# Emergency Generation Installation
# Ellisville State School
# Columbus, Bay Springs, Prentiss, & Ellisville, MS
# Group Homes

## Construction Documents Project Manual

Prepared By:

HESM&A

CONSULTING ENGINEERS

**Date: May 08, 2015** **Project Number: JAX0219**

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
COLUMBUS, BAY SPRINGS, PRENTISS & ELLISVILLE
GROUP HOMES

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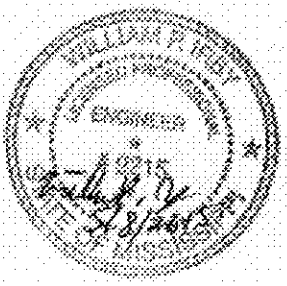

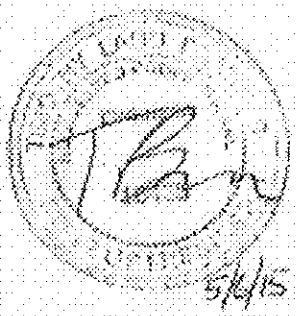

## SECTION 00030 – ADVERTISEMENT FOR BIDS

### EMERGENCY GENERATOR INSTALLATION
### ELLISVILLE STATE SCHOOL
### COLUMBUS, BAY SPRINGS, PRENTISS, & ELLISVILLE, MS GROUP HOMES

Sealed bids will be received in the conference room of Building 1 (Clyde Woodruff, Jr. Administration Building), on the Ellisville State School Campus, 1101 Highway 11 South, Ellisville, Mississippi, 39437-4444, until 10:30 a.m. on September 15, 2015 for the following:

Emergency Generator Installation
Ellisville State School
Columbus, Bay Springs, Prentiss, & Ellisville Group Homes

at which time they will be publicly opened and read. Contract Documents may be obtained from:

HESM&A Consulting Engineers
617 Renaissance Way
Ridgeland, MS 39157
David Crosby
(601) 790-9702 direct
(601) 209-0983 cell
Email David.Crosby@hesm.com

Electronic files will be furnished for contractors' use. Bid preparation will be in accordance with the *Instructions to Bidders* bound in the Project Manual. Ellisville State School reserves the right to waive irregularities and to reject any or all bids.

**A mandatory pre-bid conference for all bidders will be held at the Columbus Group Home Site located on September 01, 2015 10:30 A.M.**

Ellisville State School is an equal opportunity employer/MFHV.

Bids are to be sealed and addressed to **Ms. Lana Jefcoat, purchasing Chief, Ellisville State School, Building 1 1101 Highway 11 South, Ellisville, MS 39437**, and **must have recorded on the envelope and/or express packages:** "BID TO BE OPENED, September 15, 2015 at 10:30 A.M."

Dates of Publication:

August 12, 2015
August 19, 2015

END OF SECTION

## SECTION 00100- INSTRUCTIONS TO BIDDERS

## EMERGENCY GENERATOR INSTALLATION
## ELLISVILLE STATE SCHOOL
## COLUMBUS, BAY SPRINGS, PRENTISS & ELLISVILLE GROUP HOMES
## TERMS OF BID

The Ellisville State School will receive bids until 10:30 AM on September 15, 2015, for the project as described in the drawings and project manual: Emergency Generation Installation Ellisville State School Columbus, Bay Springs, Prentiss, & Ellisville Group Homes.

The awarding of the bids will be made subject to the following conditions:

1. **Prices shall be guaranteed through November 13, 2015.**

2. All items per the attached specifications.

3. Ellisville State School is tax exempt, and all bid prices are to be less state and federal sales tax.

4. All items which are bid on "or equal" basis must have samples or documentary evidence attached to clearly document that the items are equal in every respect.

5. NO BIDDER WILL BE ACCEPTED UNLESS QUOTED ON THE PRESCRIBED BID PROPOSAL FORM AND SIGNED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE. HOWEVER, BIDDER MAY ATTACH SUBSTANTIATION AND JUSTIFICATION FOR ALTERNATIVE BIDS.

6. Bids are to be sealed and addressed to **Ms. Lana Jefcoat, Purchasing Chief, Ellisville State School, Building 1, 1101 Highway 11 South, Ellisville, MS 39437**, and **must have recorded on the envelope and/or express packages: "BID TO BE OPENED, September 15, 2015 at 10:30 A.M."**

7. The bidder hereby certifies that his/her company does not discriminate against any employee or applicant because of age, sex, religion, race, or creed, and that his company is in full compliance with the wage and hour laws of the United States.

8. Vendors shall be aware employees of Ellisville State School are prohibited from accepting gratuities of any value. The bidder hereby certifies that his company or any agent of his company has not and will not make any type of gratuitous gesture. Failure to comply will result in bid rejection.

9. The bidder is to include a Bid bond with this bid, see specification section 00410 Bid Bond.

10. Ellisville State School reserves the right to reject any or all bids and waive formalities.

11. **This project shall be completed within 111 calendar days after receipt of agency purchase order and notice to proceed order. If the project is not completed within the specified time, the contractor will be removed from Ellisville State School's bid list for a period of three (3) years.**

BY: _____
(signature)

NAME: _____
(print)

NAME OF COMPANY: _____

MAILING ADDRESS: _____
(street, city, state, zip)

TELEPHONE AND FAX NO.: _____

END OF SECTION

## SECTION 00300 – BID FORM

## BID PROPOSAL FORM

DATE: June 12, 2015

TO: LANA JEFCOAT
PURCHASING CHIEF
ELLISVILLE STATE SCHOOL
BUILDING 1
1101 HIGHWAY 11 SOUTH
ELLISVILLE, MS 39437

GENTLEMEN:

We the undersigned have carefully examined the specifications for the Emergency Generator Installation Ellisville State School Columbus, Bay Springs, Prentiss, & Ellisville, MS Group Homes (five different site locations in four different towns), submit the following proposals:

Furnish all labor, materials, equipment, tools, etc; to install emergency generator at each group home and make connection and testing of the generator as required to perform all work shown on drawings. All work shall be completed at all sites within the 111 calendar days from date contractor is issued a notice to proceed from the Engineer and a purchase order from the Owner. The Contractor shall provide to the Owner a schedule of work within 1 week of the Notice to Proceed. We propose to furnish all labor and equipment for the sum of:

BASE BID: (Write in the amount of the base bid in words and numbers. The written word shall govern.)

_____ Dollars ($_____)

This involves the installation of one (1) 50 kw generator for the 1 Group Home at the Columbus site in Columbus, MS. (This work is to be completed within 90 calendar days from date contractor is issued a notice to proceed from the Engineer and a purchase order from the Owner).

This involves the installation of two (2) 50 kw generators for the 2 Group Homes at the Bay Springs site in Bay Springs, MS. (This work is to be completed within 97 calendar days from date contractor is issued a notice to proceed from the Engineer and a purchase order from the Owner).

This involves the installation of two (2) 50 kw generators for the 2 Group Homes at the Prentiss site in Prentiss, MS. (This work is to be completed within 104 calendar days from date contractor is issued a notice to proceed from the Engineer and a purchase order from the Owner).

ALTERNATES: (Write in the amount of all of the alternates in words and numbers. The written word shall govern.)

Alternate #1 ADD

_____

Dollars ($_____)
Description: This involves the addition to the contract for the installation of one (1) 50 kw generator for the 1 Group Home at the Ellisville site located at Cleveland St. in Ellisville, MS. (This work is to be completed within 111 calendar days from date contractor is issued a notice to proceed from the Engineer and a purchase order from the Owner).

Alternate #2 ADD

_____

Dollars ($_____)
Description: This involves the addition to the contract for the installation of one (1) 50 kw generator for the 1 Group Home at the Ellisville site located at Blank St. in Ellisville, MS. (This work is to be completed within 111 calendar days from date contractor is issued a notice to proceed from the Engineer and a purchase order from the Owner).

Respectfully Submitted:

_____
CONTRACTOR

BY: _____

Receipt of Addenda
#_____
#_____
#_____
#_____

**END** OF SECTION

## SECTION 00410 – BID BOND

A 5% Bid Bond will be required of all bidders. This bond will be properly executed on the standard form of Bid Bond of the American Institute of Architects, AIA Document A310, or surety's standard form containing substantially the same provisions, and included with the Contractor's bid documents.

END OF SECTION

## SECTION 00500 – AGREEMENT FORM

The Agreement Form Between the Owner and Contractor will be the notice to proceed letter from the Engineer and the purchase order from the Owner.

END OF SECTION

## SECTION 00600 – CONTRACT BOND

The Standard Performance Bond and Labor and Material Payment Bond Form of the American Institute of Architects, A.I.A. Document A312, 1984 Edition, will be used for the Contract Bond. A copy of this document is on file at the Engineer's office and may be examined by bidders and their surety during normal working hours. Amount for performance and labor and material shall each equal 100% of the Contract Sum.

END OF SECTION

## SECTION 00700 – GENERAL CONDITIONS

General Conditions of the Contract for Construction, Standard Document A201-2007, of the American Institute of Architects are hereby made a part of these Contract Documents to the same extent as if bound herein. A copy of this document is on file at the Engineer's office and may be examined by bidders and their surety during normal working hours.

END OF SECTION

## SECTION 00800 – SUPPLEMENTARY CONDITIONS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Document: The following supplements modify, change, delete from, or add to the **General Conditions of the Contract**, AIA Document A201, 2007. When any Article of the **General Conditions** is modified, or deleted, by these *Supplementary Conditions*, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause will remain in effect.

Article 1
GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

The Contract Documents include the Advertisement for Bids, Instructions to Bidders, Proposal Form, sample forms and all portions of addenda issued prior to execution of the Contract.

