occurrence of the event. The Contractor and Owner agree that the Contractor shall not be entitled to any money damages regardless of fault as a result of any delay, acceleration, disruption, interference, suspension, or other event affecting the Contractor or the Contractor's performance.

ARTICLE IX PAYMENTS AND COMPLETION

9.1 Contract Sum

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

9.2 Schedule of Values

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the Work, prepared in such form, and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used only as a basis for the Contractor's Applications for Payment.

9.3 Applications for Payment

9.3.1 At least ten days before the date of each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Architect an itemized Application

for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require, and reflecting retain age, if any, as provided elsewhere in the Contract Documents. The Contractor shall indicate on each Application for Payment the dollar amount and percentage due Subcontractors.

Initial _____

Progress payments (monthly) will be made based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect as follows:

On or before the 10th day of each month, 95% of the proportion of the Contract Sum properly allocable to labor, materials and equipment incorporated in the Work, up to the first day of that month, less the aggregate of previous payments in each case. Payments will be less such retainage as the Architect shall determine for all incomplete work and unsettled claims.

9.3.1.1 Until final payment, the Owner will pay 95% of the amount due the Contractor on account of progress payments. If the manner of completion of the Work and its progress are and remain satisfactory to the Owner, it may, in its sole discretion, for each Work category shown to be 50% or more complete in the Application for Payment, without reduction of previous retainage, on presentation by the Contractor with Consent of Surety for each application, certify any remaining progress payments for each Work category to be paid in full.

9.3.1.2 The full Contract retainage may be reinstated at any time in the sole discretion of the Owner.

9.3.2 Unless otherwise provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in the Article IX as Aliens; and that no

Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other persons performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

9.3.4 The Contractor shall submit a report with Initial each Application for Payment, which sets forth all subcontractors performing work during that reporting period, the dollar amount paid to the subcontractor, etc. on the form provided by Shelby County Government.

9.4 Certificate for Payment

9.4.1 The Architect will, within seven (7) days after the receipt of the Contractor's Application for Payment, issue a Certificate for Payment to the Owner for such amount as the Architect determines is properly due.

9.4.2 The issuance of a Certificate of Payment will constitute a representation by the Architect to the Owner, based on his observations at the site as provided in Subparagraph 2.2.3 and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified.

9.5 Progress Payments

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

9.6 Payments Withheld

9.6.1 The Architect may decline to certify payments and may withhold his Certificate in whole or in part, to the extent necessary to protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. The Architect may also decline to certify payment or,

because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials, or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or another contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time; or
- .7 persistent failures to carry out the Work in accordance with the Contract Documents.

9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made, without interest, for any amounts previously withheld.

9.7 Substantial Completion

9.7.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Architect a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect on the basis of an inspection determines that the Work or designated portion thereof is substantially complete, he will then prepare a Certificate of

substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall

commence on the Date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. Initial _____

9.7.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents. Payment by the Owner upon application by the Contractor and certification by the Architect for Substantial Completion does not waive any claims the Owner may have against the Contractor.

9.8 Final Completion and Final Payment

9.8.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when he finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable. The Architect's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.7.2 have been fulfilled.

9.8.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety to final payment and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of claims, encumbrances and/or alleged liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor

refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

9.8.3 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment. Initial _____

ARTICLE X
PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions and Programs

10.1.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.

10.2 Safety of Persons and Property

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

- .1 all employees on the Work and all other persons who may be affected thereby;
- .2 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury, or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities. Pavements, sidewalks, alleys, adjacent buildings not included in this Contract, which may be damaged, shall be repaired and/or replaced immediately and in a manner satisfactory to the Architect, Shelby County and/or other governing officials.

Initial _____

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under Paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, Subcontractor, or any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts the Contractor may be liable or responsible. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.16.

10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and the Architect.

10.2.7 The Contractor shall not load or permit any part of the Work to be loaded to endanger its safety.

10.3 Emergencies

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article XII for Changes in the Work.

10.3.2 Whenever the Contractor has not taken sufficient precautions for the safety of the public or the protection of work to be performed under this Project, or adjacent structures or property which may be injured by processes of construction, demolition and/or site clearance on account of such neglect, and whenever an emergency shall arise and immediate action shall be considered necessary in order to protect public or private, persons or property interest, then the Architect and/or the Owner shall so

instruct the Contractor.

10.3.3 If correction is not made in due time or if conditions such as lack of time prevent instructions to Contractor, then the Owner, without notice to the Contractor, may provide reasonable, suitable protection by causing such Work to be done and material to be furnished and placed as the Architect and Owner may consider necessary and adequate. The cost and expense of such work and

Initial _____

material so furnished shall be borne by the Contractor and, if the same shall not be paid on presentation of the bills thereof, such costs shall be deducted from any amounts due or to become due the Contractor. The performance of such emergency work under the direction of the Owner and/or Architect shall in no way relieve the Contractor of the responsibility for damages, which may occur during or after such performance.

10.3.4 None of the foregoing shall make the Owner and/or Architect responsible for foreseeing and protecting against emergency.

ARTICLE XI **INSURANCE**

11.1 Contractor's Liability Insurance

11.1.1 The Contractor shall purchase and maintain, in a company or companies licensed to do business in the State of Tennessee, such insurance as will protect the Owner from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts the Contractor or Subcontractor may be liable:

- .1 claims under workers= compensation, disability benefits, and other similar employee benefit acts;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- .4 claims for damages insured by personal injury liability coverage, which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person

by the Contractor, or (2) by any other person;

.5 claims for damages, other than the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and

.6 claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the Contract Documents, section III, paragraph 31, or required by law, whichever is greater.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractor's obligations under Paragraph 4.16.

11.1.4 All insurance policies maintained by the Contractor shall provide that insurance as applying to the Owner shall be primary and non-contributing irrespective of such insurance as the Owner may maintain in its own name and on its own behalf.

11.1.5 Certificates of Insurance acceptable to the Owner shall be filed with the Owner at the time of submittal of the Contract Documents to the Owner for execution. These certificates shall contain a provision that coverage's afforded under the policies will not be canceled until at least thirty-(30) days prior written notice has been given to the Owner. The Contractor shall immediately notify Shelby County Government, Contract Administration, 160 N. Main Street, Suite 550, Memphis, Tennessee 38103 of cancellation or changes in any of the insurance coverage required. Upon request of the Owner, certified copies of any of the required insurance policies may be requested from the Contractor or Contractor's insurance company, agency, or broker.

11.2 Owners Liability Insurance

11.2.1 The Owner shall at its discretion, purchase liability insurance or maintain a self-insured liability program.

11.3 Property Insurance

11.3.1 The General Contractor shall be responsible for all risk insurance for physical loss or damage for the project during construction until the project is accepted by the Owner at which time the Owner will provide the property coverage.

11.3.2 The Contractor shall pay each Subcontractor a just share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require such Subcontractor to make payments to his Sub-subcontractors in similar manner.

11.3.3 The Contractor or his insurance agent, broker or insurance company shall furnish to Owner a copy of all policies with the Contactor within five days of request.

11.3.4 If the Owner requests in writing that insurance for risks other than those described in Subparagraphs 11.3 and 11.3.2 or 11.3.3 or other special hazards to be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order. Initial_____

ARTICLE XII
CHANGES IN THE WORK

12.1 Change Orders

12.1.1 A Change Order is a written order to the Contractor signed by the Owner issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. The Contractor by execution of the Change Order waives any further claims or damages in any manner whatsoever for the changes set forth in the Change Order.

12.1.2 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents.

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

Initial _____

- .1 by lump sum properly itemized on the form furnished by the Owner which shall show the actual verified cost of the work, plus ten percent overhead and five percent profit; if the work is performed by a Subcontractor, the General Contractor is allowed an additional five percent;
- .2 by unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 by the method provided in Subparagraph 11.1.4.

12.1.4 If none of the methods set forth in Clauses 12.1.3.1, 12.1.3.2, or 12.1.3.3 is agreed upon, the Contractor, provided he receive a written order signed by the Owner, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Architect on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit, which shall be defined as ten percent overhead and five percent profit with an additional five percent going to the General Contractor when the work is performed by a Subcontractor. In such case, and also under Clauses 12.1.3.3 and 12.1.3.4 above, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of labor, including social security, old age and unemployment insurance and fringe benefits required by agreement or custom; workers= or workmen compensation insurance; bond premiums, rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificate for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

Initial _____

12.2 Concealed Conditions

12.2.1 Should concealed conditions encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, Contractor, subject to approval by the Architect, shall be entitled to a time extension for only the period that the Contractor's performance is extended due to the unforeseen conditions.

12.3 Minor Changes in the Work

12.3.1 The Architect will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such Changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE XIII
UNCOVERING AND CORRECTION OF WORK

13.1 **Uncovering of Work**

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

13.1.2 If any other portion of the Work has been covered which the Architect has not specifically requested to observe prior to being covered, the Architect may request to see such Work, and it shall be uncovered by the Contractor. If such Work is found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is found not in accordance with the Contract Documents, the Contractor shall pay such costs. If the Work to be uncovered by the Contractor should have been inspected by the Architect prior to being covered, and the Work is found to be in accordance with the Contract Documents, the cost of the uncovering and recovering of the Work shall be borne by the Architect.

Initial _____

13.2 **Correction of Work**

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

13.2.2 If, within one year after the Date of Substantial Completion of the Work or designated portion thereof, within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the term of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not

in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the Work, which are defective or non-conforming, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming Work as provided in Subparagraphs 4.5.1, 13.2.1, and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may, upon ten additional days= written notice, sell such Work at auction or a private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Architect's additional services made necessary thereby. If such proceeds of sale do not cover all costs, which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

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13.2.7 Nothing contained in Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the Work.

13.3 Acceptance of Defective or Non-Conforming Work

13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effective whether or not final payment has been made.

ARTICLE XIV
TERMINATION OF THE CONTRACT

14.1 Termination for Default

14.1.1 Should the Contractor fail to perform in strict accordance with this Agreement, where or as Owner may so direct, or should the Contractor become insolvent, unable to or fail to pay its obligations as they mature or, in any other respect fail in the opinion of the Owner, to properly prosecute and perform any part of its work, fail to exert its best performance efforts, be involved in labor disputes, or be terminated under any other contract with Owner, then the Contractor may be deemed by Owner to have materially breached and to have defaulted in its obligations under this Agreement. In case of a breach and default, the Owner, at its discretion, may terminate this Agreement, or any part thereof, by giving five (5) days written notice thereof to the Contractor. In case of such termination, Owner may use any and all materials, equipment, tools or chattels furnished by or belonging to the Contractor either at or for the Project.

14.1.2 The Contractor, on termination, will be deemed to have offered to Owner an assignment of all of its subcontracts and purchase orders relating to this Project. Owner may, at its discretion, do whatever is necessary to assure performance of any

Initial _____

terminated work and to take such action, if necessary, in the Contractor's name. Owner may withhold from Contractor any monies due or to become due under this or any other contract between the Contractor and Owner, to offset the damages incurred or possibly incurred as a result of the breach and default by the Contractor. In case of a breach, or in the event Owner is required to retain the services of an attorney to enforce any provisions of this Agreement, then the Contractor and its surety company shall be liable to Owner for any and all additional costs, expenses, attorney's fees and other damages, both liquidated and unliquidated, which directly or indirectly result from the Contractor's breach, threatened breach, default or lack of performance of any term or condition of this Agreement.

14.1.3 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the

Architect's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of this Contract.

14.2 Termination for Convenience

14.2.1 Owner, by written notice, shall have the right to terminate and cancel this Agreement, without the Contractor being at fault, for any cause or for its own convenience, and require the Contractor to immediately stop work. In such event, Owner shall pay the Contractor for that Work actually performed and materials furnished in an amount proportionate to the Contract price. Owner shall not be liable to the Contractor for any other costs, including prospective profits on Work not performed.

ARTICLE XV **RIGHT TO OCCUPY BY OWNER**

15.1 Early Occupancy by Owner

15.1.1 The Owner has the right to occupy or use ahead of schedule all or any substantially completed or partially completed portion of the Work when such occupancy and use are in its best interest, notwithstanding the time of completion for all of the Work. If occupancy or use increases the cost of the Work (other than for corrections which are the responsibility of the Contractor) and/or as a result of the Owner exercising its rights

Initial _____
herein, the contractor shall be entitled to extra costs and extensions of time, or both. Claims for such extra costs and extensions of time, to be valid, shall be made in writing to the Owner within seven (7) calendar days of the notification of Owner to the Contractor of its intent to so occupy or use.

15.2 Corrections after Occupancy

15.2.1 After the Owner has taken occupancy of all or any substantially completed portion of the Work, the Contractor shall not disrupt the use and occupancy of the Owner to make corrections in the Work but shall, at the discretion of the Owner, make such corrections at the expense of the Contractor after normal working hours.

15.3 Heating, Ventilating, and Air-Conditioning Systems

15.3.1 The Owner may require the use and operation of any completed heating, ventilating, and air-conditioning equipment at the time it occupies or uses any substantially completed portion of the Work. In such event, the Owner may require the Contractor to operate such equipment and will pay the Contractor the cost of such utilities required for the use and occupancy of the Owner, but the Contractor shall be responsible for such equipment and for its careful and proper operation. At any time, the Owner may assume the care and maintenance of any portion of the Work, which it is occupying and using for the operation of any such equipment, but in each case, the Contractor shall not be relieved of its responsibility for the full completion of the Work and the protection of its tools, materials, and equipment.

ARTICLE XVI
REGULATIONS

16.1 Nondiscrimination in Employment

16.1.1 During the performance of this Contractual Agreement, the contracting party agrees as follows: The CONTRACTOR agrees that no person on the grounds of handicap, age, race, color, religion, sex, or national origin, shall be excluded from participation in, or be denied benefits of, or be otherwise subject to discrimination in the performance of this contract, or in the employment practices of the CONTRACTOR. The CONTRACTOR shall upon request show proof of such non-discrimination, and shall post in conspicuous places available to all employees and applicants notices of non-discrimination.

16.2 [RESERVED]

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16.3 Maintenance and Records

16.3.1 The Contractor and all Subcontractors under the General Contract shall maintain copies of every subcontract awarded and their own payrolls, for each weekly payroll period during the term of the Construction Contract and for a period of one (1) year after release and payment is made by Owner to the Contractor.

16.4 Owner's Right of Inspection

16.4.1 Representative of the Owner, as designated by the County Mayor, shall have the right to inspect the Contractor's facilities and payroll records during the life of the Construction Contract for a period of one (1) year after final release and final payment

by the Owner for the purpose of verifying nondiscrimination in employment.

**ARTICLE XVII
PROCEDURE FOR INSTALLATION OR
REMOVAL OF FIBERGLASS INSULATION**

The following procedures should be adhered to when disturbing, installing, or removing fiberglass insulation. These procedures are established to minimize employee exposure to the adverse health affects of fiberglass exposure.

The below procedures are the minimal requirements for handling fiberglass in Shelby County Facilities. Mandates by code or law must be adhered to.

17.1 Installation, Removal, or Disturbance of Fiberglass Insulation

17.1.1 Install in well-ventilated areas and avoid breathing dust.

17.1.2 Wear loose, comfortable clothing and long-sleeved shirts to minimize skin contact.

17.1.3 Handle carefully to minimize airborne dust.

17.1.4 If high dust levels are anticipated during installation, such as with power tools, use appropriate NIOSH approved dust respirator.