1.2 OWNERSHIP AND USE OF ENGINEER'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.2.1 This Paragraph in no way supersedes the Owner's document rights set forth in the Agreement Between the Owner and the Engineer.

Article 2
OWNER

No supplementary conditions.

Article 3
CONTRACTOR

3.1 INDEMNIFICATION

3.1.1 The Contractor agrees to defend, hold harmless and indemnify the Owner against all claims or demands originating under this Contract by Subcontractors, Material men, or other entities situated similarly.

Article 4
ADMINISTRATION OF THE CONTRACT

No supplementary conditions.

Article 5
SUBCONTRACTORS

5.1 AWARD OR SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.1.1 "The Contractor will make no substitution for any Subcontractor, person or entity previously listed on the Form of Proposal without written consent of the Owner."

## Article 6
## CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No supplementary conditions.

## Article 7
## CHANGES IN THE WORK

7.1 CHANGE ORDERS

7.1.1 The maximum cost included in a Change Order for profit and overhead is limited to twenty percent (20%) of the total of the actual cost for materials, labor and subcontracts. Profit and overhead include: all taxes, fees, permits, insurance, bond, job superintendent and office expense. All Subcontractors shall acquiesce to the same requirements when participating in a Change Order.

## Article 8
## TIME

8.1 DEFINITIONS

8.1.1 The date of Substantial Completion is the date certified by the Engineer and approved by the Owner in accordance with Paragraph 9.5 entitled "Substantial Completion."

8.2 DELAYS AND EXTENSIONS OF TIME

8.2.1 If the Contractor is delayed at any time in the progress of the Work by any act of neglect of the Owner or the Engineer, or by any employee of either, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or any causes beyond the Contractor's control, or by any other causes which the Engineer determines may justify the delay, then the Contract time may be extended by Change Order for such reasonable time as the Engineer may determine, subject to the Owner's approval. Any claim for loss or any delay occasioned by any separate Contractor, or Subcontractor, shall be settled between the Contractor and such other separate Contractor, or Subcontractors.

## Article 9
## PAYMENTS AND COMPLETION

9.1 APPLICATIONS FOR PAYMENT

9.1.1 The form of Application for Payment will be AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or a computer generated form containing similar data.

9.1.2 The Owner will retain, until the Work is one hundred percent (100%) complete, ten percent (10%) of the amount due the Contractor on account of progress payments. No reduction in retainage will be made until final payment is made.

9.1.3 The Contractor must submit each month with this Application for Payment a separate letter stating that he is requesting an extension of time or that he had no need for an extension for that period of time. No payment on a monthly application will be made until the letter is received. Complete justification such as weather reports or other pertinent correspondence must be included for each day's request for extension. A Contractor's letter, or statement, will not be considered as adequate justification. The receipt of this request and data by the Owner will not be considered as Owner approval in any way.

9.1.4 Payment on materials stored at some location other than the building site, may be approved by the Engineer and the Owner after the Contractor has submitted the following items:

1 An acceptable Lease Agreement between the Contractor and the owner of the land, or building, where the materials are stored covering the specific area where the materials are located.
2 Consent of Surety, or other acceptable Bond, to cover the materials stored off-site.
3 All Perils Insurance coverage for the full value of the materials stored off-site.
4 A Bill of Sale from the Manufacturer to the Contractor for the stored materials.
5 A complete list and inventory of materials manufactured, stored and delivered to the storage site and of materials removed from the storage site and delivered to the job site.
6 A review by the Engineer of the materials stored off-site prior to release of payment.
7 Guarantee no storage costs, additional delivery fees, or subsequent costs to the Owner.

9.2 CERTIFICATE FOR PAYMENT

9.3 PROGRESS PAYMENTS

9.3.1 The amount retained by the Contractor from each payment to each Subcontractor and material supplier will not exceed the percentage retained by the Owner from the Contractor.

9.4 FAILURE OF PAYMENT

9.4.1 If the Engineer does not issue a Certificate for Payment, through no fault of the Contractor, within seven (7) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within sixty (60) calendar days as prescribed in Section 31-5-25 of the Mississippi Code 1972, Annotated, then the Contractor may stop the Work until payment of the amount owed has been received.

9.5 SUBSTANTIAL COMPLETION

9.5.1 Substantial Completion shall not be established and final until Owner approves the Engineer's Certificate of Substantial Completion.

9.6 LIQUIDATED DAMAGES

9.6.1 Time being of the essence and a matter of material consideration thereof, a reasonable estimate in advance is established to cover losses incurred by the Owner if the project is not substantially complete on the date set forth in the Contract Documents. The Contractor and his Surety will be liable for and will pay the Owner the sums agreed as liquidated damages for each calendar day of delay until the work is substantially complete.

## Article 10
## PROTECTION OF PERSON AND PROPERTY

10.1 SAFETY OF PERSONS AND PROPERTY

10.1.1 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property caused in whole or in part by the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible, except damage or loss attributable to acts or omissions of the Owner or Engineer and not attributable to the fault or negligence of the Contractor.

## Article 11
## INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor's limits of liability shall be written for not less than the following:

1 GENERAL LIABILITY:
Commercial General Liability
(Including XCU)

| | |
|---|---|
| General Aggregate | $1,000,000.00 Aggregate |
| Products & Completed Operations | $1,000,000.00 Aggregate |
| Personal & Advertising Injury | $500,000.00 Per Occurrence |
| Bodily Injury & Property Damage | $500,000.00 Per Occurrence |
| Fire Damage Liability | $50,000.00 Per Occurrence |
| Medical Expense | $5,000.00 Per Person |

2 OWNERS & CONTRACTORS PROTECTIVE LIABILITY:

| | |
|---|---|
| Bodily Injury & Property Damage | $1,000,000.00 Aggregate |
| Bodily Injury & Property Damage | $500,000.00 Per Occurrence |

3 AUTOMOBILE LIABILITY:
(Owned, Non-owned & Hired Vehicles)
Contractor Insurance Option Number 1:

| | |
|---|---|
| Bodily Injury & Property | $500,000.00 Per Occurrence |
| (Combined Single Limit) | |

Contractor Insurance - Option Number 2:

| | |
|---|---|
| Bodily Injury | $250,000.00 Per Person |
| Bodily Injury | $500,000.00 Per Accident |
| Property Damage | $100,000.00 Per Occurrence |

4 EXCESS LIABILITY:
(Umbrella on projects over $500,000)

| | |
|---|---|
| Bodily Injury & Property Damage | $1,000,000.00 Aggregate |
| (Combined Single Limit) | |

5 WORKERS' COMPENSATION:
(As required by Statute)
EMPLOYERS' LIABILITY:

| | |
|---|---|
| Accident | $100,000.00 Per Occurrence |
| Disease | $500,000.00 Policy Limit |
| Disease | $100,000.00 Per Employee |

6 PROPERTY INSURANCE:

| | |
|---|---|
| Builder's Risk | $Equal to Value of Work |
| or | |
| Installation Floater | $Equal to Value of Work |

11.1.2 Furnish one (1) copy of the Standard Construction Contract Certificate of Insurance Form for each copy of the Standard Form of Agreement Between Owner and Contractor specifically setting forth evidence of all coverage required by Subparagraphs 11.1.1, 11.1.2 and 11.1.3. Furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage.

11.1.3 Add a new Subparagraph as follows:

If the coverages are provided on a claims-made basis, the policy date or retroactive date shall predate the Contract; the termination date, or the policy, or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Contractor shall purchase and maintain such insurance as will protect the Owner from his contingent liability to others for damages because of bodily injury, including death, and property damage, which may arise from operations under this Contract and other liability for damages which the Contractor is required to insure under any provision of this Contract. Certificate of Insurance will be filed with the Owner and will be the same limits set forth in 11.1.1.

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

11.4 PROPERTY INSURANCE (BUILDER'S RISK OR INSTALLATION FLOATER)

11.4.1 Change the following Clause in Subparagraph 11.4.1 to read as follows: If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay cost not covered because of such deductibles. If the Contractor, or Insurer, increases the required minimum deductibles above the amounts to identified, or if the Contractor elects to purchase this insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified in the Contract Documents, the Contractor shall pay costs not covered because of deductibles.

11.4.2 The Owner as fiduciary shall have power to adjust and settle a loss with Insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss.

Article 12
UNCOVERING AND CORRECTION OF WORK

No supplementary conditions.

Article 13
MISCELLANEOUS PROVISIONS

No supplementary conditions.

Article 14
TERMINATION OR SUSPENSION OF THE CONTRACT

No supplementary conditions.

END OF SECTION

## SECTION 01003 – SCHEDULE OF DRAWINGS

PART 1 - GENERAL

The Drawings for this project have been prepared and scheduled by the following:

**Mechanical/Electrical**

HESM&A, A Mississippi Corporation
Ridgeland, MS 39157

| Sheet No. | Title |
|---|---|
| T1.0 | Title Sheet with Vicinity Maps |
| ME1.0 | Columbus Site Plan (James W. Hunt Home) – Electrical & Gas Piping |
| ME2.0 | Bay Springs Site Plan (Johnny W. Stringer& Cambridge Homes) - Electrical & Gas Piping |
| ME3.0 | Prentiss Site Plan (Willow Bend & Stone Briar Homes) – Electrical & Gas Piping |
| ME4.0 | Ellisville Site Plan (Cotten's Corner Home) – Electrical & Gas Piping |
| ME5.0 | Ellisville Site Plan (Clover Cove) – Electrical & Gas Piping |
| ME6.0 | Power & Gas Riser Diagrams for Columbus, Bay Springs, & Prentiss Sites |
| ME7.0 | Power & Gas Riser Diagrams for Ellisville Sites |

END OF SECTION

## SECTION 01010 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS:

A. Work covered by the Contract Documents in the Project shall include:

Under base bid furnish and install one (1) emergency generator and transfer switch at the Group Home in Columbus, MS, two (2) emergency generators and transfer switches at the two (2) Group Homes in Bay Springs MS, two (2) emergency generators at the two (2) Group Sites in Prentiss MS. Under add alternate no.1 furnish and install 1 emergency generator and one (1) transfer switch at the Group Home located on Cleveland St. in Ellisville MS, Under add alternate no.2 furnish and install (1) emergency generator and one (1) transfer switch at the Group Home located on Blank St. in Ellisville, MS. The scope of work consists of all work shown on drawings and specifications. The Contractor shall provide to the Owner a schedule of work within 1 week of the Notice to Proceed.