17.1.5 All power cutting tools must be equipped with dust collectors.

Initial _____

17.2 Exposure

17.2.1 After use, wash with warm water and mild soap. Do not scratch or rub skin if it becomes irritated. Utilize running water.

17.2.2 Wash work clothes separately, and then rinses the washer.

17.2.3 Eye exposure: Flush with flowing water for at least 15 minutes. If symptoms persist, seek immediate medical attention.

17.3 Work Site Environment

17.3.1 Insure area is free of obvious partials through proper cleanup procedures. Use of vacuum with proper filters, or wet cleanup is acceptable. (This includes office furniture, floors, and walls.)

17.3.2 Initially there may be a potential adverse impact on indoor air quality within the general work area during the installation process. Notify building manager or other appropriate person that it will be necessary to establish and maintain adequate ventilation of the work area, without causing the entry of contaminants to other parts of the building. Persons who are sensitive to odors and/or chemicals should be advised to avoid the work area during this process.

17.3.3 Exposure to employees should be kept to a minimum.

17.3.4 Disturbance of ceiling tiles where fiberglass insulation exists requires the same procedures as if installation or removal was taking place.

BY THE SIGNING OF THIS DOCUMENT AND INITIALING EACH PAGE HEREOF, THE CONTRACTOR CERTIFIES THAT HE HAS READ AND UNDERSTANDS ALL OF THE ABOVE AND AGREES TO ABIDE BY THESE GENERAL CONSTRUCTION CONDITIONS.

CONTRACTOR

BY: _____

TITLE: _____

DATE: _____

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:

1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Replace existing emergency generators.

1. Project Location: 201 Poplar Ave., Memphis, TN 38103.

B. Owner: Shelby County Government.

C. Engineer: Canup Engineering, Inc., 7953 Stage Hills Blvd., Suite 107, Bartlett, TN 38133

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Replace three existing 750 KW emergency generators with two new 1000 KVA emergency generators (denoted as Phase 2 and Phase 3 in contract documents) complete with associated electrical, fuel piping and exhaust systems. Deduct any redundant costs associated with Phase 1 if Phase 2 runs concurrently with Phase 1.

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

- B. Use of Site: Limit use of Project site to areas within the Contract limits. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 5 p.m., Monday through Friday, unless otherwise indicated.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Engineer's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be available by Engineer for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will discard submittals received from sources other than Contractor.
- E. Options: Identify options requiring selection by Engineer.
- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Engineer action stamp.

- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

- 1. Action Submittals: Submit five paper copies of each submittal unless otherwise indicated. Engineer will return four copies.
- 2. Informational Submittals: Submit one paper copies of each submittal unless otherwise indicated. Engineer will not return copies.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

- 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
- 2. Mark each copy of each submittal to show which products and options are applicable.
- 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
- 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- 5. Submit Product Data before or concurrent with Samples.
- 6. Submit Product Data in the following format:
 - a. Five paper copies of Product Data unless otherwise indicated. Engineer will return four copies.

- C. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 1 Section "Closeout Procedures."
- D. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- E. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Division 1 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Division 1 Section "Summary" for limitations on work restrictions and utility interruptions.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated.
- B. Water Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 1 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.

END OF SECTION 01500

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Division 1 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Division 1 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 4. Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 1 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Divisions 2 through 16 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Divisions 2 through 16 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number where applicable.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 1 Section "Demonstration and Training."
 6. Advise Owner of changeover in heat and other utilities.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 8. Complete final cleaning requirements, including touchup painting.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
 1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.

- e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- g. Sweep concrete floors broom clean in unoccupied spaces.
- h. Remove labels that are not permanent.
- i. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- j. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 2. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 3. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 2. Divisions 2 through 16 Sections for specific requirements for project record documents of the Work in those Sections.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Record data as soon as possible after obtaining it.
 - c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

END OF SECTION 01781

SECTION 01820 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.

1.2 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals.

1.3 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 1 Section "Operations and Maintenance Data."

3.2 INSTRUCTION

- 1. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.

END OF SECTION 01820

SECTION 15010 – BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Mechanical Systems for Packaged Generators.

1.2 RELATED WORK

- A. Division 1 - General Requirements: All applicable requirements apply to the Work of this Section unless otherwise amended.
- B. Mechanical System: As described by the following sections.
 - 1. Section 15140 - Supports and Anchors.
 - 2. Section 15145 - Seismic Restraints and Vibration Isolation.
 - 3. Section 15260 - Piping Insulation.
 - 4. Section 15490 - Facility Fuel Oil Piping.
 - 5. Section 15510 - Hydronic Piping.
 - 6. Section 15556 - Vents and Stacks.
 - 7. Section 15990 - Testing, Adjusting and Balancing.

1.3 MECHANICAL SYSTEM DESCRIPTION

- A. Provide complete operational mechanical system as follows:
 - 1. Exhaust vents and accessories for new diesel generators.
 - 2. Fuel oil piping and accessories for new diesel generators.
 - 3. Coolant piping to remote radiators for new diesel generators.
 - 4. Supports and anchors.
 - 5. Seismic restraints.
 - 6. Insulation.
 - 7. Test and balancing of systems.
 - 8. Identification of piping.
 - 9. Painting of piping and supports.

1.4 SUBMITTALS

- A. Submit product data for each section of Division 15 under the provisions of Section 01340.
 - 1. Submit six copies of all products and equipment in an indexed, bound brochure.
 - 2. Submit all items for each system complete indicating all items. Partial submittals will not be accepted.
 - 3. Substitutions shall be submitted under the provisions of Section 01 60 00.

1.5 COORDINATION

- A. For purposes of clearness and legibility, drawings are essentially diagrammatic, and, although size and location of equipment are drawn to scale wherever possible, the Contractor shall make use of all data in all of the contract documents and shall verify this information at the building site.

- B. The drawings indicate required size and points of termination of pipes and vents, and suggest proper routes of pipe to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets, and it shall be the work of this section to install piping and ducts in such a manner as to conform to structure, avoid all obstructions, preserve headroom and keep openings and passageways clear without further instruction or cost to the Owner.
- C. The Contractor shall read and familiarize himself with all divisions of the drawings and specifications.
- D. It shall be the responsibility of the Contractor to coordinate his work with all other trades for the location and installation of all sleeve inserts, anchor bolts, etc., as required for the proper installation of their work. All work shall be coordinated with the emergency generator supplier.
- E. All new work shall be coordinated with existing systems in the basement mechanical room that are to remain. Avoid existing as required.
- F. In general, all work outlined in this section shall be done by the trade in whose jurisdiction it falls, but each trade shall fully cooperate so that the work involved shall proceed in orderly manner.
- G. In doing all work under this Contract, the Contractor shall carefully protect all existing systems which are to remain in service from any damage or discoloration, and shall make good, at his own expense, any damage done to such systems.
- H. In performing the work under this Contract, it is possible that the contractor may encounter unknown underground utility lines. Such line may be lines which have or will be abandoned, inactive lines which it may be desired to preserve for future use, or active lines which must be preserved and either relocated or replaced.
- I. All building surfaces (walls, floors, etc) damaged incident to construction work under this Contract shall be replaced by the Contractor as soon as possible in a manner satisfactory to the Engineer, Owner, and governing authority, if applicable.
- J. All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned, as directed by the manufacturers, unless herein specified to the contrary. Should there be a discrepancy between the installation shown on the drawings and/or specified and the manufacturers' directions and/or recommendations, this must be brought to the Engineer's attention, and the procedure settled before proceeding with the work.
- K. Contractor shall review each major unit of work to inspect the substrate to receive the work and conditions under which the work is to be performed. The installer shall report all unsatisfactory conditions in writing to the Engineer. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- L. Where installations include manufactured products, comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than requirements indicated in the contract documents.

- M. Inspect each item of materials or equipment immediately prior to installation. Reject damaged and defective items.
- N. Provide attachment and connection devices and methods for securing work. Secure work true to line and level, and within recognized industry tolerances. Allow for expansion and building movement. Provide uniform joint width in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable visual effect choices to the Engineer for final decision.
- O. Recheck measurements and dimensions of the work, as an integral step of starting each installation.
- P. Install each unit of work during weather conditions and project status which will ensure the best possible results in coordination with the entire work. Isolate each unit of work from incompatible work as necessary to prevent deterioration.
- Q. Coordinate enclosure of the work with required inspections and tests, so as to minimize the necessity of uncovering the work for that purpose.
- R. During handling and installation of work at the project site, clean and protect work in progress and adjoining work at the basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration at time of substantial completion.
- S. Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

1.6 REGULATORY REQUIREMENTS

- A. Conform to all applicable codes governing the work of this section.
- B. Provide required notice of conflict between contract documents and governing regulatory requirements.

1.7 PROJECT RECORD DOCUMENTS

- A. Submit project record documents.
- B. Mechanical System: Provide record “as-built” drawings indicating final vent, fuel oil and coolant system installation.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit data as required by each respective section.

1.9 GUARANTEE

- A. Contractor shall guarantee all work performed under this contract to be free from defects in materials and workmanship for a period of one year from date of substantial completion.

- B. Latent defects arising during this period shall, upon notification by the Owner and Engineer, be promptly corrected at no additional cost to the owner.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Use only new and undamaged materials as specified in the respective related sections.

2.2 SUBSTITUTIONS

- A. Submit only materials which meet or exceed all requirements of those specified. Provide written description of all differences between substituted materials and that specified.

2.3 STARTERS

- A. It shall be the responsibility of this section to furnish all required starters and motor controllers for all mechanical devices. Starters shall be equipped with all accessory inputs necessary to accomplish the specified sequence of operations.
- B. Where not integral with the equipment provided starters shall be mounted and wired by Division 16.
- C. Starters shall be weatherproof where required.

2.4 MANUAL CONTROLLERS

- A. Manual Motor Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full voltage controller with overload element, red pilot light, auxiliary contact, and push button operator.
- B. Fractional Horsepower Manual Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full voltage controller for fractional horsepower induction motors, with thermal overload unit, pilot light, and toggle operator.
- C. Magnetic Controllers:
 - 1. Magnetic starters shall be NEMA 1, combination non-fused type with auxiliary contacts as required to match the specified sequence of control. Starters shall be Furnas, Allen and Bradley or Cutler Hammer - NO OTHER SUBSTITUTES.
 - 2. Starters shall have solid state overload protection.
 - 3. Auxiliary contacts shall be normally open or normally closed as required for proper control. Provide integral control transformers when required, with fused primary and secondary. Provide Hand-Off-Auto switch unless indicated otherwise on the drawings.

PART 3 - EXECUTION

3.1 EXECUTION

- A. Execute all work in accordance with the requirements of the Contract Documents.

3.2 WORKMANSHIP

- A. All work required by the respective related sections shall be performed by a mechanic or craftsman with a demonstrated ability to perform the work required.
- B. Perform all work to local established trade standards.

3.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00. Deliver and store products in shipping packaging until installation.

3.4 SYSTEM START-UP

- A. Provide factory trained service personnel for system start-up and instruction to the owner or owner's designated representative.

3.5 MECHANICAL IDENTIFICATION

- A. Plastic Pipe Markers: Install in accordance with manufacturer's instructions.
- B. Plastic Tape Pipe Markers: Install complete around pipe in accordance with manufacturer's instructions.
- C. Piping: Identify piping in equipment room and at exterior radiators with plastic pipe markers. Identify service and flow direction. Install in clear view and align with axis of piping. Identify the following:

Fuel Oil Supply

Fuel Oil Vent

Fuel Oil Overflow

Fuel Oil Return

Coolant Water Supply (Identify if Jacket Water or Aftercooler Water and Generator served).

Coolant Water Return (Identify if Jacket Water or Aftercooler Water and Generator served).

3.6 PAINTING OF EXPOSED PIPING AND SUPPORTS

- A. Product Delivery, Storage and Handling:
 - 1. Deliver materials to building in original containers with labels intact and seals unbroken.
 - 2. Keep storage area neat, clean and adequately protected from paint spillage. Repair damage caused to surfaces within storage areas.
 - 3. Dispose of cloths and waste which might constitute fire hazard at end of each work day.
- B. Quality Assurance:
 - 1. This contractor shall review all surfaces that are to receive paint to verify that they are in acceptable condition prior to beginning work. If in the opinion of this contractor, the surfaces are not acceptable for him to provide a top quality painted surface, he shall notify project engineer in writing and wait for directions prior to beginning work. Starting work shall indicate acceptance of all painted substrates and responsibility for the final surface.

C. Job Conditions:

1. Carefully and adequately protect, as required, surfaces not requiring painting in areas where painting is being carried on.
2. Apply paint under dry and dust-free conditions.
3. Do not apply paint when temperature is less than 50 degrees F. or more than 90 degrees F., or when excessively humid.

D. Materials:

1. Paints and coatings: As manufactured by Pratt & Lambert, Devoe, Glidden, Sherwin Williams or an approved equal. Colors shall be as scheduled or as selected by owner. Materials for painting of pipes shall be suitable for the normal operating temperature range of the fluid in the respective pipe.

E. Surface Preparation:

1. Clean and dry surface before painting. Remove dirt and dust by brushing with stiff bristle brush. Remove oil and grease by solvent cleaning, using solvent such as mineral spirits and wiping with clean rags. Apply rinse of clean solvent.
2. If area to be coated has been subject to chemical contamination, thoroughly rinse with water.
3. Apply primer or first coat immediately after surface preparation to prevent contamination of surface.

F. Application:

1. Apply paint uniformly without visible laps, sags, curtains, or objectionable brushmarks. Exercise care so that paint does not splatter on surfaces not to be painted. Remove promptly paint applied or splattered on surfaces not to be painted.
2. Insure that primer and intermediate coats of paint are unscarred and completely integral at time of application of each coat. Allow sufficient time between coats to ensure proper drying.
3. Sand between coats on metal surfaces prior to application of succeeding coats.

G. Schedule of Surfaces:

1. Ferrous metals exposed to weather including piping and associated supports: one coat of zinc chromate primer (where not shop applied) and two coats of flint enamel.
2. Interior Piping and Associated Supports:
 - a. Prime paint exposed structural steel items on interior which have not been given shop coat or factory finish. Re-prime any damaged areas.
 - b. Two (2) coats latex semi-gloss enamel.

H. Cleaning, Touch-Up and Project Closeout:

1. Make details inspection of paint work and touch-up abraded or otherwise disfigured surfaces or refinish as required.
2. Carefully remove splatterings, spots and blemishes caused by painting from surfaces throughout project.
3. Remove extra material from job site and leave building and ground in neat, clean finished condition.
4. Deliver to the engineer three copies of the color formulas, including paint type and manufacturer for each painted surface.

END OF SECTION 15010

SECTION 15140 – SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 REFERENCES

- A. ASME B31.9 - Building Services Piping.
- B. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- C. SMACNA - Duct Construction Standards.