B. Start of Work: Work shall be started immediately upon issuance of a proceed order. Prior to this, all Contracts and beginning documents will have been executed and insurance placed in force.

C. Time of Completion: The completion of this total work is to be on or before the time indicated in the Owner and Contractor Agreement.

D. Contractor's Duties:

1. Except as specifically noted, provide and pay for:
   Labor, materials, equipment.
   Tools, construction equipment and machinery.
   Water, heat and utilities required for construction.
   Other facilities and services necessary for proper execution and completion of work.

2. Pay legally required sales, consumer, use, payroll, privilege and other taxes.

3. Secure and pay for, as necessary for proper execution and completion of work, and as applicable at time of receipt of bids:
   Permits
   Government Fees
   Licenses

4. Give required notices.

5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work.

6. Promptly submit written notice to Engineer of observed variance of Contract Documents from legal requirements. It is not the contractor's responsibility to make certain that Drawings and Specifications comply with codes and regulations. Appropriate modifications to Contract Documents will adjust necessary changes. Assume responsibility for work known to be contrary to such requirements, without notice.

7. Enforce strict discipline and good order among employees. Do not employ on work, unfit persons or persons not skilled in assigned task.

1.02 CONTRACTS: Construct work under a single lump-sum contract.

1.03 FUTURE WORK:

A. Unless otherwise indicated, no provisions are to be made for future work.

1.04 CONTRACTOR USE OF PREMISES:

A. Confine operations at site to areas permitted by:
1. Law
2. Ordinances
3. Permits
4. Contract Documents

B. Do not unreasonably encumber site with materials or equipment.

C. Do not load structure with weight that will endanger structure.

D. Assume full responsibility for protection and safe-keeping of products stored on premises.

E. Move any stored products which interfere with operations of Owner or other Contractors.

F. Obtain and pay for, use of additional storage or work areas needed for operations.

END OF SECTION

## SECTION 01025 – SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide Schedule of Values allocated to the various portions of the work.

1.02 SCHEDULE OF VALUES:

A. Submit a Schedule of Values to the Engineer at least ten days prior to submitting first Application for Payment. Upon Engineer's request, support the values given with data substantiating their correctness. Use Schedule of Values only as basis for Contractor's Application for Payment.

B. Form of Submittal: Submit typewritten Schedule of Values on AIA Document G703A or similar computer generated form, using the Table of Contents of this Specification as basis for format for listing costs of work for sections under Divisions 2 - 16. Identify each line item with number and title as listed in Table of Contents of this Specification.

C. Preparing Schedule of Values:

1. Itemize separate line item cost for each of the following general cost items: Performance and Payment Bonds, field supervision and layout, and temporary facilities and controls.

2. Itemize separate line item cost for work required by each section of this Specification. Break down installed cost with overhead and profit.

3. For each line item which has installed value of more than $20,000, break down costs to list major products or operations under each item, rounding figures to nearest dollar. Make sum of total costs of all items listed in schedule equal to total Contract Sum.

D. Review and Resubmittal: After Engineer's review, if requested, revise and resubmit Schedule until accepted.

END OF SECTION

## SECTION 01027 – APPLICATIONS FOR PAYMENT

1.01 SCOPE:

A. This Section describes procedures for preparing and submitting Applications for Payment by the Contract.

1.02 APPLICATIONS FOR PAYMENT

A. Format:
   1. Applications for Payments will be prepared on AIA forms G702 - Application and Certificate for Payment and G703 - Continuation Sheet; or, a computer generated form containing similar data may be used.

B. Preparation of Application:
   1. Present required information in typewritten form.
   2. Execute certification by signature of authorized officer.
   3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
   4. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original Item of Work.
   5. Prepare Application for Final Payment as specified in Section 01700 entitled Contract Closeout.

C. Submittal Procedures:
   1. Submit three copies of each Application for Payment.
   2. Submit an updated construction schedule with each Application.
   3. Submit requests for payment at monthly intervals.
   4. Submit requests to the Professional at agreed upon times, or as may be directed otherwise.

D. Substantiating Data:
   1. Submit data justifying dollar amounts in questions when such information is needed.
   2. Provide one (1) copy of the data with a cover letter for each submittal.
   3. Indicate the Application number, date and line item number and description.

END OF SECTION

## SECTION 01040 – COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Scope: To set forth procedures, conditions and responsibility for coordination of the total project and for cutting and patching.

B. Project Coordinator: The Contractor will designate one individual as Project Coordinator or Superintendent, as referred to in the General Conditions.

1.02 DUTIES OF PROJECT COORDINATOR:

A. General:

1. Coordination: Coordinate the work of all Subcontractors and material suppliers.

2. Supervision: Supervise the activities of every phase of work.

3. Communication: Establish lines of authority and communication at the job site.

4. Location: The Project Coordinator must be present on the job all of the time.

5. Permits: Assist in obtaining building and special permits required for construction.

B. Interpretations of Contract Documents:

1. Consultation: Consult with Engineer to obtain interpretations.

2. Assistance: Assist in resolution of any questions.

3. Transmission: Transmit written interpretations to concerned parties.

C. Cessation of Work: Stop all work not in accordance with the requirements of the Contract Documents.

D. Division One: Coordinate and assist in the preparation of all requirements of Division One and specifically as follows:

1. Cutting and Patching: Supervise and control all cutting and patching of other trades' work.

2. Project Meetings: Schedule and preside at all project meetings.

3. Construction Schedules: Assist in preparation of all construction schedules. Supervise work to monitor compliance with schedules.

4. Shop Drawings, Product Data and Samples: Maintain copies of all submittals required by the Project Manual.

5. Schedule of Values: Assist in preparation and be knowledgeable of each entry in the Schedule of Values.

6. Testing: Coordinate all required testing.

7. Temporary Facilities and Controls: Allocate, maintain and monitor all temporary facilities.

8. Project Closeout: Conduct final inspections and assist in collection and preparation of closeout documents.

9. Cleaning: Direct and execute a continuing cleaning program throughout construction, requiring each trade to dispose of their debris.

10. Project Record Documents: Maintain up-to-date project record documents.

11. Enforce all safety requirements.

E. Changes: Recommend and assist in the preparation of requests to the Engineer for any changes in the Contract.

F. Application for Payment: Assist in the preparation and be knowledgeable of each entry in the Application and Certificate for Payment.

1.03 SUBCONTRACTOR'S DUTIES:

A. The Subcontractor is responsible to coordinate and supervise his employees in the work accomplished under his part of the Contract.

B. Schedules: Conduct work to assure compliance with construction schedules.

C. Suppliers: Transmit all instructions to his material suppliers.

D. Cooperation: Cooperate with Project Coordinator and other Subcontractors.

1.04 CUTTING AND PATCHING:

A. Avoid unnecessary cutting and patching by careful coordination of the work.

B. Execute necessary cutting, fitting, or patching of work where required to:

1. Make several parts fit properly.

2. Uncover work to provide for installation of ill-timed work.

3. Remove and replace defective work.

4. Remove and replace work not conforming to Contract requirements.

5. Install new work and provide required alterations in existing buildings.

C. In addition to Contract requirements, upon Engineer's written instructions:

1. Uncover work for observation of covered work.

2. Remove samples of installed materials for testing.

D. Do not endanger any work by cutting or altering.

E. Payment for Costs: Costs caused by ill-timed or defective work or work not conforming to Contract Documents will be borne by party responsible for ill-timed, rejected or non-conforming work.

PART 2 - PRODUCTS

2.01 MATERIALS FOR CUTTING AND PATCHING:

A. Materials for replacement of work removed: Comply with specifications for type of work to be done. Match existing materials when patching existing surfaces.

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING:

A. General:

1. Inspection: Inspect existing conditions of work, including elements subject to movement or damage during cutting and patching.

2. Preparation Prior to Cutting: Provide shoring, bracing and support as required to maintain structural integrity of project. Provide protection for other portions of project and protection from the elements.

3. Performance:

a. Execute cutting methods which prevent damage to other work and will provide surfaces to receive installation of repairs and new work.

b. Execute excavating and backfilling by methods which prevent damage to other work and prevent settlement.

c. Restore work which has been cut or removed; install new products to provide complete work in accordance with requirements of the Contract Documents.

d. Refinish entire surfaces as necessary to provide an even finish. Refinish continuous surfaces to the nearest intersection and assemblies entirely.

e. Perform all patching in the existing buildings to match and blend with the existing finishes to avoid any conspicuous evidence of the operation.

END OF SECTION

## SECTION 01060 – REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 STANDARDS AND CODES:

A. References to standards, codes, specifications, recommendations and regulations refer to the latest edition or printing prior to the date of issue of the Project Specifications, unless otherwise indicated.