1.2 SUBMITTALS

- A. Submit under provisions of Section 15010.
- B. Product Data: Provide manufacturers catalog data including load capacity.
- C. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.3 DELIVERY STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 15010.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable International Mechanical Code for support of pipes and vents.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Fuel Oil and Radiator Coolant Piping:
 - 1. Conform to ASME B31.9.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.
 - 3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
 - 4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 - 5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
 - 6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
 - 7. Vertical Support: Steel riser clamp.
 - 8. Floor Support for Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

2.2 ACCESSORIES

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded. Comply with ASTM F708.

2.3 INSERTS

- A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.4 FLASHING

- A. Metal Flashing: 26 gage galvanized steel.
- B. Metal Counterflashing: 22 gage galvanized steel.

2.5 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage galvanized steel.
- B. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Per U.L. Fire Resistance Directory.
- C. Stuffing or Firestopping Insulation: Per requirements of the U.L. Fire Resistance Directory for the particular application involved. Fireproofing systems not in accordance with the U.L. Fire Resistance Directory will not be acceptable.

2.6 VENT SUPPORTS

- A. Support all vents in strict accordance with SMACNA Guidelines and the manufacturer's recommendations.
- B. Vents and mufflers shall be supported from the structure above without bearing on the engine of the generator.

2.7 ANCHORS

- A. Steel Shapes and Plates: ASTM A 36/A 36M.
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex head.
- C. Washers: ASTM F 844, steel, plain, flat washers.
- D. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, and tension and shear capacities appropriate for application.
 - 1. Stud: Threaded, zinc-coated carbon steel.
 - 2. Expansion Plug: Zinc-coated steel.
 - 3. Washer and Nut: Zinc-coated steel.
- E. Concrete: Portland cement mix, **3000 psi** minimum. Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for formwork, reinforcement, and concrete.

- F. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink, nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: **5000-psi**, 28-day compressive strength.
- G. Anchors shall be designed for a minimum thrust of 200 lbs per diameter inch pipe size (i.e. a 2" pipe will develop 400 lbs of force).

2.8 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

2.9 TRAPEZE HANGERS

- A. Trapeze pipe hangers require calculation and detail of each unit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.2 PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.
- E. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- F. Support riser piping independently of connected horizontal piping.
- G. Design hangers for pipe movement without disengagement of supported pipe.
- H. Prime coat steel hangers and supports. Provide prime coat and two weatherproof finish coats for all exterior pipe supports.

3.3 FLASHING

- A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

3.4 SLEEVES

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors one inch above finished floor level. Calk sleeves.
- D. Where insulated piping penetrates fire rated walls, floors or partitions, sleeve and seal per requirements of the U.L. Fire Resistance Directory.

3.5 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

- A. Systems or devices listed in the U.L. Fire Resistance Directory under categories listed in Section 07270 shall be used to protect all mechanical piping or conduit (temperature controls) penetrations of fire rated construction, the system used shall conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance. Systems or devices must be asbestos-free.
- B. The systems shall withstand the passage of cold smoke either as an inherent property of the system or by the use of a separate product included as a part of the U.L. system or device, and designed to perform this function.
- C. Acceptable manufacturers and products shall be those listed in the U.L. Fire Resistance Directory for the U.L. System involved.
- D. Fill, void or cavity materials: As classified the U.L. Fire Resistance Directory.
- E. Provide submittal for each wall, floor and penetration type.

3.6 SCHEDULES

PIPE SIZE Inches	MAX. SUPPORT SPACING Feet	HANGER ROD DIAMETER Inches
½” to 1¼”	5’	3/8”
1 ½” to 2”	8’	3/8”
2 ½” to 3”	8’	½”
4” to 6”	8’	5/8”

3.7 ANCHOR INSTALLATION

- A. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.

- B. Fabricate and install steel anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and AWS D1.1.
- C. Construct concrete anchors of poured-in-place concrete of dimensions indicated and include embedded fasteners.
- D. Install pipe anchors according to expansion-joint manufacturer's written instructions if expansion joints or compensators are indicated.

3.8 ATTACHMENTS

- A. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to **6 inches** for heavy loads.
 - 2. Steel Clevises (MSS Type 14): For **120 to 450 deg F** piping installations.
- B. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 - 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 - 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 - 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 - 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 - 6. C-Clamps (MSS Type 23): For structural shapes.
 - 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): **750 lb.**
 - b. Medium (MSS Type 32): **1500 lb.**
 - c. Heavy (MSS Type 33): **3000 lb.**
 - 8. Side-Beam Brackets (MSS Type 34): For sides of steel beams.
 - 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

END OF SECTION 15140

SECTION 15145 – SEISMIC RESTRAINTS AND VIBRATION ISOLATION

PART 1 - GENERAL

1.1 GENERAL

- A. Provide seismic restraints in accordance with the requirements of the 2009 International Building Code for the following:
1. All high hazard (natural gas and fuel oil) piping, all other piping in Mechanical Equipment Rooms 3" diameter and larger, all piping (other than gas) outside Mechanical Equipment Rooms 3" diameter and larger and all conduits 2-1/2" diameter and larger. Exception: Entire piping runs suspended by individual hangers 12 inches or less in length, as measured from the top of the pipe to the bottom of the support where the hanger is attached, need not be braced.
 2. Piping and equipment exterior to the building need not be braced.
 3. Seismic Design Factors
 - a) Seismic Importance Factor and Occupancy Category
 $I_E = 1.00$
Occupancy Category I
 - b) Site Specific Spectral Response Accelerations:
 $S_S = 0.443 \text{ g}$
 $S_1 = 0.268 \text{ g}$
 - c) Site Class D
 - d) Spectral Response Coefficients
 $S_{DS} = 0.427 \text{ g}$
 $S_{D1} = 0.333 \text{ g}$
 - e) Seismic Design Category D
 - f) Component Importance Factor
 $I_p = 1.5$ for new equipment and piping serving emergency generators.
 $I_p = 1.0$ for all other equipment.
- B. Restraints for piping (where required) shall be in accordance with the SMACNA Seismic Restraint Manual and ASCE 7-05 as applicable for each portion of the work.
- C. Where possible, hangers and supports for ducts and pipes shall not exceed a length of 12 inches.
- D. Coordinate bracing methods with vibration isolation systems. Use cable restraints, in accordance with SMACNA Restraint Manual and ASCE 7-05, to prevent short circuiting vibration isolation devices.
- E. Anchor and secure all devices, equipment, tanks, panels, etc. to resist seismic forces with seismically approved anchors.
- F. Provide shop drawings showing specific details of seismic restraints and anchors. Shop drawings shall include seismic restraint calculations for all connections of equipment to the structure. Calculations must be stamped by a registered professional engineer licensed in the State of Tennessee.

1. All mechanical equipment, piping and ductwork as noted on the equipment schedule or in the specification shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.
2. All isolators and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.
3. All such systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.
4. This specification is considered to be minimum requirements for seismic consideration and is not intended as a substitute for legislated, more stringent, national, state or local construction requirements.
5. Any variance or non-compliance with these specification requirements shall be corrected by the contractor in an approved manner.

G. The work in this section includes, but is not limited to the following:

1. Vibration isolation for piping, ductwork and equipment.
2. Equipment isolation bases.
3. Flexible piping connections.
4. Seismic restraints for isolated equipment.
5. Seismic restraints for non-isolated equipment.
6. Certification of seismic restraint designs and installation supervision.

H. Definitions

1. Life Safety Systems:
 - a. All new systems involved with the replacement emergency generators.
2. Positive Attachment:
 - a. A positive attachment is defined as a cast-in anchor, a drill-in wedge anchor, a double sided beam clamp loaded perpendicular to a beam, or a welded or bolted connection to structure. Single sided "C" type beam clamps for support rods of overhead piping, ductwork, fire protection, electrical conduit, bus duct, or cable trays, or any other equipment are not acceptable on this project as seismic anchor points.
3. Transverse Bracing:
 - a. Restraint(s) applied to limit motion perpendicular to the centerline of the pipe, duct or conduit.
4. Longitudinal Bracing:
 - a. Restraint(s) applied to limit motion parallel to the centerline of the pipe, duct or conduit.

1.2 RELATED WORK

- A. Section 15140 Supports & Anchors.
- B. Section 15490 Fuel Oil Piping.
- C. Section 15510 Hydronic (Engine Coolant) Piping.

D. Supplementary Support Steel

1. Contractor shall supply supplementary support steel for all equipment, piping, ductwork, etc. including roof mounted equipment, as required or specified.

E. Attachments

1. Contractor shall supply restraint attachment plates cast into housekeeping pads, concrete inserts, double sided beam clamps, etc. in accordance with the requirements of the vibration vendor's calculations.

1.3 SUBMITTAL DATA REQUIREMENTS

A. The manufacturer of vibration isolation and seismic restraints shall provide submittals for products under provisions of Section 15010 and as follows:

1. Descriptive Data:
 - a. Catalog cuts or data sheets on vibration isolators and specific restraints detailing compliance with the specification.
 - b. Detailed schedules of flexible and rigidly mounted equipment, showing vibration isolators and seismic restraints by referencing numbered descriptive drawings.
2. Shop Drawings:
 - a. Submit fabrication details for equipment bases including dimensions, structural member sizes and support point locations.
 - b. Provide all details of suspension and support for ceiling hung equipment.
 - c. Where walls, floors, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts, conduit and pipe must be included and approved before the condition is accepted for installation. Restraint manufacturers' submittals must include spacing, static loads and seismic loads at all attachment and support points.
 - d. Provide specific details of seismic restraints and anchors; include number, size and locations for each piece of equipment.
3. Seismic Certification and Analysis:
 - a. Seismic restraint calculations must be provided for all connections of equipment to the structure. Calculations must be stamped by a registered professional engineer with at least five years of seismic design experience, licensed in the state of the job location.
 - b. All restraining devices shall have a preapproval number from California OSHPD or some other recognized government agency showing maximum restraint ratings. Preapprovals based on independent testing are preferred to preapprovals based on calculations. Where preapproved devices are not available, submittals based on independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to support seismic restraint designs must be stamped by a registered professional engineer with at least five years of seismic design experience and licensed in the state of the job location. Testing and calculations must include both shear and tensile loads as well as one test or analysis at 45° to the weakest mode.

- c. Analysis must indicate calculated dead loads, static seismic loads and capacity of materials utilized for connections to equipment and structure. Analysis must detail anchoring methods, bolt diameter, embedment and/or welded length. All seismic restraint devices shall be designed to accept, without failure, the forces detailed in section E. acting through the equipment center of gravity. Overturning moments may exceed forces at ground level.

1.4 MANUFACTURER'S RESPONSIBILITY

- A. Manufacturer of vibration isolation and seismic control equipment shall have the following responsibilities:
 - 1. Determine vibration isolation and seismic restraint sizes and locations.
 - 2. Provide vibration isolation and seismic restraints as scheduled or specified.
 - 3. Provide calculations and materials if required for restraint of un-isolated equipment.
 - 4. Provide installation instructions, drawings and trained field supervision to insure proper installation and performance.

1.5 DELIVERY STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 15010.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All vibration isolators and seismic restraints described in this section shall be the product of a single manufacturer. Mason Industry's products are the basis of these specifications; products of other manufacturers are acceptable provided their systems strictly comply with the specification and have the approval of the specifying engineer. Submittals and certification sheets shall be in accordance with article B and Section 15010.
- B. For the purposes of this project, failure is defined as the discontinuance of any attachment point between equipment or structure, vertical permanent deformation greater than 1/8 inch and/or horizontal permanent deformation greater than 1/4 inch.

2.2 VIBRATION ISOLATORS AND SEISMIC RESTRAINTS

- A. TYPE 1 - Two layers of 3/4" thick neoprene pad consisting of 2" square waffle modules separated horizontally by a 16 gauge galvanized shim. Load distribution plates shall be used as required. Pads shall be Type Super "W" as manufactured by Mason Industries, Inc.
- B. TYPE 2 - Bridge-bearing neoprene mountings shall have a minimum static deflection of 0.2" and all directional seismic capability. The mount shall consist of a ductile iron casting containing two separated and opposing molded neoprene elements. The elements shall prevent the central threaded sleeve and attachment bolt from contacting the casting during normal operation. The shock absorbing neoprene materials shall be compounded to bridge-bearing specifications. Mountings shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Mountings shall be Type BR as manufactured by Mason Industries, Inc.

- C. TYPE 3 - Sheet metal panels shall be bolted to the walls or supporting structure by assemblies consisting of a neoprene bushing cushioned between 2 steel sleeves. The outer sleeve prevents the sheet metal from cutting into the neoprene. Enlarge panel holes as required. Neoprene elements pass over the bushing to cushion the back panel horizontally. A steel disc covers the inside neoprene element and the inner steel sleeve is elongated to act as a stop so tightening the anchor bolts does not interfere with panel isolation in 3 planes. Bushing assemblies can be applied to the ends of steel cross members where applicable. All neoprene shall be bridge bearing quality. Bushing assemblies shall be type PB as manufactured by Mason Industries, Inc.
- D. TYPE 4 - A one piece molded bridge bearing neoprene washer/bushing. The bushing shall surround the anchor bolt and have a flat washer face to avoid metal to metal contact. Neoprene bushings shall be type HG as manufactured by Mason Industries, Inc.
- E. TYPE 5 - Spring isolators shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" neoprene acoustical friction pad between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflection, compressed spring height and solid spring height. Mountings shall be Type SLF as manufactured by Mason Industries, Inc.
- F. TYPE 6 - Restrained spring mountings shall have an SLF mounting as described in Type 5, within a rigid housing that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operation. Since housings will be bolted or welded in position there must be an internal isolation pad. Housing shall be designed to resist all seismic forces. Mountings shall have Anchorage Preapproval "R" Number from OSHPD in the state of California certifying the maximum certified horizontal and vertical load ratings. Mountings shall be SLR as manufactured by Mason Industries, Inc.
- G. TYPE 7 - Spring mountings as in Type 5 built into a ductile iron or steel housing to provide all directional seismic snubbing. The snubber shall be adjustable vertically and allow a maximum of 1/4 inch travel in all directions before contacting the resilient snubbing collars. Mountings shall have an Anchorage Preapproval "R" number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Mountings shall be SSLFH as manufactured by Mason Industries, Inc.
- H. TYPE 8 - Air Springs shall be manufactured with upper and lower steel sections connected by a replaceable flexible nylon reinforced neoprene element. Air spring configuration shall be multiple bellows to achieve a maximum natural frequency of 3 Hz. Air Springs shall be designed for a burst pressure that is a minimum of three times the published maximum operating pressure. All air spring systems shall be connected to either the building control air or a supplementary air supply and equipped with three leveling valves to maintain leveling within plus or minus 1/8". Submittals shall include natural frequency, load and damping tests performed by an independent lab or acoustician. Air Springs shall be Type MT and leveling valves Type LV as manufactured by Mason Industries, Inc.

- I. TYPE 9 - Restrained air spring mountings shall have an MT air spring as described in Type 8, within a rigid housing that includes vertical limit stops to prevent air spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the air spring so as not to interfere with the air spring action. Limit stops shall be out of contact during normal operation. Housing shall be designed to resist all seismic forces. Mountings shall be SLR-MT as manufactured by Mason Industries, Inc.
- J. TYPE 10 - Hangers shall consist of rigid steel frames containing minimum 1 1/4" thick neoprene elements at the top and a steel spring with general characteristics as in Type 5 seated in a steel washer reinforced neoprene cup on the bottom. The neoprene element and the cup shall have neoprene bushings projecting through the steel box. To maintain stability the boxes shall not be articulated as clevis hangers nor the neoprene element stacked on top of the spring. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30° arc from side to side before contacting the rod bushing and short circuiting the spring. Submittals shall include a hanger drawing showing the 30° capability. Hangers shall be type 30N as manufactured by Mason Industries, Inc.
- K. TYPE 11 - Hangers shall be as described in Type 10, but they shall be precompressed and locked at the rated deflection by means of a resilient seismic upstop to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of a scale. Submittals shall include a drawing of the hanger showing the 30 degree capability. Hangers shall be type PC30N as manufactured by Mason Industries, Inc.
- L. TYPE 12 - Seismic Cable Restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cable assemblies shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California verifying the maximum certified load ratings. Cable assemblies shall be Type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod nut and the clevis or SCBV if clamped to a beam all as manufactured by Mason Industries, Inc.
- M. TYPE 13 - Seismic solid braces shall consist of steel angles or channels to resist seismic loads with a minimum safety factor of 2 and arranged to provide all directional restraint. Seismic solid brace end connectors shall be steel assemblies that swivel to the final installation angle and utilize two through bolts to provide proper attachment. Seismic solid brace assembly shall have anchorage preapproval "R" number from OSHPD in the state of California verifying the maximum certified load ratings. Solid seismic brace assemblies shall be type SSB as manufactured by Mason Industries, Inc.

Note: Type 12 - 14 apply to trapeze as well as clevis hanger locations. At trapeze anchor locations piping must be shackled to the trapeze. Specifications apply to hanging equipment as well.

- N. TYPE 14 - Steel angles, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California. Rod clamp assemblies shall be Type SRC as manufactured by Mason Industries, Inc.
- O. TYPE 15 - Pipe clevis cross bolt braces are required in all restraint locations. They shall be special purpose preformed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross braces shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California. Clevis cross brace shall be type CCB as manufactured by Mason Industries, Inc.
- P. TYPE 16 - All-directional seismic snubbers shall consist of interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene. Bushing shall be replaceable and a minimum of 1/4 inch thick. Rated loadings shall not exceed 1000 psi. A minimum air gap of 1/8 inch shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces. Snubber end caps shall be removable to allow inspection of internal clearances. Neoprene bushings shall be rotated to insure no short circuits exist before systems are activated. Snubbers shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Snubber shall be Type Z-1225 as manufactured by Mason Industries, Inc.
- Q. TYPE 17 - All directional seismic snubbers shall consist of interlocking steel members restrained by shock absorbent rubber materials compounded to bridge bearing specifications. Elastomeric materials shall be replaceable and a minimum of 3/4" thick. Rated loadings shall not exceed 1000 psi. Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8" nor more than 1/4". Snubbers shall be installed with factory set clearances. The capacity of the seismic snubber at 3/8" deflection shall be equal or greater than the load assigned to the mounting grouping controlled by the snubber multiplied by the applicable "G" force. Submittals shall include the load deflection curves up to 1/2" deflection in the x, y and z planes. Snubbers shall have an anchorage preapproval "R" number from OSHPD in the state of California verifying the maximum certified horizontal and vertical load ratings. Snubbers shall be series Z-1011 as manufactured by Mason Industries, Inc.
- R. TYPE 18 - Stud wedge anchors shall be manufactured from full diameter wire, not from undersized wire that is "rolled up" to create the thread. The stud anchor shall also have a safety shoulder which fully supports the wedge ring under load. The stud anchors shall have an evaluation report number from the I.C.B.O Evaluation Service, Inc. verifying its allowable loads. Drill-in stud wedge anchors shall be type SAS as manufactured by Mason Industries, Inc.
- S. TYPE 19 - Female wedge anchors are preferred in floor locations so isolators or equipment can be slid into place after the anchors are installed. Anchors shall be manufactured from full diameter wire, and shall have a safety shoulder to fully support the wedge ring under load. Female wedge anchors shall have an evaluation report number from the I.C.B.O Evaluation Service, Inc. verifying its allowable loads. Drill-in female wedge anchors shall be type SAB as manufactured by Mason Industries, Inc.

- T. TYPE 20 - Vibration isolation manufacturer shall furnish integral structural steel bases. Rectangular bases are preferred for all equipment. Centrifugal refrigeration machines and pump bases may be T or L shaped where space is a problem. Pump bases for split case pump shall include supports for suction and discharge elbows. All perimeter members shall be steel beams with a minimum depth equal to 1/10 of the longest dimension of the base. Base depth need not exceed 14" provided that the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in all mounting locations to provide a base clearance of 1". Bases shall be type WF as manufactured by Mason Industries, Inc.
- U. TYPE 21 - Vibration isolation manufacturer shall furnish rectangular steel concrete pouring forms for floating and inertia foundations. Bases for split case pumps shall be large enough to provide for suction and discharge elbows. Bases shall be a minimum of 1/12 of the longest dimension of the base but not less than 6". The base depth need not exceed 12" unless specifically recommended by the base manufacturer for mass or rigidity. Forms shall include minimum concrete reinforcing consisting of 1/2" bars welded in place on 6" centers running both ways in a layer 1 1/2" above the bottom. Forms shall be furnished with steel templates to hold the anchor bolts sleeves and anchors while concrete is being poured. Height saving brackets shall be employed in all mounting locations to maintain a 1" clearance below the base. Wooden formed bases leaving a concrete rather than a steel finish are not acceptable. Base shall be type BMK or K as manufactured by Mason Industries, Inc.
- V. TYPE 22 - Curb mounted rooftop equipment shall be mounted on spring isolation curbs. The lower member shall consist of a sheet metal Z section containing adjustable and removable steel springs that support the upper floating section. The upper frame must provide continuous support for the equipment and must be captive so as to resiliently resist wind and seismic forces. All directional neoprene snubber bushings shall be a minimum of 1/4" thick. Steel springs shall be laterally stable and rest on 1/4" thick neoprene acoustical pads. Hardware must be plated and the springs provided with a rust resistant finish. The curbs waterproofing shall consist of a continuous galvanized flexible counter flashing nailed over the lower curbs waterproofing and joined at the corners by EPDM bellows. All spring locations shall have access ports with removable waterproof covers. Lower curbs shall have provision for 2" of insulation. The roof curbs shall be built to seismically contain the rooftop unit. Contact points between the rooftop equipment, the curb and the building's structure shall show load path through those locations only.

The unit must be solidly fastened to the top floating rail, and the lower Z section anchored to the roof structure. Curb shall have anchorage preapproval "R" from OSHPD in the state of California attesting to the maximum certified horizontal and vertical load ratings. Curb shall be type RSC as manufactured by Mason Industries, Inc.

Where roof curbs are indicated to be seismic type without spring isolators, all provisions of above Type 22 shall apply with the exception of spring isolation. The system shall be designed for positive anchorage or welding of equipment to supports and welding of supports to the building steel, capable of carrying the design seismic and wind loads.

- W. TYPE 23 - Flexible spherical expansion joints shall employ peroxide cured EPDM in the covers, liners and Dacron tire cord frictioning. Expansion joints shall be suitable for water/glycol mixture. Solid steel rings shall be used within the raised face rubber ends to prevent pullout. Flexible cable bead wire is not acceptable. Sizes 2" and larger shall have two spheres reinforced with a ring between spheres to maintain shape and complete with split ductile iron or steel flanges with hooked or similar interlocks. Sizes 16" to 24" may be single sphere. Sizes 3/4" to 1 1/2" may have threaded bolted flange assemblies, one sphere and cable retention. 14" and smaller connectors shall be rated at 250 psi up to 190°F with a uniform drop in allowable pressure to 190 psi at 250°F. 16" and larger connectors are rated 180 psi at 190°F and 135 psi at 250°F. Safety factors to burst and flange pullout shall be a minimum of 3/1. All joints must have permanent markings verifying a 5 minute factory test at twice the rated pressure.
- X. Concentric reducers to the above specifications may be substituted for equal ended expansion joints.
- Y. Expansion joints shall be installed in piping gaps equal to the length of the expansion joints under pressure. Control rods need only be used in unanchored piping locations where the manufacturer determines the installation exceeds the pressure requirement without control rods, as control rods are not desirable in seismic work. If control rods are used, they must have 1/2" thick Neoprene washer bushings large enough in area to take the thrust at 1000 psi maximum on the washer area. Expansion joints shall be installed on the equipment side of the shut off valves.
- Z. Submittals shall include two test reports by independent consultants showing minimum reductions of 20 DB in vibration accelerations and 10 DB in sound pressure levels at typical blade passage frequencies on this or a similar product by the same manufacturer. All expansion joints shall be installed on the equipment side of the shut off valves. Expansion joints shall be SAFEFLEX SFDEJ, SFEJ, SFDCR or SFU and Control Rods CR as manufactured by Mason Industries, Inc.
- AA. TYPE 24 - Flexible stainless steel hose shall have stainless steel braid and carbon steel fittings. Sizes 3" and larger shall be flanged. Smaller sizes shall have male nipples. Minimum lengths shall be as tabulated:

<u>Flanged</u>		<u>Male Nipples</u>	
3"Ø x 14"L	10"Ø x 26"L	1/2"Ø x 9"L	1 1/2"Ø x 13"L
4"Ø x 15"L	12"Ø x 28"L	3/4"Ø x 10"L	2"Ø x 14"L
5"Ø x 19"L	14"Ø x 30"L	1"Ø x 11"L	2 1/2"Ø x 18"L
6"Ø x 20"L	16"Ø x 32"L	1 1/4"Ø x 12"L	8"Ø x 22"L

Hoses shall be installed on the equipment side of the shut-off valves horizontally and parallel to the equipment shafts wherever possible. Hoses shall be type BSS as manufactured by Mason Industries, Inc.

- BB. TYPE 25 - All-directional acoustical pipe anchor, consisting of two sizes of steel tubing separated by a minimum 1/2" thick 60 durometer neoprene. Vertical restraint shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material should not exceed 500 psi and the design shall be balanced for equal resistance in any direction. All-directional anchors shall be type ADA as manufactured by Mason Industries, Inc.

- CC. TYPE 26 - Pipe guides shall consist of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1/2" thickness of 60 durometer neoprene. The height of the guides shall be preset with a shear pin to allow vertical motion due to pipe expansion or contraction. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of $\pm 1 \frac{5}{8}$ " motion, or to meet location requirements. Pipe guides shall be type VSG as manufactured by Mason Industries, Inc.
- DD. TYPE 27 - Split Wall Seals consist of two bolted pipe halves with minimum 3/4" thick neoprene sponge bonded to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not already in place around the pipe prior to the construction of the building member. Seals shall project a minimum of 1" past either face of the wall. Where temperatures exceed 240° F, 10# density fiberglass may be used in lieu of the sponge. Seals shall be Type SWS as manufactured by Mason Industries, Inc.
- EE. TYPE 28 - The horizontal thrust restraint shall consist of a spring element in series with a neoprene molded cup as described in Type 5 with the same deflection as specified for the mountings or hangers. The spring element shall be designed so it can be preset for thrust at the factory and adjusted in the field to allow for a maximum of 1/4" movement at start and stop. The assembly shall be furnished with 1 rod and angle brackets for attachment to both the equipment and the duct work or the equipment and the structure. Horizontal restraints shall be attached at the centerline of thrust and symmetrical on either side of the unit. Horizontal thrust restraints shall be type WBI/WBD as manufactured by Mason Industries, Inc.

PART 3 - EXECUTION

3.1 GENERAL

- A. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data.
- B. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or duct work resulting in stresses or misalignment.
- C. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.
- D. The contractor shall not install any equipment, piping, duct or conduit which makes rigid connections with the building unless isolation is not specified. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.
- E. Coordinate work with other trades to avoid rigid contact with the building.
- F. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the engineers' attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractor's expense.

- G. Bring to the engineers' attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the responsible contractor's expense.
- H. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractor's expense.
- I. Overstressing of the building structure must not occur because of overhead support of equipment. Generally bracing may occur from:
 - 1. Flanges of structural beams.
 - 2. Upper truss cords in bar joist construction.
 - 3. Cast in place inserts or wedge type drill-in concrete anchors.
- J. Type 12 cable restraints shall be installed slightly slack to avoid short circuiting the isolated suspended equipment, piping or conduit.
- K. Type 12 cable assemblies are installed taut on non-isolated systems. Type 13 seismic solid braces may be used in place of cables on rigidly attached systems only.
- L. At locations where Type 12 or 13 restraints are located, the support rods must be braced when necessary to accept compressive loads with Type 14 braces.
- M. At all locations where Type 12 or 13 restraints are attached to pipe clevis's, the clevis cross bolt must be reinforced with Type 15 braces.
- N. Drill-in concrete anchors for ceiling and wall installation shall be Type 18, and Type 19 female wedge type for floor mounted equipment.
- O. Vibration isolation manufacturer shall furnish integral structural steel bases as required.
- P. Hand built elastomeric expansion joints may be used when pipe sizes exceed 24" or specified movements exceed Type 23 capabilities.
- Q. Where piping passes through walls, floors or ceilings the vibration isolation manufacturer shall provide Type 27 wall seals.
- R. Locate isolation hangers as near to the overhead support structure as possible.

3.2 VIBRATION ISOLATION AND SEISMIC RESTRAINTS

- A. Vibration Isolation of Piping:
 - 1. Horizontal pipe isolation: The first three pipe hangers in the main lines near the mechanical equipment shall be as described in Type 11. Type 11 hangers must also be used in all transverse braced isolated locations. Brace hanger rods with SRC clamps Type 14. Horizontal runs in all other locations throughout the building shall be isolated by hangers as described in Type 10. Floor supported piping shall rest on isolators as described in Type 6. Heat exchanger's and expansion tanks are considered part of the piping run. The first three isolators from the isolated equipment will have the same static

deflection as specified for the mountings under the connected equipment. If piping is connected to equipment located in basements and hangs from ceilings under occupied spaces the first three hangers shall have 0.75" deflection for pipe sizes up to and including 3", 1 1/2" deflection for pipe sizes up to and including 6", and 2 1/2" deflection thereafter. Hangers shall be located as close to the overhead structure as practical. Where piping connects to mechanical equipment install Type 23 expansion joints or Type 24 stainless hoses if 23 is not suitable for the service.

2. Riser isolation: Risers shall be suspended from Type 10 hangers or supported by Type 5 mountings, anchored with Type 25 anchors, and guided with Type 26 sliding guides. Steel springs shall be a minimum of 0.75" except in those expansion locations where additional deflection is required to limit load changes to $\pm 25\%$ of the initial load. Submittals must include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on the building structure, spring deflection changes and seismic loads. Submittal data shall include certification that the riser system has been examined for excessive stresses and that none will exist in the proposed design.