B. Applicable portions of standards listed that are not in conflict with provisions of the Contract Documents are fully incorporated in the Contract Documents by reference.

END OF SECTION

## SECTION 01068 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.02 DEFINITIONS:

A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in the contract documents are defined generally in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to extent not stated more explicitly in another provision of contract documents.

B. General Requirements: The provisions or requirements of Division-1 sections. General Requirements apply to entire work of Contract and, where so indicated, to other elements which are included in the project.

C. Indicated: The term "Indicated" is a cross-reference to graphics, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by Engineer", "requested by Engineer", etc. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Contractor's area of construction supervision.

E. Approve: Where used in conjunction with Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.

F. Project Site: The space available to Contractor for performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of project site is shown on drawings, and may or may not be identical with description of land upon which project is to be built.

G. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

H. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing protecting, cleaning and similar operations, as applicable in each instance.

I. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

J. Installer: The entity (person or firm) engaged by Contractor or its subcontractor or subcontractor for performance of a particular unit of work at project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in operations they are engaged to perform.

K. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the work, either at project site or elsewhere, and to report and (if required) interpret results of those inspections or tests.

1.03 SPECIFICATION EXPLANATIONS:

A. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, most stringent requirement (which is generally recognized to be also most costly) is intended and will be enforced, unless specifically detailed language written into contract documents (not by way of reference to an industry standard) clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Engineer for a decision before proceeding.

B. Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a particular unit of work, option is intended to be Contractor's regardless of whether specifically indicated as such.

C. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Engineer for decision before proceeding.

D. Specialists; Assignments: In certain instances, specification text requires (or at least implies) that specific work be assigned to specialists or expert entities, who must be engaged for performance of those units of work. These must be recognized as special requirements over which Contractor has no choice or option. These assignments must not be confused with (and are not intended to interfere with) normal application of regulations, union jurisdictions and similar conventions. One purpose of such assignments is to establish which party or entity involved in a specific unit of work is recognized as "expert" for indicated construction processes or operations. Nevertheless, final responsibility for fulfillment of entire set of requirements remains with Contractor.

E. Trades: Except as otherwise indicted, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized trades people of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by trades people of that corresponding generic name.

F. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.04 DRAWING SYMBOLS:

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., eighth edition.

B. M/E Drawings: Graphic symbols used on mechanical/electrical drawings are generally aligned with symbols recommended by ASHRAE, supplemented by more specific symbols were appropriate as recommended by other recognized technical associations including ASME, ASPE, IEEE, and similar organizations. Refer instances of uncertainty to Engineer for clarification before proceeding.

1.05 INDUSTRY STANDARDS:

A. General Applicability of Standards: Applicable standards of construction industry have same force and effect (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith.

B. Referenced standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work.

C. Non-referenced standards recognized in the construction industry are hereby defined, except as otherwise limited in contract documents, to have direct applicability to the work, and will be so enforced for performance of the work. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

D. Copies of Standards: Provide where needed for proper performance of the work; obtain directly from publication sources. Abbreviations and Names: Where acronyms or abbreviations are used in specifications or other contract documents, they are defined to mean the industry recognized name of trade association, standards generating organization, governing authority or other entity applicable to context of text provision. Refer to "Encyclopedia of Associations," published by Gale Research Co., available in large libraries.

1.06 GOVERNING REGULATIONS/AUTHORITIES:

A. General: The procedure followed by Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing contract documents; recognizing that such information may or may not be of significance in relation to Contractor's responsibilities for performing the work. Contact governing authorities directly for necessary information and decision having a bearing on the performance of the work including but not limited to facilities to protect the public during construction.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

END OF SECTION

## SECTION 01200 – PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Progress Meetings:

1. A minimum of one regularly scheduled meeting per month will held at the Project Site.
2. Other Meetings will be held as progress of work dictates.
3. Attendance:
   a. Owner
   b. Engineer and his consultants
   c. General Contractor
   d. Subcontractors as pertinent to the agenda
4. Minimum Agenda:
   a. Review work progress since last meeting
   b. Note field observations, problems and decisions
   c. Identify problems which impede planned progress
   d. Review off-site fabrication problems
   e. Review and establishment of allowable "rain days" for proceeding month
   f. Revise construction schedule as indicated
   g. Plan progress during the next work period
   h. Review proposed changes
   i. Complete other current business

END OF SECTION

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   a. Owner
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4. Minimum Agenda:
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   c. Identify problems which impede planned progress
   d. Review off-site fabrication problems
   e. Review and establishment of allowable "rain days" for proceeding month
   f. Revise construction schedule as indicated
   g. Plan progress during the next work period
   h. Review proposed changes
   i. Complete other current business

END OF SECTION

## SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide Schedule of Values allocated to the various portions of the work.

B. Provide current construction schedules for the entire work.

C. Submit, and update as needed, an estimated progress payment schedule for Owner's use in planning investment of project funds.

D. Submit, where required, product Safety Data Sheets listing any material content subject to EPA regulations or listed by them as carcinogenic or toxic.

1.02 SCHEDULE OF VALUES:

A. Submit a Schedule of Values to the Engineer at least ten days prior to submitting first Application for Payment. Upon Engineer's request, support the values given with data substantiating their correctness. Use Schedule of Values only as basis for Contractor's Application for Payment.

B. Form of Submittal: Submit typewritten Schedule of Values on AIA Document G702 and G703 using Table of Contents of this Specification as basis for format for listing costs of work for sections under Divisions 2 - 16. Identify each line item with number and title as listed in Table of Contents of this Specification.

C. Preparing Schedule of Values:

1. Itemize separate line item cost for each of the following general cost items: Performance and Payment Bonds, field supervision and layout, and temporary facilities and controls.

2. Itemize separate line item cost for work required by each section of this Specification. Break down installed cost with overhead and profit.

3. For each line item which has installed value of more than $20,000, break down costs to list major products or operations under each item, rounding figures to nearest dollar. Make sum of total costs of all items listed in schedule equal to total Contract Sum.

D. Review and Resubmittal: After Engineer's review, if requested, revise and resubmit Schedule until accepted.

1.03 CONSTRUCTION SCHEDULES:

A. Provide projected construction schedules for entire work and revise periodically. The following is a minimum requirement and other type schedules are acceptable with Engineer's approval.

B. Form of Schedules: Prepare in form of horizontal bar chart.

1. Provide separate horizontal bar column for each trade or operation.

2. Order: Table of Contents of Specifications.

3. Identify each column by major specification section number.

4. Horizontal Time Scale: Identify first work day of each week.

5. Scale and Spacing: To allow space for updating.

C. Contents of Schedules:

1. Provide complete sequence of construction by activity.

2. Indicate dates for beginning and completion of each stage of construction.

3. Show projected percentage of completion for each item of work as of first day of each month.

D. Updating:

1. Show all changes occurring since previous submission of updated schedule.

2. Indicate progress of each activity and completion dates.

E. Submittals:

1. Submit initial schedules to the Engineer within fifteen (15) days after date of Notice to Proceed.

2. Submit to Engineer, periodically updated schedules accurately depicting progress to first day of each month.

3. Submit two (2) copies, one to be retained by the Engineer and the other forwarded to the Owner.

1.04 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

A. Submit to Engineer, shop drawings, product data, and samples required by specification sections.

B. Shop Drawings: Original drawings prepared by Contractor, Supplier or Distributor which illustrate some portion of the work; showing fabrication, layout, setting or erection details.

1. Prepared by qualified detailer.

2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

3. Minimum sheet size: 8 1/2" x 11".

4. Reproductions for Submittals: Photo copy or opaque Diazo print for up to 11" x 17". Transparent sepia plus opaque Diazo print for larger sizes.

C. Product Data:

1. Manufacturer's standard schematic drawings: Modify drawings to delete information which is not applicable to the project. Supplement standard information to provide additional information applicable to project.

2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data: Clearly mark each copy to identify pertinent materials, products or models. Show dimensions and clearances required. Show performance characteristics and capacities, wiring diagrams and controls.

3. Where required, product data shall include Safety Data Sheets listing material content subject to EPA regulations or listed by them as carcinogenic or toxic.

D. Samples: Physical examples to illustrate materials, equipment or workmanship and to establish standard by which completed work is judged.

1. Office Samples: Of sufficient size and quantity to clearly illustrate functional characteristics of products or material with integrally related parts and attachment devices and full range of color samples. After review, samples remain in possession of the Engineer until completion of the construction project.
2. Field Samples and Mock-Ups: Erect on project site at location acceptable to Engineer. Construct each sample or mock-up complete, including work of all trades required in finished work.

E. Contractor Responsibilities:

1. Review shop drawings, product data and samples prior to submission.

2. Verify field measurements, field construction criteria and catalog numbers and similar data.

3. Coordinate each submittal with requirements of work and of Contract Documents.

4. Contractor's responsibility for errors and omissions in submittals is not relieved by Engineer's review of submittals.

5. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Engineer's review of submittals unless Engineer gives written acceptance of specific deviations.

6. Notify Engineer in writing at the time of submission, of deviations in submittals from requirements of Contract Documents.

7. Begin no work requiring submittals until the return of submittals bearing Engineer's stamp and initials or signature, indicating review.

8. After Engineer's review, distribute copies.

F. Submission Requirements:

1. Schedule submission with ample time before dates reviewed submittals will be needed.

2. Submit number of copies of shop drawings and product data up to 11" x 17" in size, which Contractor requires for distribution, plus one copy to be retained by Engineer and one copy for Consulting Engineer for Divisions 3, 5, l5 and 16. Submit one transparent sepia and one opaque copy for larger sizes.