B. Seismic Restraint of Piping

1. Seismically restrain all piping listed as a, b or c below. Use Type 12 cables if isolated. Type 12 or 13 restraints may be used on un-isolated piping.
 - a. All high hazard piping.
 - b. Piping located in boiler rooms, mechanical equipment rooms, and refrigeration equipment rooms that is 1 1/4" I.D. and larger.
 - c. All other piping 2 1/2" diameter and larger.
2. Transverse piping restraints shall be at 40' maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
3. Longitudinal restraints shall be at 80' maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
4. Where thermal expansion is a consideration, guides and anchors may be used as transverse and longitudinal restraints provided they have a capacity equal to or greater than the restraint loads in addition to the loads induced by expansion or contraction.
5. For all gas piping transverse restraints must be at 20' maximum and longitudinal restraints at 40' maximum spacing.
6. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24" of the elbow or TEE or combined stresses are within allowable limits at longer distances.
7. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints in a manner similar to clevis supports.
8. Branch lines may not be used to restrain main lines.
9. Cast iron pipe of all types, glass pipe and any other pipes joined with a four band shield and clamp assembly in Zones 2B, 3 and 4 shall be braced as in sections B.C.2 and 3. For Zones 0, 1 and 2A, 2 band clamps may be used with reduced spacing of 1/2 of those listed in sections B.C.2 and 3.

PART 4 - SCHEDULES

4.1 EQUIPMENT ISOLATOR AND SEISMIC RESTRAINT SCHEDULE

	<i>Vibration Isolation and or Seismic Restraint</i>	
<i>Equipment Schedule</i>	<i>Type</i>	<i>Static Deflection</i>
FLOOR MOUNTED PUMPS	7-23	0.75
GENERATOR DAY TANKS	NOTE 1, 2	---

NOTES:

1. Provide seismic anchor bolts and 3/4" thick neoprene waffle pads.
2. See drawings for additional information.

END OF SECTION 15145

SECTION 15260 – PIPING INSULATION

PART 1 - GENERAL

1.1 REFERENCES

- A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
- C. ASTM C449 - Mineral Fiber Hydraulic-setting Thermal Insulating and Finishing Cement.
- D. ASTM C534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- E. ASTM C547 - Mineral Fiber Preformed Pipe Insulation.
- F. ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
- G. ASTM E84 - Surface Burning Characteristics of Building Materials.
- H. NFPA 255 - Surface Burning Characteristics of Building Materials.
- I. UL 723 - Surface Burning Characteristics of Building Materials.

1.2 SUBMITTALS

- A. Submit under provisions of Section 15010.
- B. Product Data: Provide product description, list of materials and thickness for each service, and locations.
- C. Manufacturer's Installation Instructions: Indicate procedures which ensure acceptable workmanship and installation standards will be achieved.

1.3 QUALITY ASSURANCE

- A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255 and UL 723.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 15010.
- B. Deliver materials to site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- C. Store insulation in original wrapping and protect from weather and construction traffic.
- D. Protect insulation against dirt, water, chemical, and mechanical damage.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 - PRODUCTS

2.1 GLASS FIBER TYPE "A"

- A. Insulation: ASTM C547; rigid molded, noncombustible.
 - 1. 'K' value: ASTM C335, 0.23 at 75 degrees F.
 - 2. Minimum Service Temperature: -20 degrees F.
 - 3. Maximum Service Temperature: 300 degrees F.
 - 4. Maximum Moisture Absorption: 0.2 percent by volume.
- B. Vapor Barrier Jacket
 - 1. ASTM C921, White kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
 - 3. Secure with self sealing longitudinal laps and butt strips.
 - 4. Secure with outward clinch expanding staples and vapor barrier mastic. Seal at staples with vapor barrier finish.
 - 5. Sealant: ASTM C449.
- C. Aluminum Jacket: ASTM B209.
 - 1. Thickness: 0.016 inch sheet.
 - 2. Finish: Smooth.
 - 3. Joining: Longitudinal slip joints and 2 inch laps.
 - 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 - 5. Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel. Do not use screws.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. On exposed piping, locate insulation and cover seams in least visible locations.
- C. For insulated pipes conveying fluids above ambient temperature:

- 1. Provide standard jackets, with or without vapor barrier, factory applied or field applied.

2. Neatly bevel and seal insulation at unions, valves, etc.
3. Finish with glass cloth and adhesive.
4. PVC fitting covers are not acceptable.
5. Protect with aluminum jacket.

D. For engine coolant piping exposed in mechanical equipment rooms, insulate pipe and protect with aluminum jacket to a height of 6'- 0" AFF. Secure aluminum jacket with stainless steel bands per the manufacturer's recommendations. Do not secure aluminum jacket with screws. Engine coolant piping at level higher than 6'-0" AFF need not be insulated.

3.3 INSULATION SCHEDULE

PIPING SYSTEMS	PIPE SIZE Inch	THICKNESS Inch	TYPE
Engine Coolant Supply and Return within 6'-0" AFF	All	1-1/2"	A

3.4 INSULATION

- A. Insulation with vapor barrier jacket shall not be installed using staples unless same is protected by mastic being applied over staples.
- B. Insulation shall be continuous through all hangers, supports and penetrations.
- C. Install per manufacturer's recommendations.

END OF SECTION 15260

SECTION 15490 – FUEL OIL PIPING

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design restraint and anchors for fuel-oil piping and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.2 SUBMITTALS

- A. Submit under provisions of Section 15010.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For facility fuel-oil piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers and supports for multiple pipes.

1.3 DELIVERY STORAGE AND HANLDING

- A. Deliver, store, protect, and handle products to site under provisions of Section 15010.

1.4 QUALITY ASSURANCE

- A. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- B. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with ASME B31.9, "Building Services Piping," for fuel-oil piping materials, installation, testing, and inspecting.
- F. Comply with requirements of the EPA and of state and local authorities having jurisdiction.
- G. Include recording of fuel-oil storage tanks and monitoring of tanks and piping.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-oil piping and related equipment that fail in materials or workmanship within specified warranty period.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Rigid Fuel Oil Pipe and Vent Pipe: Steel Pipe, ASTM A 53 or A 106, black steel, Schedule 40, Type S, Grade B, seamless.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
- B. Flexible Piping:
 - 1. As approved by the engine manufacturer.
 - 2. For supply/return piping between day tank and engine only.

2.2 PIPING SPECIALTIES

- A. Y-Pattern Strainers:
 - 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
 - 2. End Connections: Threaded ends for NPS 2 and smaller.
 - a. Strainer Screen: 120-mesh strainer.
 - b. CWP Rating: 125 psig.
- B. Manual Air Vents:
 - 1. Body: Bronze.
 - 2. Internal Parts: Nonferrous.
 - 3. Operator: Screwdriver or thumbscrew.
 - 4. Inlet Connection: NPS 1/2.
 - 5. Discharge Connection: NPS 1/8.
 - 6. CWP Rating: 150 psig.
 - 7. Maximum Operating Temperature: 225 deg F.

2.3 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for fuel oil.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 MANUAL FUEL-OIL SHUTOFF VALVES

- A. General Requirements for Metallic Valves: Comply with UL 842.
 - 1. CWP Rating: 125 psig.
 - 2. Threaded Ends: Comply with ASME B1.20.1.
 - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 - 4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

- B. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; A Subsidiary of American Meter Company.
 - 2. Body: Bronze, complying with ASTM B 584.
 - 3. Ball: Chrome-plated bronze.
 - 4. Stem: Bronze; blowout proof.
 - 5. Seats: Reinforced TFE; blowout proof.
 - 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 - 7. Ends: Threaded, flared, or socket as indicated in the valve schedule.
 - 8. CWP Rating: 600 psig.
 - 9. Service Mark: Initials "WOG" shall be permanently marked on valve body.

PART 3 - EXECUTION

3.1 INDOOR PIPING INSTALLATION

- A. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- B. Install piping exposed in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping free of sags and bends.
- F. Install fittings for changes in direction and branch connections.
- G. Connect to existing as required.
- H. Verify final equipment locations for roughing-in.

3.2 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- D. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to "Quality Assurance" Article.
 - 1. Bevel plain ends of steel pipe.
 - 2. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

3.3 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.
- B. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment having threaded pipe connection.
- C. Connect piping to equipment with ball valve and union. Install union between valve and equipment.

3.4 TESTING

- A. Piping: Minimum hydrostatic or pneumatic test-pressures measured at highest point in system:
 - 1. Fuel-Oil Distribution Piping: Minimum 5 psig for minimum 30 minutes.
 - 2. Isolate storage tanks during testing to protect tanks.

END OF SECTION 15490

SECTION 15510 – HYDRONIC PIPING

PART 1 - GENERAL

1.1 REFERENCES

- A. ANSI/ASME - Boiler and Pressure Vessel Code.
- B. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.
- C. ANSI/ASME B16.29 - Wrought copper and wrought copper alloy solder joint drainage fittings.
- D. ASTM 53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless.
- E. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

1.2 REGULATORY REQUIREMENTS

- A. Conform to ANSI/ASME B31.9.

1.3 SUBMITTALS

- A. Include data on pipe materials, pipe fittings, valves, and accessories under provision of Section 15010.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place under provisions of Section 15010.

PART 2 - PRODUCTS

2.1 ENGINE COOLANT PIPING

- A. ASTM A53 Seamless, Schedule 40, black. Fittings: ANSI B16.9 welded or flanged. ANSI B16.5 forged steel gasket flanges of the welded neck type shall be used at all flanged connections.
- B. FLEXIBLE RADIATOR HOSES - For Final connection to engine – Flexible hoses shall be as recommended by the engine manufacturer. Comply with SAE 20R1.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.

- C. Prepare piping connections to equipment with unions.

3.2 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure, and maintain slope to drain.
- B. Install piping to conserve building space, and not interfere with use of space and existing systems.
- C. Group piping whenever practical at common elevations.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- E. Provide clearance for installation of insulation, and access to valves and fittings.
- F. Provide union, cutoff valve and flexible connector at inlet and outlet connections to remote radiators.
- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level. Provide one set of hose-end drain valves for each set of radiator lines to permit draining.
- H. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

3.3 APPLICATION

- A. Provide di-electric unions at all piping connections of dis-similar metals.

END OF SECTION 15510

SECTION 15556 – VENTS AND STACKS

PART 1 - GENERAL

1.1 REFERENCES

- A. IFGC – International Fuel Gas Code.

1.2 SHOP DRAWINGS

- A. Furnish complete stack shop drawings for review. Drawings shall include all required accessories for a complete venting system. Submit under provisions of Section 15010.

1.3 DELIVERY STORAGE AND HANLDING

- A. Deliver, store, protect, and handle products to site under provisions of Section 15010.

PART 2 - PRODUCTS

2.1 INSULATED POSITIVE PRESSURE VENT FOR GENERATOR EXHAUST

- A. Furnish and install where indicated on the drawings a factory built Underwriters Laboratories, Inc. listed MODEL DW chimney and breeching as manufactured by Van-Packer Co., Buda, IL. to match existing. The chimney shall be listed by UL as a “1400° Fahrenheit Chimney” for continuous operation at 1400°F and intermittent operation at 1800°F and also as a “Building Heating Appliance Chimney” (UL 103) for continuous operation at 1000°F and intermittent operation at 1400°F.
- B. The chimney manufacturer shall furnish all items which form a part of the assembly, including straight sections, tee sections, elbows, cleanout, drains, expansion joints, adapter kits, guybands, flashing, counter flashing and a thimble where required. Furnish vents as required to connect new generator exhaust to existing vents – See plans. Field verify all sizes, dimensions, offsets, etc. Diameter of inner liner to match existing (12” – verify).
- C. Installation shall be made in accordance with the manufacturer’s recommendation and in compliance with the Underwriters Laboratory, Inc. listing.
- D. All vent sections shall be of double wall construction with 4” insulation between the liner and the shell. The liner shall be 20-gauge type 316 stainless steel and the shell shall be of 24-gauge type 316 stainless steel.
- E. All sections shall be joined with a vee band sealed with silicone sealant around the inner liner and a drawband around the outer shell. Silicone sealant shall also be used on the outer drawband for exterior installations provided by the Installing Contractor. High temperature joint cement shall be used instead of silicone sealant on the vee band for operating temperatures exceeding 600°F.

PART 3 - EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS

- A. All vents shall be installed in accordance with the manufacturer's recommendations and in compliance with the Underwriters Laboratory, Inc. listing. Maintain recommended clearance to combustibles.

3.2 GENERAL

- A. Diameter shall match existing.
- B. Store delivered materials inside, out of the weather. Protect materials from accidental damage or vandalism.
- C. Support vent from building structure using rigid structural shapes for attachment of fixed point supports. (Plate Support Assembly). Anchor supports to structure by welding, bolting, steel expansion anchors, or concrete inserts. Size of structural shapes shall be in accordance with manufacturer's recommendations.
- D. Coordinate installation to connect to existing and seal.
- E. Protect incomplete vent installations by attaching temporary closures over open ends of sections.
- F. Clean all vents and breechings of dust and debris prior to final connection.

END OF SECTION 15556

SECTION 15990 – TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 REFERENCES

- A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.
- B. ASHRAE - 1984 Systems Handbook: Chapter 37, Testing, Adjusting and Balancing.
- C. NEBB - Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1.2 SUBMITTALS

- A. Submit name of adjusting and balancing agency and samples of forms to be used for approval within 30 days after award of Contract.
- B. Submit test reports under provisions of Section 15010.
- C. Prior to commencing work, submit draft reports indicating adjusting, balancing, and equipment data required.
- D. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
- E. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
- F. Include detailed procedures, agenda, sample report forms.

1.3 QUALIFICATIONS

- A. Independent contractor, certified by AABC or NEBB, with minimum five years documented experience.

1.4 REPORT FORMS

- A. Submit reports on AABC National Standards for Total System Balance or NEBB forms.
- B. Forms shall include the following information:
 - 1. Title Page:
 - a. Company name
 - b. Company address
 - c. Company telephone number
 - d. Project name
 - e. Project location

- f. Project Engineer
- g. Project Contractor
- h. Project altitude
- 2. Instrument List:
 - a. Instrument
 - b. Manufacturer
 - c. Model
 - d. Serial number
 - e. Range
 - f. Calibration date
- 3. Air Moving Equipment:
 - a. Location
 - b. Manufacturer
 - c. Model
 - d. Air flow, specified and actual
 - e. Return air flow, specified and actual
 - f. Outside air flow, specified and actual
 - g. Total static pressure (total external), specified and actual
 - h. Inlet pressure
 - i. Discharge pressure
 - j. Fan RPM
 - k. Measurement and recording of all duct static pressure and differential pressure sensors.
- 4. Fan Data:
 - a. Location
 - b. Manufacturer
 - c. Model
 - d. Air flow, specified and actual
 - e. Total static pressure (total external), specified and actual
 - f. Inlet pressure
 - g. Discharge pressure
 - h. Fan RPM
- 5. Electric Motors:
 - a. Manufacturer
 - b. HP/BHP
 - c. Phase, voltage, amperage; nameplate, actual, no load.
 - d. RPM
 - e. Service factor
 - f. Starter size, rating, heater elements
- 6. Radiator Coil:
 - a. Terminal Unit No. (Generator Served)
 - b. Surface Area
 - e. Entering Fluid Temperature
 - f. Leaving Fluid Temperature
- 7. Coolant Water Flow:
 - a. Measurement, Adjusting and Recording of final coolant water flow to each engine. Coordinate with engineer/generator manufacturer.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Section 15010.

1.6 QUALITY ASSURANCE

- A. Agency shall be company specializing in the adjusting and balancing of systems specified in this Section with minimum five years documented experience. Perform Work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor.
- B. Total system balance shall be performed in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance, ASHRAE - 1984 Systems Handbook or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.
- B. Testing and balancing of generator exhaust vents and engine coolant systems must be coordinated with the generator supplier. Factory authorized personnel from generator manufacturer must be on site to assist with the balance of these systems.