3. Submit number of samples specified in each of the specification sections.

4. Accompany submittals with transmittal letter, containing date, project title and number, Contractor's name and address, the number of each shop drawing, product data and sample submitted, notification of deviations from Contract Documents, and other pertinent data.

5. Submittals shall include:
   a. Date and revision dates.
   b. Project title and number.
   c. The names of: Engineer (& Engineer where applicable), Contractor, supplier, manufacturer and separate detailer, where pertinent.
   d. Identification of product or material.
   e. Relation to adjacent structure or materials.
   f. Field dimensions, clearly identified as such.
   g. Specification section number.
   h. Applicable standards, such as ASTM number or Federal Specification.
   i. A blank space 2" x 3" for Engineer stamp.
   j. Identification of deviations from Contract Documents.
   k. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

G. Resubmission Requirements:

1. Shop Drawings: Revise initial drawings as required and resubmit as specified for initial submittal. Indicate on drawings, any changes which have been made other than those required by Engineer.

2. Product Data and Samples: Submit new data and samples as required for initial submittal.

H. Distribution of Submittals after Review:

1. Distribute copies of shop drawings and product data which carry Engineer's stamp to: Contractor's file, Job Site file, Subcontractor, Supplier and Fabricator. Make necessary number of prints of transparent sepia for distribution.

2. Distribute samples as directed.

I. Engineer's Duties:

1. Review submittals with reasonable promptness.

2. Review for design concept of project and information given in Contract Documents.

3. Review of separate item does not constitute review of an assembly in which item functions.

4. Affix stamp and initials or signature certifying to review of submittal.

5. Return submittals to contractor for distribution. Only the sepia will be returned for larger size submittals.

END OF SECTION

## SECTION 01400 – QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Contractor shall monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality. Comply fully with manufacturers' instructions, including each step in sequence. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

B. Comply with specified standards as a minimum quality for the Work, except when more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship. Perform work by persons qualified to produce workmanship of specified quality. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

C. Contractor shall install field samples at the site as required by individual specifications Sections for review by the Engineer or Owner.

1. Acceptable samples represent a quality level for the Work.

2. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Engineer.

D. Tests will be performed under provisions identified in this Section.

1. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals and finishes.

2. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by the Engineer.

END OF SECTION

## SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL:

1.01 DESCRIPTION:

A. To set forth the procedure and conditions for substitutions and to give the product options available to the contractor.

1.02 PRODUCTS LIST:

A. Within 10 days after date of contract, submit to Engineer five (5) copies of complete list of all products which are proposed for installation.

B. Tabulate list by each specification section.

C. For products specified under reference standards, include with listing of each product:

1. Name and address of manufacturer.

2. Trade name.

3. Model or catalog designation.

4. Manufacturer's data.

5. Performance and test data.

6. Reference standards.

1.03 CONTRACTOR'S OPTIONS:

A. For products specified only by reference standards, select any product meeting standards, by any reputable manufacturer.

B. For products specified by naming several products or manufacturers, select any product and manufacturer named.

C. For product specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equal", or "approved equal" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.

D. Where more than one manufacturer's product is specified for one use, the Drawings have been prepared for the one listed first; and building adjustments may be necessary to accommodate the others. The Contractor will be responsible for any changes in the building construction required because of product selection, and shall make any such changes to the satisfaction of the Engineer without additional cost to the Owner.

1.04 SUBSTITUTIONS:

A. Procedure for submitting substitutions shall be as follows:

1. Items followed by the words "or approved equal": Submit requests for approval to Engineer at least ten (10) days prior to bid date. Use only those approved in writing prior to bid date.

2. Items qualified by words "or equal" or "equal to": Unless otherwise specified in other Specification Sections, submit substitutions to Engineer for approval at any time before purchase, but not more than 30 days after date of Agreement.

B. Submit five (5) copies of requests for substitution. For substitutions requiring approval prior to bidding, submit copy to Engineer, where relevant, at same time copies are submitted to Engineer. Include in request:

1. Complete data substantiating compliance of proposed substitutions with Contract Documents.

2. For Products:

a. Product identification, including manufacturer's name and address.

b. Manufacturer's literature: Product description, performance and test data and required standards. Safety Data Sheets where required.

3. For Construction Methods:

a. Detailed description of proposed method.

b. Drawings illustrating methods.

c. Itemized comparison of proposed substitution with product or method specified.

4. Data relating to changes in construction schedule.

5. Accurate cost data on proposed substitution in comparison with product or method specified.

C. In making request for substitution, bidder/contractor represents:

1. He has personally investigated proposed product or method and determined that it is equal or superior in all respects to that specified and that no product involved contains ingredients regulated by the EPA or which are carcinogenic or toxic.

2. He will provide the same guarantee for substitution as for product or method specified.

3. He will coordinate installation of accepted substitution into work, making those changes required for work to be complete in all respects.

4. He waives all claims for additional costs related to substitution which consequently become apparent.

5. Cost data is complete and includes all related costs under his contract.

D. Substitutions will not be considered if:

1. They are indicated or implied on shop drawings, or product data submittals without formal request submitted in accordance with this section.

2. Acceptance will require substantial revision of contract documents.

3. In the Engineer's judgment, the product or material is not equal.

END OF SECTION

## SECTION 01700 – CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION:

A. The work required under this section consists of the pre-requisites to and procedures for substantial completion and final inspections, and submitting of all close-out documents and related items to complete the work indicated on the Drawings and described in the Project Manual.

1.02 INSPECTIONS:

A. Preparatory Procedure: When the Contractor considers the Project, or a unit of the Project, to be substantially complete, he shall inspect the work, correct all possible deficiencies he discovers, prepare a list of remaining items to be completed or corrected, submit it to Engineer, and revise and amend said list as required.

B. Substantial Completion Inspection: When he finds sufficient evidence of substantial completion, Engineer inspects project, amplifies and amends Contractor's list and when substantially complete, issues a Certificate of Substantial Completion, with an initial "punch list" for final inspection.

C. Final Inspection: After Contractor has completed all work including items on original "punch list" and any additions thereto, he requests in writing a final inspection, and submits at the same time two copies, unless otherwise specified, of all Close-out Documents. Then Engineer and Owner, along with representatives of any Governmental Agencies contributing funds, make final inspection, and when they find all work acceptable and fully performed, Engineer submits the Final Certificate for Payment.

1.03 CLOSEOUT DOCUMENTS:

A. Final Application for Payment.

B. Consent of Surety Company to Final Payment.

C. Release of Liens and certification that all bills have been paid: A sworn statement and affidavit from the Contractor to the Owner stating that all bills for this job have been paid and that the Owner is released from any and all claims and/or damages.

D. Guarantee of Work: Sworn statement that all work is guaranteed against defects in materials and workmanship for one year from date of Substantial Completion, except where specified for longer periods.

1. Word the guaranty as follows: "We hereby guarantee all work performed under the Contract for the above captioned project to be free from defective materials and workmanship for a period of one (1) year from Substantial Completion date or such longer period of time as may be called for in the Contract Documents for such portions of the work." All guarantees and warranties shall be obtained in the Owner's name.

2. Within the guaranty period, if repairs or changes are needed in connection with guaranteed work which, in the opinion of the Owner, is rendered necessary as a result of the use of materials, equipment, or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor shall promptly, upon receipt of notice from and without expense to the Owner, place in satisfactory condition in every particular, all such guaranteed work, correct all defects to the building, site, equipment, or contents thereof and make good all damages to the building, site, equipment, or contents therein, which in the opinion of the Owner, is the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract; and make good any work or materials or the equipment or contents of said buildings or site disturbed in fulfilling any such guaranty.

3. If, after notice, the Contractor fails to proceed promptly to comply with the terms of the guaranty, the Owner may have the defects corrected and the Contractor and his sureties shall be liable for all expense incurred.

4. All special guarantees applicable to definite parts of the work stipulated in the Project Manual or other papers forming part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guaranty.

E. Project Record Documents: Furnish Record Documents, and provide manuals and instructions as hereinafter specified.

F. Additional documents specified within the Project Manual:

1. General: Provide all additional certificates, warranties, guarantees, bonds or documents as called for in the individual sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements.

1.04 RECORD DOCUMENTS:

A. Maintenance of Documents:

1. Maintain one copy of all: Contract Drawings, Project Manual, Addenda, Change Orders, Review Shop Drawings, Review Submittals, Product Safety Data Sheets, Equipment Brochures, Parts Lists, Operating Instructions, Field and Laboratory Test Records, and other modifications to the Contract.

2. Store documents apart from documents used for construction.

3. Maintain documents in clean, dry, legible condition. Do not use record documents for construction purposes.

4. Make documents available at all times for inspection by Engineer.

B. Recording:

1. General: Mark all modifications in red pencil. Keep record documents current. Do not permanently conceal any work until required information has been recorded.

2. Contract Drawings: Legibly mark to record actual construction:

   a. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.

   b. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

   c. Field changes of dimension and detail.

   d. Changes made by Change Order or Field Order.

1.05 MANUALS AND INSTRUCTIONS:

A. Provide three copies of all maintenance and instruction manuals customarily supplied by manufacturers for items incorporated in the work. Assemble together in hardback binders.

B. Arrange, by appointment, to give physical demonstration and oral instructions for machine and equipment operation to the Owner or a designated representative.

1.06 FINAL CLEANING:

A. Employ experienced workmen or professional cleaners for final cleaning. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and concealed spaces. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish. Repair, patch and touch-up marred surfaces to specified finish to match adjacent surfaces. Broom clean paved surfaces; rake clean other surfaces of grounds. Replace air conditioning filters if units were operated during construction. Clean ducts, blowers and coils if air conditioning units were operated without filters during construction. Maintain cleaning until project, or respective portions thereof, is accepted or occupied by Owner.