PART 2 - PRODUCTS

This part is not used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before commencing work, verify that systems are complete and operable. Ensure the following:
 - 1. Equipment is operable and in a safe and normal condition.
 - 2. Proper thermal overload protection is in place for electrical equipment.
- B. Report any defects or deficiencies noted during performance of services to Project Engineer.
- C. Promptly report abnormal conditions in mechanical systems or conditions which prevent system balance.
- D. If, for design reasons, system cannot be properly balanced, report as soon as observed.
- E. Beginning of work means acceptance of existing conditions.

3.2 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.
- B. Provide additional balancing devices as required.

3.3 INSTALLATION TOLERANCES

- A. Adjust air handling systems to plus or minus 10 percent for supply return and exhaust systems from figures indicated.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 15010.
- B. Recorded data shall represent actually measured, or observed condition.
- C. Permanently mark settings of dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- G. Check and adjust systems approximately six months after final acceptance and submit report.

3.5 EXHAUST SYSTEM PROCEDURE

- A. Adjust existing generator exhaust fans (one fan per engine) to provide required exhaust airflow and eliminate back-pressure on engine. Coordinate with generator supplier.
- B. Adjust as required at each fan.
- C. Ensure existing fans are properly interlocked with respective generator.
- D. Coordinate fan adjustment with original supplier of fans (Gorham/Schaffler, phone (901) 345-6100).
- E. Existing engine exhaust fans are to be re-used. Notify the owner of any defects with existing fans.

3.6 WATER SYSTEM PROCEDURE

- A. Adjust fluid systems to provide required engine coolant flow.
- B. Use calibrated fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, provide flow measuring devices or base flow balance on temperature difference across various heat transfer elements in the system.

END OF SECTION 15990

SECTION 16010 – BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This section specifies the basic electrical requirements for this project as well as the general requirements which apply to the work of Division 16 in addition to those stipulated in Section 1. Should any discrepancies exist between the requirements of Division 16 and those found in Section 1; the more stringent requirement shall govern except where the two requirements are contradictory in which case the Section 1 requirements shall govern.
- B. The electrical work required for this project consists of furnishing all labor, equipment and materials necessary to obtain complete and operational electrical systems as indicated on the drawings and as specified herein.
- C. The Contractor shall furnish all material and labor as required for the installation of the new electric service per the local power company's requirements. The Contractor shall coordinate with the local power company for all requirements.

1.2 CODES, STANDARDS AND PERMITS:

- A. The installation shall comply with the following:
 - 1. All applicable local and state wiring ordinances.
 - 2. The National Electrical Code (NFPA-70-2008).
 - 3. All applicable provisions of the Occupational Safety and Health Act (OSHA).
 - 4. Requirements of the power company furnishing services to the project.
 - 5. International Building Code (2009 Edition).
 - 6. Life Safety Code (NFPA 101-2008).
 - 7. Americans with Disabilities Act (ADA).
- B. This contractor shall apply for, obtain, and pay for all permits required. At the conclusion of the installation, he/she shall secure a certificate of inspection, properly signed by the controlling building department, which shall state that all rules have been complied with and that the work is satisfactory.
- C. Should any part of the plans or specifications be found to be in conflict with applicable codes or ordinances, the contractor shall notify the engineer before submitting his/her bid.

1.3 TRADE NAMES AND EQUALS

- A. Manufacturer's trade names or catalog numbers used in these specifications and indicated on the drawings denote type, size, quality, and design of equipment desired.
- B. Where equipment is specified as "equal", or "approved equal", it shall mean equal in the opinion of the engineer. This contractor is free to offer substitutions for consideration as equal after the contract is

signed; however, he shall be prepared to furnish specified materials where substitutions are not approved.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIAL AND EQUIPMENT

- A. The contractor shall be responsible for the purchase, delivery, and storage of all materials and equipment indicated to be supplied under this section of the specifications, and it shall be his/her responsibility to schedule the delivery of materials and equipment at such stages of the work as will permit uninterrupted construction of all phases of the work.
- B. Where owner furnished equipment is to be turned over to this contractor for installation, it shall be the responsibility of this contractor to receive such equipment and store in a safe, dry location.
- C. This contractor shall do all required rigging, hoisting, transporting, etc., of all equipment furnished under this contract, and shall further furnish any additional structural members, as may be required, for the proper support of any and all equipment furnished hereunder.

1.5 USE OF DOCUMENTS:

- A. The scope of the electrical work for this project is not limited to the requirements of any one drawing, any portion of the drawings, any one specification division, or any portion of the specifications whose main theme is electrical. The scope of the electrical work for this project consists of all electrical work required to obtain complete and operating systems and equipment as indicated on or as can be reasonably inferred from all drawings and specifications.
- B. The drawings indicate diagrammatically the general arrangement of circuits and outlets, locations of switches, panelboards, electrically operated equipment & appliances and other work. This data is as accurate as planning can determine, but accuracy is not guaranteed. Field verification of all dimensions, locations, levels, etc., to suit field conditions is directed.
- C. Should any structural or mechanical interferences prevent the installation of conduit, setting of junction boxes and cabinets, arrangement of lighting fixtures and method of suspension, etc., in the locations indicated on the drawings, the necessary deviations therefrom must be made without additional cost to the owner, where relocation is not over five (5) feet from the location shown on the drawings.
- D. Review all drawings and adjust all work to conform to all conditions shown therein. Discrepancies between different drawings, or between drawings and specifications or codes and regulations governing the installation shall be brought to the attention of the Owner's Representative prior to the date of bid opening.
- E. The locations of equipment, motors, etc., as indicated on the drawings are approximate only. Verify all dimensions with the appropriate equipment installer before rough-in. Where conduit, wiring, service equipment, lights, switches, or other electrical equipment interfere with construction; remove, relocate and rearrange such material and equipment as required to make a complete and satisfactory installation.
- F. Any offsets in conduit required or necessary to avoid interferences with structure, or the work of other trades, etc., shall be made at no additional cost to the owner.

1.6 COORDINATION

- A. The electrical contractor shall coordinate his/her work with that of other subcontractors on the job and also with that of the owner in order that there be no delay in the proper installation and completion of the several parts of the work.
- B. This contractor shall use every precaution to protect the work of others, and he/she will be held responsible for all damage done by his workers to the work of other trades. He/she shall also protect his work from danger of breakage, dirt, foreign materials, etc., and shall replace all work so damaged.
- C. Coordinate phases of the work with the owner and other trades to allow the owner to continue normal business operations throughout the duration of the project. Any necessary power outages shall be scheduled for other than the owner's hours of operation, or be pre-arranged with the owner.

1.7 MANUFACTURER'S RECOMMENDATIONS

- A. Unless specifically indicated otherwise, all equipment and materials shall be installed in accordance with the best recommendation of the manufacturer. A copy of the manufacturer's installation recommendations shall be kept in the job superintendent's office and shall be available to the owner's representative at all times.

1.8 CUTTING AND PATCHING

- A. This contractor shall be responsible for all cutting and patching required for the installation of his work, and he/she shall employ workers skilled in the trades required for all cutting and patching work.
- B. This contractor shall be responsible for the proper location of all chases, recesses, and openings required for his work.
- C. This contractor shall provide all sleeves, etc., required for the introduction and placement of his work, and shall be responsible for the correct location of same.
- D. Beams or columns shall not be pierced without permission of the structural engineer, and then only as directed.

1.9 PAINTING

- A. Painting of materials and equipment furnished under the electrical portion of the contract, if required, will be done under a separate section of the project specifications. The electrical contractor shall, however, refinish and restore to the original condition and appearance, all electrical equipment which has sustained damage to manufacturer's finish paint.
- B. All electrical equipment shall be provided with factory applied prime and finish paint, unless otherwise specified.

1.10 SHOP DRAWINGS (SUBMITTALS)

- A. Six copies of shop drawings and/or manufacturer's descriptive data of a nature to completely identify the equality of the material or equipment intended for installation shall be submitted for approval before beginning any construction and within thirty days after signing contract. Failure to submit data for approval within thirty days time limit will be construed as meaning equipment called for by name will be furnished. Data shall be organized in same order as listed below, shall be submitted all in one three ring binder, indexed by flysheet on front page, each item tabbed and labeled, arranged in the order they appear in the specifications, and be bound in sets, all sets identical. No exception will be made to this procedure and time schedule.
- B. Each item submitted for review shall have submittal data preceded by a typewritten description (by contractor or item supplier) of the item. Description shall include make and model numbers and shall describe the item. List all options and accessories which are included. List any options or accessories shown on shop drawings which are not included.

1.11 RECORD DRAWINGS

- A. This contractor shall maintain a complete up-to-date set of record drawings and specifications on the job site. Drawings shall be maintained in a neat condition and shall clearly show any changes from original drawings and specifications.
- B. Contractor shall use a designed set of prints of the contract documents, as prepared by the engineer, to mark up for record drawing purposes.
- C. The contractor shall prepare a set of reproducible record drawings. These drawings and a set of specifications shall be turned over to the owner and shall become the property of the owner before final payment will be made.

1.12 MAINTENANCE MANUALS

- A. Contractor shall provide three (3) copies of operational and maintenance manuals for all equipment installed under this division of the specifications. The manuals shall include a list of spare parts and proper operational and maintenance procedures.
- B. The manuals shall be organized and fully indexed. Manuals shall consist of three-ring, hard back binders with appropriate dividers for each part.
- C. Manual contents shall include, but shall not be limited to the following:
 - 1. Name and address of contractor, equipment manufacturer and supplier.
 - 2. Set of approved shop drawings or approved submittal data.
 - 3. Wiring diagrams and installation drawings.
 - 4. Spare parts and replacement parts lists as recommended by the manufacturer.
 - 5. Proper operational procedures and maintenance procedures.

6. Installation and operation manuals.
7. Maintenance and service manuals.
8. Copy of warranties and guarantees.

- D. Operating and maintenance manuals shall be turned over to the owner before final payment will be made.
- E. It shall be the responsibility of this contractor maintain, warrant, clean, etc., any equipment supplied by this contractor until all installation and operating and maintenance manuals are turned over to the owner.

1.13 ELECTRICAL DEMOLITION:

- A. Remove all existing electrical wiring, raceways, junction boxes, fixtures, and devices indicated on the drawings, as specified herein, or as may be required to complete the work.

1.14 SAFETY DEVICES

- A. Electrical equipment and wiring used during construction shall be installed and insulated in a manner to insure the safety of personnel.
- B. Provide suitable guards, signs, etc. to protect personnel from “hot” wiring in panelboards, junction boxes, etc. during the construction period.

1.15 GUARANTEE

- A. The contractor shall guarantee to the owner all work performed under this contract to be free from defects in workmanship and material for a period of one (1) year from date of final acceptance. Defects arising during this period will be promptly remedied by the contractor at his own expense upon notice by the owner. All lamps for lighting fixtures shall be excluded from this guarantee, but one (1) complete and operative set of lamps for lighting fixtures shall be in place at the time of final acceptance.

END OF SECTION 16010

SECTION 16060 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 4. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 feet in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Conductor Terminations and Connections:
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
 3. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 1. Feeders and branch circuits.
 2. Flexible raceway runs.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Report measured ground resistances that exceed the following values:
 1. Power and Lighting Equipment or System: 10 ohms.
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 16060

SECTION 16073 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.3 SUBMITTALS

- A. Product Data: For steel slotted support systems.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.

- c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 5. Channel Dimensions: Selected for applicable load criteria.
- B. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 6. Toggle Bolts: All-steel springhead type.
 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete.
- C. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 16073

SECTION 16075 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Identification for conductors.
 - 2. Underground-line warning tape.
 - 3. Warning labels and signs.
 - 4. Equipment identification labels.
 - 5. Miscellaneous identification products.

1.2 SUBMITTALS

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

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 CONDUCTOR IDENTIFICATION MATERIALS

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

2.2 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.

2.3 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

3.2 IDENTIFICATION SCHEDULE

- A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- B. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
 1. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- C. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 1. Labeling Instructions:
 - a. Indoor Equipment: Adhesive film label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION 16075

SECTION 16120 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70.
- B. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. O-Z/Gedney; EGS Electrical Group LLC.
 - 4. 3M; Electrical Products Division.
 - 5. Tyco Electronics Corp.

- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- B. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- C. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- C. Support cables according to Division 16 Section "Hangers and Supports for Electrical Systems."
- D. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."
- E. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- F. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16120

SECTION 16130 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 SUBMITTALS

- A. Product Data: For raceways, and fittings.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. IMC: ANSI C80.6.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel or die-cast, set-screw or compression type.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- B. LFNC: UL 1660.

- C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: Rigid steel conduit.
 - 2. Concealed Conduit, Aboveground: Rigid steel conduit.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Minimum Raceway Size: 1/2-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Complete raceway installation before starting conductor installation.
- C. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."
- D. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- F. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- G. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.

END OF SECTION 16130

SECTION 16410 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Molded-case circuit breakers (MCCBs).
 - 4. Enclosures.

1.2 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
- B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
- C. Operation and maintenance data.

1.5 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Lugs: Suitable for number, size, and conductor material.

2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Lugs: Suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Suitable for number, size, trip ratings, and conductor material.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Comply with mounting and anchoring requirements specified in Division 16 Section "Hangers and Supports for Electrical Systems."
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.2 IDENTIFICATION

- A. Comply with requirements in Division 16 Section "Electrical Identification."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 2. Test continuity of each circuit.
- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

END OF SECTION 16410

SECTION 16231 – PACKAGED ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged engine-generator set(s) suitable for use in mission critical applications with the features as specified and indicated. Engine generator(s) will be used as the standby power source for the system, but shall be capable of providing reliable power with no run-time limitations while the primary source of power is unavailable.
- B. Provide new controls for the existing generator sets that match the controls of the new generator set provided. Equipment shall include new voltage regulation and governing controls that are compatible with the existing engines and alternators. Governor actuators on existing engines may be updated if desired by the supplier of the equipment.
- C. Provide all miscellaneous parts and all service and supervision necessary for the installation of new generator set controls for the existing generator sets. The vendor for the diesel generator sets shall be fully responsible for the operation of the entire system as installed.
- D. Provide all service and supervision necessary for the installation of a new system master control. The vendor of the diesel generator set shall be fully responsible for the operation of the entire system as installed.
- E. Provide site testing and commissioning of generator sets as they are installed/modified, and a full site test after completion of all site installation and conversion work.

1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.
- B. Emergency Standby Power (ESP): Per ISO 8528: The maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 h of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output (Ppp) over 24 h of operation shall not exceed 70 % of the ESP unless otherwise agreed by the RIC engine manufacturer.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
 - 1. Thermal damage curve for generator.
 - 2. Time-current characteristic curves for generator protective device.
 - 3. Sound test data, based on a free field requirement.
 - 4. Reactive capability curve for the alternator provided.
- B. The system supplier shall include in the submittal documentation a detailed description of the equipment and processes used to compensate for the difference in pitch between the new and existing generator sets.
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, and location and size of each field connection.
 - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
 - 2. Wiring Diagrams: Control interconnection, Customer connections.
- D. Certifications:
 - 1. Submit statement of compliance which states the proposed product(s) is certified to the emissions standards required by the location and application of the Project.
 - 2. Submit statement of compliance which states the proposed product(s) are seismically certified in compliance with local requirements signed and sealed by a qualified professional engineer.
 - 3. Product(s) shall be preapproved for California's Office of Statewide Health Planning and Development (OSHPD) seismic certification of equipment. Justification for preapproval shall be based on calculations as well as physical dynamic testing.