END OF SECTION

## SECTION 15010 - MECHANICAL GENERAL

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This division and the accompanying drawings cover furnishing of all labor, equipment, appliances, and materials and performing all operations in connection with the installation of complete plumbing systems as specified herein and as shown on the drawings.

B. The general provisions of the contract including the Conditions of the Contract (General, Supplementary and other conditions) and other divisions as appropriately apply to work specified in this division.

1.02 CODES, ORDINANCES, AND PERMITS:

A. All plumbing materials and workmanship shall comply with the following codes and standards as applicable:

1. The National Electric Code (2014 Edition)

2. The International Building Code (2012 Edition)

3. The International Plumbing Code (2012 Edition)

4. The International Fuel Gas Code (2012 Edition)

5. City of Columbus, Bay Springs, Prentiss, & Ellisville, MS Plumbing Code (as applicable)

C. Applicable Publications: The publications listed below form a part of this specification to the extent referenced and are referred to in the text by the basic designation only.

1. American National Standards Institute, Inc. Standards (ANSI)

2. American Society for Testing and Materials Publications (ASTM)

3. American Gas Association Inc. Laboratories (AGA)

4. American Society of Mechanical Engineers Code (ASME)

5. Factory Mutual Underwriters (FM)

7. Underwriters Laboratories Inc. (UL)

D. All work done under this Contract shall comply with all state and local code authorities having jurisdiction and with the requirements of the Utility Companies whose services may be used. All modifications required by these codes and entities shall be used made by the Contractor without additional charges. Any conflict between these documents and the governing codes shall be immediately brought to the attention of the Engineer of Record. Where code requirements are less than those shown on the Plans or in the Specifications, the Plans and Specifications shall be followed. Where applicable, N.F.P.A. requirements shall be met.

E. The Contractor shall obtain all permits, inspections, and approvals as required by all authorities having jurisdiction, and deliver certificates of approval to the Architect. All fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor.

F. The Contractor shall comply with all applicable provisions of the William-Steiger Occupational Safety and Health Act (O.S.H.A.).

1.03 APPLICABILITY:

A. The work specified herein shall include all labor, materials, equipment, tools, supplies and supervision required to install and place in operation the mechanical systems and appurtenances specified herein and/or indicated on the drawings or reasonably implied as necessary for completion of the various systems.

1.04 COORDINATION OF MECHANICAL DOCUMENTS:

A. The mechanical work listed in these documents shall be coordinated with the work indicated on all other drawings, schedules, schematics, and specifications. Should a conflict occur, the contractor shall submit a request for clarification to the engineer prior to bid opening. NO ALLOWANCES shall be made for any assumptions made by the contractor or any sub-contractors that are in direct conflict with the intent of the construction documents; in the event a conflict is discovered after construction has commenced, the resolution of the conflict shall be decided by the Engineer of Record, whose interpretation of the documents shall be final.

PART 2 - PRODUCTS

2.01 COORDINATION OF PRODUCTS:

A. The products of particular manufacturers have been used as the basis of design in preparation of these documents. Any modifications to the mechanical systems and their components, the electrical systems, the building structure and architecture, or any other portion of the building that result from the use of any other than the basis of design equipment shall be coordinated with all other trades. Such coordination shall occur before shop drawing submittals and shall be clearly indicated on the shop drawings. Any related modifications shall be the responsibility of the contractor and shall be performed without any additional cost to the Contract.

2.02 DESCRIPTION:

A. All components of the mechanical systems shall be new. All equipment and products for which independent laboratory testing and labeling is applicable and/or required shall bear the Underwriter's Laboratories, Inc. (UL) label.

PART 3 - EXECUTION

3.01 GENERAL:

A. The Contractor shall provide and prepare all trenching, boring etc; as required for installation f piping.

B. The mechanical plans do not give exact elevations or locations of lines, nor do they show all the offsets, or other installation details. The Contractor shall carefully lay out his work at the site to conform to the existing structural conditions, to provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and to thereby provide an integrated, coordinated and satisfactorily operating installation.

C. The Contractor is responsible for the proper location and size of all sleeves, holes, inserts, cores, etc; pertaining to his work.

D. The Contractor shall so coordinate the work of the several various trades that it may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades.

3.02 ELECTRICAL WORK:

A. All electrical equipment provided under this Division shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 16.

3.03 PROTECTION OF EQUIPMENT:

A. Plug ends of pipe when work is stopped and close ends of ducts with plastic taped in place until work resumes.

B. Damaged equipment shall be repaired or replaced at the option of the Engineer of Record.

3.04 PAINTING:

A. Factory painted equipment that has been scratched or marred shall be repainted to match original factory color.

3.05 PROTECTION OF EXISTING UTILITIES:

A. The Contractor shall use extreme caution during excavation operations not to damage or otherwise interrupt the operations of existing utilities. The Contractor shall be responsible for the continuous operation of these lines and shall provide bypasses or install such shoring, bracing, or underpinning as may be required for proper protection.

B. Schedule work so existing systems will not be interrupted when they are required for normal usage of the existing building. Obtain approval from the Owner at least 7 days prior to any interruption to service of utilities.

3.06 CUTTING AND PATCHING:

A. The Contractor shall assume all cost of, and be responsible for, arranging for all cutting and patching required to complete the installation of his portion of the Work. All cutting shall be carefully and neatly done so as not to damage or cut away more than is necessary of any existing portions of the structure.

B. All surfaces shall be patched to the condition of the adjacent surfaces.

3.09 CLEANING:

A. Remove all stickers, rust, stains, labels, and temporary covers before final acceptance.

B. The exterior surfaces of all mechanical equipment, piping, etc., shall be cleaned of all grease, oil, paint, dust and other construction debris.

3.10 EQUIPMENT, MATERIALS AND BID BASIS:

A. It is the intention of these Specifications to indicate a standard of quality for all material incorporated in this work. Manufacturer's names are used to designate the item of equipment or material as a means of establishing grade and quality. Where several manufacturers are named, only these manufacturers' products will be considered and the Contractor's bid shall be based on their products. Other named manufacturers, although acceptable as manufacturers, must prove their product will perform satisfactorily and will meet space requirements, etc., and shall obtain pre-approval of their equipment, before submitting shop drawings, when their equipment achieves the required results in a manner different than that of the first named manufacturer. Where only one manufacturer is named, unless the Specifications state otherwise, manufacturers of similar quality products will be considered. Such unnamed manufacturer's products will, however, be considered as substitutions and shall not be used as a basis for bidding. In the event the Contractor wishes to submit substitutions to the Architect for review prior to bid, he shall furnish descriptive catalog material, text data, samples, etc., as well as any other pertinent data necessary to demonstrate that the proposed substitutions are acceptable equals to the specified product. No substitutions shall be made without the written consent of the Engineer.

B. The use of one named manufacturer in the schedules on the Drawings is for guide purposes. The provisions of the above paragraph will govern in the selection of products to be used.

3.11 GUARANTEE:

A. All systems and components shall be provided with a one year guarantee from the time of final acceptance or beneficial occupancy (Coordinate with the Engineer). The guarantee shall cover all materials and workmanship. During this guarantee period, all defects in materials and workmanship shall be corrected by repair or replacement without incurring additions to the Contract.

3.12 RECORDS AND INSTRUCTIONS FOR OWNER:

A. The Contractor shall accumulate during the job's progress the following data in triplicate prepared in neat brochures or packet folders and turned over to the Engineer for check and subsequent delivery to the Owner:

1. Provide all warranties and guarantees, manufacturer's directions and material covered by the Contractor.

2. Provide approved fixture brochures, wiring diagrams, and control diagrams.

B. All of the above data shall be submitted to the Engineer for approval at such time as the Contractor asks for his last estimate prior to his final estimate, but in no case, less than two weeks before final inspection.

C. A competent technician employed by the Temperature Control Subcontractor shall be required to instruct the Owner in proper operating procedures and shall explain the significance of the temperature control literature filed in the maintenance manual over a period of (two days - 16 hours) while the system is in continuous operation as specified above.

3.13 RECORD DRAWINGS:

A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings" reflecting an accurate dimensional record of all buried or concealed work. In addition, the "Record Drawings" shall be marked to show the precise location of concealed work and equipment, including concealed or embedded piping and valves and all changes and deviations in the Mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Engineer. The "Record Drawings" shall consist of a set of mylar sepia prints of the Contract Drawings for this Division with the Engineer's seal and Engineer's firm name removed or blacked out. Prior to commencing work the Contractor shall purchase from the Architect a set of mylar sepia prints to be used for the "Record Drawings".

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.

C. The Contractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following:

"RECORD DRAWINGS – "3/8" high letters to be used for recording field deviations, and "5/16" high letters to be used for dimensional data only.

3.14 INSTALLATION:

A. All equipment shall be installed in strict conformance with manufacturer's recommendations, as specified herein. If any conflict arises between these instructions, notify the Engineer immediately for clarification.

END OF SECTION

## SECTION 15011 - SCHEDULE OF SUBMITTAL DATA

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The requirements of the General Conditions, Supplementary Conditions, and Section 15010-Mechanical General, apply to all work herein.

1.02 QUALITY ASSURANCE:

A. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this contract. The Contractor shall submit to the Engineer a sufficient number of copies of all such Shop Drawings or catalog data to provide him with as many reviewed copies as he may need, plus two (2) copies for retention, one by the Architect and one by the Engineer.

B. Before submitting Shop Drawings to the Engineer for review, the Contractor shall examine them and satisfy himself that they are correctly representative of the material or equipment to which they pertain. The Contractor shall so note these Drawings before submitting them. The Contractor's review of the Shop Drawings is not intended to take the place of the official review by the Architect. Any Shop Drawings which have not been reviewed by the Architect shall not be used in fabricating or installing any work.