1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:
 - 1. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Source quality-control test reports.
 - 1. Certified summary of prototype-unit test report. See requirements in section 2.13.A. Include statement indicating torsional compatibility of components.
 - 2. Certified Test Report: Provide certified test report documenting factory test per the requirements of this specification, as well as certified factory test of generator set sensors

per NFPA110 level 1. The testing shall include transient testing to include results of quarter load step load application and rejection voltage and frequency changes and recovery times at both 1.0 and 0.8 power factor (lagging).

3. List of factory tests to be performed on units to be shipped for this Project.
4. Report of exhaust emissions and compliance statement certifying compliance with applicable regulations.

C. Warranty:

1. Submit manufacturer's warranty statement to be provided for this Project.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 50 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- D. Comply with NFPA 37 (Standard For the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- E. Comply with NFPA 70 (National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702).
- F. Comply with NFPA 110 (Emergency and Standby Power Systems) requirements for Level 1 emergency power supply system regardless of the actual use of the equipment.
- G. Comply with UL 2200.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Control system equipment shall be fully operational over a temperature range of -40 to +70 degrees centigrade. Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 1. Ambient Temperature: Minus 15 to plus 40 deg C.
 2. Relative Humidity: 0 to 95 percent.
 3. Altitude: Sea level to 1000 feet (300 m).
- B. The existing facility will be occupied throughout the period of this project. The emergency power system must remain fully operational throughout the installation of the new equipment, with the exception of supervised test periods during which equipment is under test.

- C. The existing system is composed of (4) Onan model 750DFZ generator sets, which have been heavily modified in the past. These generator sets now are fitted non-factory standard governing and voltage regulation systems. The existing alternators are not 2/3 pitch. The supplier shall include all hardware and other materials necessary to utilize the existing alternators in parallel with the new generator set provided, which shall be supplied with 2/3 pitch alternator design.
- D. New switchgear for the system is being provided under separate contract. The equipment provided shall interface and operate that switchgear to provide a complete and operable system. The switchgear shall include 3-phase bus totalizing CT's for the master control and 3-phase fused bus voltage monitoring points for each generator set and for the master control. The paralleling breakers provided shall include 5-cycle electrical operation with AC closing and DC opening functions. The breakers shall also include shunt trip, bell alarm contacts, and a minimum of two sets of form C contacts for use by the generator sets in performing the paralleling operations required by this project.
- E. The existing automatic transfer switches in the facility shall be incorporated into the system provided under this contract. Provide any hardware and modifications required to utilize this equipment for starting and stopping of the system from any transfer switch.

1.8 WARRANTY

- A. Base Warranty: Manufacturer shall provide base warranty coverage on the material and workmanship of the generator set and other equipment for a minimum of twenty-four (24) months for Standby product from registered commissioning and start-up.
- B. Extended Warranty: Manufacturer shall offer extend coverage of 5 years from date of registered commissioning and start-up.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: This system has been Engineered and designed around Cummins Power Generation. Only approved bidders shall supply equipment provided under this contract. Equipment by other named suppliers that meets the requirement of this specification are acceptable if a complete project submittal is provided by the proposed vendor and approved by the consultant not less than 2 weeks before scheduled bid date. Other suppliers are not acceptable.
 - 1. Cummins Power Generation

2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.

- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
1. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.
- C. Capacities and Characteristics:
1. Power Output Ratings: Continuous electrical output power rating for standby operation of not less than 1000 kW, at 80 percent lagging power factor, 480/277 volt, three phase, 4-wire, 60 hertz.
 2. Alternator shall be capable of accepting maximum 5500 kVA in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set. Provide an external characteristic curve documenting this performance as requested.
 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component. The engine-generator nameplate shall include information of the power output rating of the equipment.
- D. Generator-Set Performance:
1. Steady-State Voltage Operational Bandwidth: 0.5 percent of rated output voltage from no load to full load.
 2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds. On application of a 100% load step the generator set shall recover to stable voltage within 10 seconds.
 3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.
 4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
 5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds. On application of a 100% load step the generator set shall recover to stable frequency within 10 seconds.
 6. Output Waveform: At full load, harmonic voltage content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for any single harmonic. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.
 7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a 300 percent of rated full-load current for not less than 10 seconds without damage to generator system components. For a 1-phase, bolted short circuit at system output terminals, system shall regulate both voltage and current to prevent over-voltage conditions on the non-faulted phases.
 8. Start Time: Comply with NFPA 110, Level 1, Type 10, system requirements. Ambient Condition Performance: Engine generator shall be designed to allow operation at full rated load in an ambient temperature under site conditions, based on highest ambient condition. Ambient temperature shall be as measured at the air inlet to the engine generator for enclosed units, and at the control of the engine generator for machines installed in equipment rooms.

9. Load Sharing: Engine generator shall share real and reactive load proportionally within plus or minus 3 percent with all other engine generators in the system.
10. Noise Output: Engine generator shall be tested by the manufacturer per ANSI S12.34. Data documenting performance shall be provided with submittal documentation.

2.3 ENGINE

- A. Fuel: Engine Fuel oil, Grade DF-2
- B. Rated Engine Speed: 1800 rpm.
- C. Lubrication System: The following items are mounted on engine or skid:
 1. Lube oil pump: shall be positive displacement, mechanical, full pressure pump.
 2. Filter and Strainer: Provided by the engine manufacturer of record to provide adequate filtration for the prime mover to be used.
 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Engine Fuel System: The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions.
 1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
- E. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity and performance.
 1. Designed for operation on a single 480-volt AC, single phase, 60 hertz power connection. Heater voltage shall be shown on the project drawings.
 2. Installed with isolation valves to isolate the heater for replacement of the element without draining the engine cooling system or significant coolant loss.
 3. Provided with a 24VDC thermostat, installed at the engine thermostat housing
- F. Governor: Adjustable isochronous, with speed sensing. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate as appropriate to the state of the engine generator. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various paralleling states.
- G. Cooling System: Closed loop, liquid cooled, with horizontal remote radiator..
 1. The remote radiator system design shall be developed specifically for this application. The engine manufacturer shall review and approve the final design of the entire cooling system, including radiator, fan, supports, piping, valves, pumps, and all other major components. The generator set manufacturer shall provide prototype test data for the specific hardware proposed demonstrating that the machine will operate at rated standby load in an outdoor ambient condition of 50C.

2. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 3. Size of Radiator overflow tank: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 5. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
- H. Muffler/Silencer: Selected with performance as required to meet sound requirements of the application, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements. For generator sets with outdoor enclosures the silencer shall be inside the enclosure.
- I. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and restriction indicator.
- J. Starting System: 12 or 24V, as recommended by the engine manufacturer; electric, with negative ground.
1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
 2. Cranking Cycle: As required by NFPA 110 for level 1 systems.
 3. Battery Cable: Size as recommended by engine manufacturer for cable length as required. Include required interconnecting conductors and connection accessories.
 4. Battery Compartment: Factory fabricated of metal with acid-resistant finish.
 5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation. The battery charging alternator shall have sufficient capacity to recharge the batteries with all parasitic loads connected within 4 hours after a normal engine starting sequence.
 6. Battery Chargers: Unit shall comply with UL 1236 and include the following features:
 - a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
 - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
 - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
 - d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
 - e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
 - f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

- A. Comply with NFPA 30.
- B. Day Tank Comply with UL 142, freestanding, factory-fabricated fuel tank assembly, with integral, float-controlled transfer pump and the following features:
 - 1. Allocation: A separate day tank shall be provided for each engine generator
 - 2. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of day tank.
 - a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of day-tank leak.
 - 3. Tank Capacity: As recommended by engine manufacturer for an uninterrupted period of 2 hours' operation at 100 percent of rated power output of engine-generator system without being refilled.
 - 4. Pump Capacity: Minimum 4 GPM with 20 foot lift, driven by ¼ HP, 120/240V 1-phase motor.
 - 5. Control: Provided with On/Off/Emergency run switch, Test/Reset Switch, AC Circuit Breaker, DC Circuit Breaker, and the following indicator lamps:
 - a. Ready (Green) – AC Supply and DC Control Power Available.
 - b. High Fuel (Red) – Latching fault, indicates fuel level near overflow, shuts down pump, and closes N/O dry contacts.
 - c. Low Fuel (Red) – Latching fault, indicates pump failure or operating float switch failure, closes N/O dry contacts.
 - d. Low Fuel Shutdown (Red) – Latching fault, indicates near empty tank, closes N/O contacts which may be used to shutdown engine generator to avoid air in the injection system.
 - e. Overflow To Basin (Red) – Latching fault, indicates fuel in overflow/rupture basin, shuts down pump, closes N/O dry contacts
 - f. Spare (Red) – with N/O and N/C dry contacts
 - g. Pump Running (Green)
 - 6. Piping Connections: Factory-installed fuel supply and return lines from tank to engine; local fuel fill, and vent lines in compliance with local code requirements.

2.5 GENERATOR SET CONTROL AND MONITORING

- A. Engine generator control shall be microprocessor based and provide automatic starting, monitoring, protection and control functions for the unit. It shall also include paralleling controls to allow automatic, isochronous paralleling with other identical generator set(s) and existing equipment at the project location.
- B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches, the paralleling supervisory system, or the remote monitoring system to initiate starting and stopping of generator set. When mode-selector switch

is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. Switches with different configurations but equal functions are acceptable. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local generator set-mounted and remote emergency-stop switch also immediately shuts down generator set.

- C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and remote emergency-stop switch also shuts down generator set.
- D. Configuration: Operating and safety indications, protective devices, system controls, engine gages and associated equipment shall be grouped in a common control and monitoring panel. Mounting method shall isolate the control panel from generator-set vibration. The generator set design including the control panel shall be validated by vibration testing on prototype equipment using an identical engine and frame size alternator proposed for this project. AC output power circuit breakers and other output power equipment shall not be mounted in the control enclosure.
- E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
 - 1. AC voltmeter (3-phase, line to line and line to neutral values). Metering shall be provided for both generator set output and for system bus. Voltage reference for system bus shall be provided by others in the system switchgear.
 - 2. AC ammeter (3-phases).
 - 3. AC frequency meter.
 - 4. AC kW output (total and for each phase). Display shall indicate power flow direction.
 - 5. AC kVA output (total and for each phase). Display shall indicate power flow direction.
 - 6. AC Power factor (total and for each phase). Display shall indicate leading or lagging condition.
 - 7. Ammeter-voltmeter displays shall simultaneously display conditions for all three phases.
 - 8. Provide an analog AC metering display that provides visual indication of 3phase voltage, current, frequency, kW, and power factor.
 - 9. Emergency Stop Switch: Switch shall be a red “mushroom head” pushbutton device complete with lock-out/tag-out provisions. Depressing switch shall cause the generator set to immediately stop the generator set and prevent it from operating.
 - 10. Fault Reset Switch: Supply a dedicated control switch to reset/clear fault conditions.
 - 11. Paralleling Breaker control switches: The control shall include manual open and close provisions for the paralleling breaker, and LED status lamps indicating whether the breaker is open or closed. The operating panel display shall include a display indicating degrees away from synchronous condition with the bus, and an “ok to close breaker” message.
 - 12. DC voltmeter (alternator battery charging).
 - 13. Engine-coolant temperature gage.
 - 14. Engine lubricating-oil pressure gage.
 - 15. Running-time meter.

16. Generator-voltage and frequency digital raise/lower switches. Rheostats for these functions are not acceptable. The control shall adjustment of these parameters in a range of plus or minus 5% of the voltage and frequency operating set point (not nominal voltage and frequency values.) . Any adjustment of voltage or frequency while the paralleling breaker is open shall not impact on the load sharing settings when the paralleling breaker is closed.
 17. Fuel tank derangement alarm.
 18. Fuel tank high-level shutdown of fuel supply alarm.
 19. AC Protective Equipment: The control system shall include over/under voltage, reverse kVAR, reverse kW, over current, over load (kW) short circuit, loss of voltage reference, and over excitation shut down protection. There shall be a ground fault alarm for generator sets rated over 1000 amps, overload warning, and overcurrent warning alarm. All protective devices shall be field configurable without the use of any tool, including personal computers.
 20. Status LED indicating lamps to indicate remote start signal present at the control, existing shutdown condition, existing alarm condition, not in auto, and generator set running.
 21. A graphical display panel with appropriate navigation devices shall be provided to view all information noted above, as well as all engine status and alarm/shutdown conditions (including those from an integrated engine emission control system). The display shall also include integrated provisions for adjustment of the gain and stability settings for the governing and voltage regulation systems, as well as paralleling control settings for synchronizing, load sharing, and load govern gains.
 22. Panel lighting system to allow viewing and operation of the control when the generator room or enclosure is not lighted.
 23. Data Logging: The control system shall log the latest 20 different alarm and shut down conditions, the total number of times each alarm or shutdown has occurred, and the date and time the latest of these shutdown and fault conditions occurred.
 24. DC control Power Monitoring: The control system shall continuously monitor DC power supply to the control, and annunciate low or high voltage conditions. It shall also provide an alarm indicating imminent failure of the battery bank based on degraded voltage recover on loading (engine cranking).
- F. Control Heater: Generator sets that are installed in outdoor enclosures, or are in tropical or coastal environments shall be provided with control heaters for anti-condensation protection.
- G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.
1. Overcrank shutdown.
 2. Coolant low-temperature alarm.
 3. Control switch not in auto position.
 4. Battery-charger malfunction alarm.
 5. Battery low-voltage alarm.
- H. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition.
- I. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

- J. Remote monitoring. The manufacturer of the generator set shall provide a remote monitoring system that is interfaced to the facility through a TCP/IP interface to any PC operating with a Windows-based browser.
 - 1. The monitoring system shall allow monitoring of all the data required by NFPA 110 for level 1 systems, as well as all alarm and shutdown conditions.
 - 2. The system shall include event monitoring which records any event the control system that is annunciated by the generator set control, such as starting, stopping, alarms, and shutdown conditions. Each event shall be date and time stamped.
 - 3. The system shall provide a configurable data logging service when the system is operating, and when it is not operating. It shall have on-board storage facilities for not less than 1 year of data..

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Generator Overcurrent Protection: The generator set shall be provided with a UL Listed/CSA Certified protective device that is coordinated with the alternator provided to prevent damage to the generator set on any possible overload or overcurrent condition external to the machine. The protective device shall be listed as a utility grade protective device under UL category NRGU. The control system shall be subject to UL follow-up service at the manufacturing location to verify that the protective system is fully operational as manufactured. Protector shall perform the following functions:
 - 1. Initiates a generator kW overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 - 2. Under single phase or multiple phase fault conditions, or on overload conditions, indicates an alarm conditions when the current flow is in excess of 110% of rated current for more than 10 seconds.
 - 3. Under single phase or multiple phase fault conditions, operates to switch off alternator excitation at the appropriate time to prevent damage to the alternator.
 - 4. The operator panel shall indicate the nature of the fault condition as either a short circuit or an overload.
 - 5. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot greater than 120% of nominal voltage.
 - 6. The protective system provided shall not include an instantaneous trip function.