C. The review of Shop Drawings or catalog data by the Engineer shall not relieve the Contractor from responsibility for deviations from the Plans and Specification unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect. Also, it shall not relieve him from responsibility for error of any kind in Shop Drawings. When the contractor does call such deviations to the attention of the Architect, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.

D. Verification and assignment of dimensions, quantities, and construction means, methods, sequences or procedures, the correctness of which is set forth in the Contract Documents or submittal, shall be the sole responsibility of the Contractor.

E. Reproduction of design documents in any portion for use in a submittal is <u>not</u> acceptable.

PART 2 - PRODUCTS

2.01 GENERAL:

A. All products shall be new and bear all labels which are identified by the applicable specification section and Contract Documents.

PART 3 - EXECUTION

3.01 SUBMITTAL DATA:

A. General

1. The submittal data to be furnished for this project shall comply with the Specifications and Contract Documents in their entirety. Any submittals herein scheduled are as a minimum only and shall not be construed to limit the submittal data required within the individual Sections of these Specifications.

2. Shop Drawings will be returned unchecked unless the following information is included: Reference to all pertinent data in the Specifications or on the Drawings, such as sound power levels of motor driven equipment where called for in the specifications, electrical characteristics and horse power, capacities, construction material of equipment, UL labels where required, accessories specified, manufacturer, make and model number, weights where specified, starters where required by Division 15, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings. All submitted equipment must be identified on Shop Drawings with the same "Mark Numbers" as identified on Drawings or in Specifications. All pertinent data such as accessories shall also be marked. Any deviation from any part of the Contract Documents shall be clearly and completely highlighted.

B. The bound submittals are to be submitted for review within 30 days after the Contract is awarded. No submittal will be checked until ALL required submittals have been received by the Engineer. Only Automatic Temperature Controls, ductwork and piping fabrication drawings may be submitted after the completed bound submittal is reviewed and accepted by the Engineer.

C. The Contractor shall submit with the bound and identified submittal data a letter signed by the Contractor's Project Manager (or higher level officer of the firm) stating that all electrical characteristics of the mechanical equipment to be supplied has been fully coordinated with the electrical contractor. No submittal data will be checked until this letter is submitted. Any changes to the electrical requirements from the Contract Documents resulting from alternate equipment being submitted shall be performed without any additions to the Contract Sum. Submit attachment and fastening methods for piping and equipment to the Structural Engineer for approval. Shop Drawings shall be submitted for each of the following:
Fitting
Piping
Valves

3.02 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Description

1. Complete operating and maintenance instructions shall be provided to the Owner. Four (4) separate copies (three for the owner, one for the Architect) shall be provided, and each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each system, and shall include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instruction shall be included for each piece of equipment. Manufacturers' Standard literature is acceptable for each piece of equipment. However, the contractor shall prepare a SYSTEM O&M manual including overall system descriptions, operating and energy conservation techniques.

3.03 OTHER SUBMITTALS – CLOSEOUT DOCUMENTS:

A. Submit two copies of the following prior to occupancy of the project by the Owner. See contract close-out – Section 01700.

1. As built drawings for ductwork, HVAC piping, plumbing and fire protection systems.

2. Request for final payment.

3. Letter or "Release of Liens".

4. Letter of "Guarantee".

5. Consent of Surety Company to final payment.

6. Power of Attorney.

7. Contractor's Affidavit of Payment of Debts and Claims.

END OF SECTION

## SECTION 15400 - GAS PIPING BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This Section of the Specifications and related drawings describe requirements pertaining to the plumbing piping and equipment.

B. Refer to the following sections for related work:

15011 Schedule of Submittal Data

1.02 RECORD DOCUMENTS:

A. Provide corrected Record Documents in accordance with the Project Record Documents Sections and the Mechanical General Section.

1.03 GENERAL PROVISIONS AND BASIC MATERIALS:

A. The requirements of the Mechanical General Section 15010 apply to this work.

1.04 CODE:

A. The work shall comply with the International Plumbing Code, International Fuel Gas Code, and NFPA 54; acceptability under the codes shall not authorize any substitution, smaller size, lighter weight or less durable materials for the items specified.

B. The Contractor shall obtain and pay for all required permits and inspections and shall deliver one copy of each inspection certificate to the Architect before the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GAS PIPING:

A. Aboveground Piping, Pipe Sizes Up To and Including 2": Black steel pipe, Schedule 40, ASTM-A53 with threaded joints and Class 150 malleable iron threaded fittings, except piping located within return air plenums or above non-accessible ceilings which shall be all welded same as for pipe sizes 2-1/2" and larger.

B. Aboveground Piping, Pipe Sizes 2-1/2" and Larger: Black steel pipe Schedule 40, ASTM-A53 with buttwelded joints and standard weight wrought steel buttwelded fittings.

C. Exposed Exterior Piping, All Pipe Sizes: Black steel pipe, Schedule 40, ASTM-A120 with buttwelded joints and standard weight wrought steel buttwelded fitting. Pipe shall have a factory applied extruded high density polyethylene coating of a minimum thickness of 24 mils with a hot applied adhesive undercoating. Coating shall be equal to Republic X-Tru-Coat. All joints, fittings and mars in pipe coating shall be wrapped with a cold applied coal tar tape of 35 mil thickness minimum. Tape coating shall be equal to X-Tru-Tape Tapecoat CT or Scotchwrap No. 51.

D. Underground Piping, Pipe Sizes Up to 3": PE 2406 – Type II polyethylene pipe and fittings, ASTM D-1248 with socket fusion joints.

E. Underground Piping, Pipe Sizes 4" and Larger: PE 2406 – Type II polyethylene pipe and fittings, ASTM D-1248 with butt fusion joints.

F. Polyethylene pipe and fittings shall be as manufactured by Phillips Driscopipe, Inc., Plexco or Uponor Aldyl Co.

2.02 BASIC PIPING SPECIALTIES:

A. Unions:

1. Unions shall be the same material and working pressure as the fittings specified for the piping system. Unions on piping 2-1/2" in size and larger shall be bolted flanged joint and on smaller than 2-1/2" shall be screwed connection.

2. Unions and flanges provided between copper and ferrous pipe connections shall be insulating (dielectric) type to electrically separate dissimilar metal connections in piping system.

B. Dielectric Adapters:

1. Dielectric adapters shall be the union type for pipes 2" in size and larger. Adapters shall have working pressure of 250 psi for union type and 165 psi for flanged type. The insulating gaskets shall have an operating range of 40 degrees F to 240 degrees F and shall limit the galvanic corrosion to a maximum of 1% of the short circuit current. Dielectric adapters shall be Ebco, Crane or Capitol.

2. Provide a dielectric adapter between any ferrous and copper connection including piping and equipment.

2.03 VALVES:

A. Gas valves and cocks shall be Class 200 plug cocks, conforming to ASTM A-126 Class B, with semi-steel body Teflon coated tapered plug, threaded of flanged ends, wrench operated; Walworth 1559 or approved equal.

2.04 PLUMBING SYSTEM INSULATIONS:

A. All pipe insulation material shall have a permanent composite insulation, jacket and adhesive fire and smoke hazard rating as tested by procedure ASTM-B84, NFPA 255, and UL 723 not exceeding Flame Spread 25, Smoke Developed 50.

PART 3 – EXECUTION

3.01 INSTALLATION:

A. Install piping and make all joints in accordance with the pipe manufacturer's recommendations. Make provisions for thermal expansion and contraction.

3.02 EXCAVATION, TRENCHING AND BACKFILLING:

A. Perform all excavation, trenching and backfilling for work under Division 15. During excavation, material for backfilling shall be piled back from the banks of the trench to avoid overloading and to prevent slides and cave-ins. All excavated materials not to be used for backfilling shall be re moved and disposed of. Grading shall be done to prevent surface water from flowing into trenches and other excavation and any water accumulating therein shall be removed by pumping. All excavations shall be made by open cut. No tunneling shall be done.

B. Bottom of trench shall be uniformly graded to provide firm support and even bearing surface for pipe.

C. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that barrels of pipe rest evenly on bottom of trench along entire length of pipe.

D. Pipe shall be inspected and tested prior to backfilling. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. Trench shall be hand filled to a minimum of 12" above the top of the pipe with clean earth and tamped to 95 percent compaction after first layer using the modified Proctor test method of compaction.

3.03 TESTS OF PIPING:

A. Install temporary connections and plugs or valves at all points necessary for venting air from the piping, filling, holding test pressure, draining and flushing the piping.

B. All gas piping shall be tested with air at a minimum of 50 psi for two (2) hours with no drop in pressure.

3.04 START-UP, ADJUSTMENT, INSTRUCTION:

A. Start-up, lubricate, adjust and test equipment installed under this Section and furnish instructions to the Owner as specified in the Mechanical General Section.

END OF SECTION

## SECTION 16010 - ELECTRICAL GENERAL

PART 1 - GENERAL

1.01 SCOPE:

A. This Division and the accompanying electrical drawings cover furnishing all labor, equipment and materials and performing all operations in connection with the installation of a complete and operational electrical system.

B. There are many interfaces between the work involved with this Division and the work in other Divisions, particularly with Division 15. Be aware of the responsibilities at the interfaces. The exact locations of apparatus, fixtures, equipment and raceways shall be ascertained from all concerned and the work shall be installed accordingly. In addition, coordinate with all equipment suppliers and other trades to verify the actual installation requirements prior to rough-ins.