2.7 PARALLELING CONTROLS

- A. The paralleling controls shall be integrated functions of the microprocessor-based generator set control. No equipment room space is available for external control systems.
- B. First Generator Closing Controls. The control system shall include logic and communication between generators to prevent more than one generator set from closing the bus under “dead bus” conditions. The control system shall include fall-back provisions so that if the designated first generator to close to the bus does not connect, it is positively disconnected and another generator in the system is automatically the first to close to the bus. It shall also include fall-back provisions to operate safely in the event that the primary system fails.

- C. Synchronizer. The control system shall include an automatic synchronizing function that is configurable for phase lock loop or slip frequency synchronizing, and defaulted to phase lock loop operation. The synchronizer shall include frequency, phase angle, and voltage matching functions, and be configurable for phase angle acceptance window. Default settings of the synchronizer shall cause connection to the paralleling bus to occur within plus or minus 5 electrical degrees of bus conditions. All generators shall be synchronized within 15 seconds from starting (except existing generator sets, which shall synchronize at least as fast as they operated prior to addition to the new equipment in the facility.) The synchronizer shall directly operate to close the paralleling breaker. No external interruption of the close signal shall be allowed. The closing logic shall include failure to close functions that diagnose failure to close and auxiliary contact failure and operate properly during either of these failure modes.
- D. Load Sharing. The load sharing control shall provide isochronous (no droop in speed) operation of the generator set while paralleled with either identical generator sets or the existing generator sets. All generator sets shall operate at the same percent of their standby rating for both kW and kVAR. Load sharing shall be maintained within plus or minus 5% of equal based on percent of generator set rating.
 - 1. Reactive load sharing between new generator sets and existing sets may be set up in droop for compatibility with existing generator sets. It shall be configurable for future operation with isochronous voltage control when all generator sets in the existing system have been replaced.
 - 2. The system shall actively share real and reactive power over a range of -10% to 120% of rated generator set output for both kW and kVAR.
- E. Master Synchronizer Compatibility. The paralleling control system shall be compatible with one or more master synchronizers which enable synchronizing of the system bus to a utility voltage reference, for the purpose of facilitating closed transition transfer between sources.

2.8 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1-32.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H
- D. Temperature Rise 80 C over a 40C environment.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance on all alternators rated 30kVA and larger.
- G. Enclosure: Drip-proof.

- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.
- I. The alternator shall be provided with anti-condensation heater(s) in all applications where the generator set is provided in an outdoor enclosure, or when the generator set is installed in a coastal or tropical environment.
- J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding. Alternators operating at voltage higher than 690VAC shall be provided with form-wound stator coils.
- K. Subtransient Reactance: 12 percent maximum, based on the rating of the engine generator set.

2.9 VIBRATION ISOLATION DEVICES

- A. Vibration Isolation: Generators installed on grade shall be provided with elastomeric isolator pads integral to the generator, unless the engine manufacturer requires use of spring isolation.
 - 1. IBC Compliance: Isolators complying with IBC requirements shall be specified in the equipment documentation, as well as the installation requirements for the unit.

2.10 SYSTEM MASTER CONTROL

- A. Provide a new free-standing, front accessible system master control. The system master control shall be a standard product of the generator set manufacturer. This control system shall be based on dedicated purpose control components that are standard products of the generator set manufacturer. No 3rd-party PLC-based equipment shall be used for control functions.
 - 1. Operator Panel. The operator panel shall be provided with the following features and capabilities.
 - a. 1% accuracy digital AC output instruments; Ammeter, Voltmeter, Frequency Meter, Wattmeter, KW-hour meter, Power Factor Meter, kVAR meter, KVA meter shall be provided for the utility supply service and the generator bus. AC metering shall provide total values and per phase values. Provide analog metering displays for the system bus indicating voltage, current, kW load, power factor, and frequency.
 - b. Alarm and status indicating panel to indicate the following conditions (alarm horn shall be located on master control).
 - 1) Hardware Failure Warning
 - 2) EEPROM Write Error Warning
 - 3) Not In Automatic Event
 - 4) Genset Bus Overvoltage Warning
 - 5) Genset Bus Undervoltage Warning
 - 6) Genset Bus Frequency Warning
 - 7) AC Metering Out Of Range Warning
 - 8) Genset Bus Overload Warning
 - 9) Common Warning Event
 - 10) Real Time Clock Power Interrupt Warning
 - 11) Utility Bus Loss Of Phase Warning

- 12) Calibration Checksum Warning
 - 13) Load Demand Set up Warning
 - 14) Remote IO Communication Failure Warning
 - 15) Genset Bus Available Event
 - 16) TD Start
 - 17) TD Stop
 - 18) Manual
 - 19) Test
 - 20) Standby
 - 21) Generator Set #n On Line. (one for each genset in the system)
 - 22) Load Demand Mode
 - 23) Priority #n Load On (one for each load add level in the system)
 - 24) Load Shed Level n (one for each load shed level in the system)
 - 25) System Test
 - 26) Remote System Start
 - 27) Check Generator Set #n (one for each genset in the system)
 - 28) System Not in Auto Mode
2. Internal Controls. The following internal control components or functions shall be provided for the master control:
- a. Provide load demand control signals for each generator set provided, which operate when enabled to minimize fuel consumption during extended outages. The load demand system shall include a master auto/off switch to disable load demand operation.
 - b. Load pick up output contacts rated 1 A at 120 VAC. Provide direct control for all feeder breakers and/or transfer switches in the system (16 levels total). The priority level for each load shed contact set shall be field configurable through the master control operator panel.
 - c. Load shed output contacts, rated 1 A at 120 VAC. Provide direct control for all feeder breakers and/or transfer switches in the system (16 levels total). The priority level for each load shed contact set shall be field configurable through the master control operator panel.
 - d. The master functions shall include manual and automatic genset start/stop commands and test functions. The Test function will start gensets and transfer load if “test with load” is enabled.
 - e. Provide all other components required, such as properly sized current transformers, transducers, terminal blocks, etc., for proper and reliable system operation.
 - f. Master control equipment shall contain a system of diagnostic LED’s to assist in analyzing proper system function.
3. Sequence of Operation
- a. The system shall be designed to have paralleling breakers normally open when utility power is available, transfer switches connected to normal power, feeder breakers to transfer switches closed, and generators switched off, but ready to start (control switch in AUTO) on a signal from any transfer switch.
 - b. On a utility power failure at any transfer switch, the following sequence shall occur, whether or not the master control is operational:
 - 1) All generator sets shall start and accelerate to rated speed and voltage.
 - 2) When any generator set approaches rated voltage and frequency, the generator set shall close to the dead system bus. The generator set controls shall include an arbitration function to prevent more than one generator set from closing to the bus on a black start.

- 3) When the first generator set has closed to the bus, the remaining generator sets turn on their synchronizers and first priority transfer switches close to the bus. The system master controller provides inhibit signals to lower priority transfer switches to prevent connecting of their loads to the system bus until adequate bus capacity is available.
- 4) As each generator closes to the bus, the system master control allows other transfer switches to close to the bus, until all loads are served.
- 5) Manual transfer switches may be connected to the bus as required.
- c. On utility power return, the following sequence occurs:
 - 1) Automatic transfer switches return their loads to normal utility power.
 - 2) When all automatic transfer switches have returned to normal power, the generator sets open their paralleling breakers. Note that manual transfer switches may be switched back to normal power at any time.
 - 3) Generator sets operate for a cooldown period and shutdown, and are ready for a remote start.
4. Construction
 - a. Note space available and access requirements for the equipment, and provide equipment that will fit into the space allowed
 - b. The master control system shall be listed and labeled under the requirements of UL 891, including all covers, barriers, and supports. Individual control sections shall be isolated from each other by metal or insulating barriers.
 - c. All wiring shall be UL listed 105 degree C, 600 volt rated, and sized as required. Each wire, device or function shall be suitably identified by silk screen or similar permanent identification.
 - d. The framework and all other sheet metal components of the system shall be primed with a rust inhibiting primer, and finished with two coats of satin finish ANSI 61 gray enamel.
 - e. All door mounted control components shall be industrial type oil tight devices with contact ratings a minimum of twice the maximum circuit ampacity they are controlling. Toggle switches and other light duty control devices are not acceptable. Indicator lamps shall be high intensity LED type devices. Indicator lamp condition (on or off) shall be easily visible in bright room lighting conditions.
 - f. AC control circuits in the switchboard shall be protected with properly sized fuses in safety fuse blocks, with visible fuse blown indication for each fuse. Potential transformers shall be protected on line and load side.
 - g. All CT connections shall include shorting type terminal blocks.
 - h. All field control interconnecting wiring shall be sized as specified by system manufacturer (wiring not designated by the system manufacturer shall be minimum 14 AWG copper). All control interconnect wiring shall be stranded.
 - i. All active control system components in the system shall be suitable for operation in ambient temperatures ranging from -40 to +70 degrees C. The active control electronics shall be environmentally protected from dust, dirt, and humidity. The controls shall be suitable for operation in an ambient ranging from 5-95% relative humidity, and shall be protected from the effects of equipment vibration.

2.11 CONVERSION EQUIPMENT AND INSTALLATION.

- A. Provide new controls for each existing generator set in the system. The generator set control components shall be standard product(s) of the generator set manufacturer. Control equipment shall meet the following requirements:
 - 1. Control functions provided shall include all the control functions noted in sections 2.5, 2.6, 2.7, and 2.8 of this specification.
 - 2. Provide new analog engine sensors and wiring harness(es) to result in a fully operational generator set package.
- B. Provide all hardware, installation, and testing services for the conversion of each existing generator set. Testing shall include full load, 1.0 power factor testing of each generator set after conversion. The testing shall demonstrate the ability of the generator sets to operate at rated load, and demonstrate stability on application of load addition and dropping of 25%, 50%, 75%, and 100% of rated generator set capacity.
- C. Conversion work of the existing generator sets shall commence after installation and commissioning of the new generator set provided under this contract.
- D. The generator set supplier shall include a minimum 2-week rental of a 2000kW portable diesel generator set that will be paralleled with the new generator set for emergency service while the existing generator sets are being converted. The entire cost of the rental equipment shall be included in the generator set proposal regardless of the duration of the rental period.

2.12 SYSTEM REMOTE MONITORING AND CONTROL

- A. Provide a new remote monitoring and control system that allows for remote monitoring and control of the entire system as modified, including generators and paralleling controls. The equipment provided shall be a standard product of the generator set manufacturer. Provide all equipment required for monitoring of generator sets, including paralleling equipment. The equipment provided shall be certified for compliance to UL, FCC, and RoHS requirements. A single device shall monitor all generator sets in the system.
- B. The remote monitoring and control system shall allow for web browsing from users on the same LAN. Current browsers from Google and Microsoft (Windows 7 or 8 operating systems), as a minimum, shall be operational with the equipment provided.
- C. The following security measures shall be provided: Login security with configurable usernames and passwords, three levels of security access—administrator, operator, and read only, 128-bit Secure Sockets Layer (SSL) Encryption, Auto log out.
- D. The system shall allow access to screens with the following functions:
 - 1. Home Page shall be a color graphical representation displaying all installed generator sets. The system shall be configurable for future use with transfer switches and other sensors such as fuel level monitoring equipment. User shall be able to click on graphical representation to view generator set, transfer switch or sensor and output screens.
 - 2. Generator Set Page shall be a color graphical representation displaying real time and historical data on any individual generator set. The user shall have the ability to remotely start, stop, and acknowledge warning faults. Generator set settings, data logs and event

logs shall be viewable from the system user interface. Data, to the extent specified for the generator set control, displayed shall include:

- a. Control Switch Position (auto, off, manual)
 - b. Genset Control State (stopped, running, cooldown, warning, shutdown, shutdown/cooldown)
 - c. Paralleling Control State (running, first closing, breaker open, breaker closed, isochronous, load share, load govern (utility paralleled))
 - d. Genset Fault Codes and descriptions
 - e. All NFPA 110 alarm conditions as required for Level 1 systems
 - f. All AC alarm and shutdown conditions (ground fault, high AC voltage, low AC voltage, under frequency, generator set overload, generator set overcurrent, generator set short circuit, reverse kW power, reverse kVAR power, fail to synchronize, fail to close, generator in load demand, generator breaker tripped, utility breaker tripped)
 - g. Emergency Stop
 - h. All AC supplied conditions (line to line and line to neutral voltage and current, frequency, 3-phase and total kW, total power factor, total kVAR, total kVA)
 - i. Engine status, including Battery Voltage, oil pressure, coolant temperature, engine RPM, # engine starts, engine run time, start or stop command present, oil temperature, fuel rate, fuel level (percent or high/low).
 - j. Event Logs shall generate and store active alarms/events from any configured devices as well as store historic alarms/events. The screen will provide details including device name, alarm name, date and time of alarm, status. The ability to acknowledge alarms/events will be available on this page. Event logs shall display the same alarms/events as displayed in the Generator Set and Transfer Switch Pages.
 - k. Data logs shall store and display all system and device related information. The screen will provide pre-configured Modbus register data points for the respective generator set or transfer switch control. Data logs shall display the same parameters as displayed in the Generator Set and Transfer Switch Pages.
3. The user shall have the capability to generate reports against any connected generator set. The report shall display a graphical representation of the selected parameter/s over the past 24 hours, past 7 days, past 30 days or customized intervals. These parameters are also plotted on a time scale with a summary of the minimum, maximum, and average values. Reports shall be capable of export in a CSV file format for further analysis.
 4. The equipment shall be provided with a minimum of 32 gigabytes of internal data logging storage capability.

2.13 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Powder-coated and baked over corrosion-resistant pretreatment and compatible primer. Manufacturer's standard color or as directed on the drawings.

2.14 SOURCE QUALITY CONTROL

- A. Prototype Testing: The generator set manufacturer shall have tested one or more engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
 - 1. Tests: Comply with NFPA 110, Level 1 Energy Converters. In addition, the equipment engine, skid, cooling system, and alternator shall have been subjected to actual prototype tests to validate the capability of the design under the abnormal conditions noted in NFPA110. Calculations and testing on similar equipment which are allowed under NFPA110 are not sufficient to meet this requirement.
 - 2. Provide a test report documenting tests conducted to demonstrate compliance to NFPA 110 and this specification, along with results of testing.

- B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
 - 1. Test engine generator set manufactured for this Project to demonstrate compatibility and functionality.
 - 2. Full load run.
 - 3. Maximum power.
 - 4. Voltage regulation.
 - 5. Steady-state governing.
 - 6. Single-step load pickup.
 - 7. Simulated safety shutdowns.
 - 8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
 - 9. [Additional testing requirements may be added to this section]

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation, application, and alignment instructions and with NFPA 110.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.3 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."
- B. After completion of new generator set and all conversion work, the entire system shall be tested using available facility load and external load bank used for generator set testing. The testing shall demonstrate that the generator sets properly start and share all available kW and kVAR loads. A minimum of 2000kW of 1.0 power factor load bank shall be made available by the supplier of the equipment to perform this testing.

END OF SECTION 16231