C. The plans and specifications are considered cooperative and complimentary. Where one contradicts the other contact the Design Engineer for clarification prior to any installation.

D. All applicable portions of the General and Specific Conditions are included herein by reference.

1.02 DEFINITIONS:

A. Install: Receive, store, place, fix in position, secure, anchor, etc., including necessary appurtenances and labor so the equipment or installation will function as specified and intended.

B. Furnish: Purchase and supply equipment and components, including shipping and receiving.

C. Provide: Furnish, install, connect, test, demonstrate and leave operational.

D. Wiring: Wire or cable installed in raceway with all required boxes, fittings, connectors, etc.

E. Work: Materials completely installed, including the labor involved.

F. Or approved equal: Equal in type, design, quality and appearance, as determined by the Architect.

G. Raceway: Galvanized rigid steel conduit (GRC), electrical metallic tubing (EMT), schedule 40 Polyvinyl Chloride (PVC), flexible steel (FLX), sheathed flexible steel (SLT), code gauge wireway (WW).

1.03 CODES AND REGULATIONS:

A. All work shall comply with all local laws, ordinances and regulations applicable to the electrical system installation, NFPA, OSHA, ANSI, SBC, municipal ordinances governing electrical work, and with the requirements of the latest edition of the National Electrical Code.

B. Where different sections of any of the aforementioned codes and regulations, the specifications or the plans require different materials, methods of construction, or other requirements, the most restrictive or stringent shall govern. In any conflict between a general provision and a special provision, the special provision shall govern.

C. Obtain all permits and licenses, and pay all fees as required for execution of the Contract. Arrange for necessary inspections required by the Engineer, city, county, state and other local authorities having jurisdiction (LAHJ) and present certificates of approval to the Engineer or his designated representative.

D. Under no circumstances will asbestos, or asbestos related materials, be allowed on this project.

E. Communicate with all required utility offices to meet utility schedules and regulations. Coordinate the local utility requirements with the requirements of these contract documents. Should conflicts arise, notify the Engineer immediately. Acquire services to avoid project delays. Conform to regulations of the local utility company with respect to metering, service entrance and service access.

1.04 SITE VISIT:

A. **All parties shall visit the site and thoroughly familiarize themselves with the local conditions and existing conditions which may affect the cost of the Work prior to any project activity or submission of bids.**

B. Where work under this Division requires extension, relocation, reconnection or modifications to the existing equipment or systems, the existing equipment or systems shall be restored to their original condition prior to completion of this Project.

C. **No allowances will be made for lack of knowledge of existing job conditions which could reasonably be identified during site visit.**

D. Verify the service entrance voltage and short circuit contribution with the serving power utility and provide written confirmation of same to the Engineer prior to submitting shop drawings or ordering any materials for use in the building served. Provide service entrance equipment fully rated to interrupt the available fault current from the serving utility.

1.05 DRAWINGS AND SPECIFICATIONS:

A. The Electrical Drawings are diagrammatic, and are not intended to show the exact location of raceways, outlets, boxes, bends, sleeves, fire sealant, couplings or other such elements except where dimensions are noted. Provide all required offsets, extensions or pull boxes required for a fully coordinated and operational system.

B. The Drawings and Specifications shall both be considered as part of the Contract. Any work or material shown in one and omitted in the other, or which may fairly be implied by both or either, shall be provided in order to give a complete job.

C. Should conflicts exist between the Drawings and Specifications, notify the Engineer for clarification prior to installation.

D. Coordinate installation of the electrical equipment with structural systems and mechanical systems such that full maintenance access is provided.

E. All conduit and wiring shown on the Electrical Drawings shall be provided under this Division regardless of its function.

F. Equipment configuration is based upon one manufacturer's product. Where the equipment selected by the Contractor for use on this Project differs from the configuration shown, the Contractor shall be responsible for coordinating space requirements, connection arrangements, interfaces with mechanical and plumbing equipment and all other affected trades and providing access for future maintenance and repair. Submit proposed revisions for approval by the Engineer.

1.06 DEVIATIONS:

A. No deviations from the drawings and specifications shall be made without the full knowledge and consent of the Engineer.

B. If it is found that existing conditions make desirable a modification in requirements covering any particular item, report such item to the Engineer for his review and instructions.

1.07 EQUIPMENT CONNECTIONS:

A. The horsepower, wattage (or amperes) of mechanical equipment indicated is the estimated requirement of equipment furnished under another Division. All wiring, protective devices and disconnect switches shall be of the voltage, size and ampacity required for the actual equipment installed, when equipment varies from that specified on the drawings, without increase or additional costs. In no case shall these items be of smaller capacity than permitted by EQUIPMENT NAMEPLATE/NATIONAL ELECTRIC CODE.

B. Coordinate with other trades and review the drawings of other divisions and provide suitable control equipment and feeders/branch circuits so that the above requirements shall be met without incurring additions to the Contract in time or cost. Conform with UL Listing and nameplate requirements for equipment furnished. Such adjustments shall be subject to the approval of the Engineer.

C. Provide suitable over current protection and disconnecting means in conformance with the requirements of the NEC, for all items or equipment utilized on the project no matter how, or by whom, furnished. However, duplication, or redundancy, is not required. Coordinate said requirements with equipment furnished and with applicable trades.

D. Where drawings indicate or specifications require equipment to be controlled by line voltage interlock, safety device or control, provide line voltage control wiring in Division 16.

E. For each electrical connection required, provide pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire connectors, and other items required to complete splices and terminations of the necessary types. Cover splices or terminations with electrical insulation equivalent to insulation of conductors terminated.

PART 2 - PRODUCTS

2.01 STANDARDS FOR MATERIALS AND WORKMANSHIP:

A. All material shall be new and shall bear the inspection label of Underwriter's Laboratories, Inc. (UL).

B. The published standards and requirements of the National Electrical Manufacturer's Association (NEMA), Underwriters' Laboratories (UL), Electrical Testing Laboratories (ETL), American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers (IEEE), Insulated Cable Engineers Association (ICEA), National Fire Protection Association (NFPA), Occupational safety Health Association (OSHA) and the American Society for Testing and Materials (ASTM) shall govern and apply where such have been established for the particular material in question.

C. Specified catalog numbers and trade or manufacturers names are intended to describe the material, devices, or apparatus desired for type, construction features, electrical characteristics, ratings, operating functions, style and quality. Similar materials of other manufacturers, not less than specified quality, capacity or character may be substituted in conformity with the provisions of the General and Supplementary Conditions. Materials of the same type shall be the product of one manufacturer. Refer to Shop Drawing requirements.

D. Furnish all materials specified herein or indicated on the drawings.

E. All work shall be installed in a practical and workmanlike manner by competent workmen, licensed and skilled in their trade.

2.02 SHOP DRAWINGS:

A. Provide complete electrical characteristics for all equipment. Submit for approval data of the materials and equipment to be incorporated into the Work. Submittals shall include descriptive materials, catalog cuts, diagrams, performance characteristics, and charts published by the manufacturer indicating conformance to the specification and drawing requirements; model numbers alone will not be acceptable. Submittals shall be made by Specification section number, tabbed, within three ring binders, grouped and submitted in packages as indicated below. Submittals for lighting fixtures shall include full photometric data. Shop drawings shall be submitted for the following equipment and items suitably bound, and marked:

Package I:
Section 16120 Wires and Cables
Section 16130 Boxes and Fittings
Section 16140 Wiring Devices

Package II:
Section 16430 Emergency Power System

B. Shop drawings and/or catalog data submittals on all items of equipment and materials shall be submitted in conformity with requirements of the General and Supplementary Conditions. Do not submit more than the required number of sets as indicated by Engineer. Do not submit equipment or materials not requested in the Specifications.

C. All material lists and shop drawing submittals shall include a stamped indication by the Contractor signifying that the submittals have been previously reviewed for complete compliance with the Contract Documents, that all coordination required between trades prior to field installation has occurred and that the material being submitted is approved for installation. The stamped indication shall include the name of the contracting firm, the date of the review and the signature of the contractor. The Engineer will not review the shop drawing submittals without the contractor's stamped approval already on the shop drawings. The responsibility of complying with the Contract Documents will not be relieved by the Engineer's review, which requires 10 working days from the date the shop drawings are received by the Engineer.

D. All pricing is to be based upon the products, manufacturers, and processes described in the Contract Documents. Requests for approval of substitutions shall be written and delivered to the Engineer's office in conformity with the provisions of the General and Supplemental Conditions. Do not submit any shop drawing or product data that does not conform with the contract documents.

E. Resubmittals, if necessary, shall be made as specified above. Resubmittals will highlight and indicate any and all revisions made there to and will include the following text "Resubmittal #___", typed in a prominent location on the cover sheet.

F. The Contractor shall provide with the shop drawing submittal dimensioned layouts of all spaces using the equipment he intends to furnish.

G. Samples of all materials proposed for use shall be presented to the Engineer for his approval when requested.

H. Submittals shall be noted with any deviations, alterations or limitations of product from the specified materials. The product will be rejected upon failure to indicate this information. Any conflict or failure to perform comparably to the originally specified materials will result in product rejection. It will be the Contractor's responsibility to replace the alternate material or equipment with the originally specified one and to demolish, replace, repair and retest the equipment, including repair or replacement of any component of the building, finishes or other systems affected by said replacement, at no additional costs to the Owner.

2.03 SUPPORT FASTENER DEVICES:

A. Anchors for post tensioned concrete applications shall be cast in place continuous or spot insert channel providing a safety factor of 3 in 3000 lb hard rock concrete.

B. Anchors for cast in place concrete shall be insert type expansion shields and bolts, lead shields and bolts or self drilling expansion shields and bolts. Powder actuated pins of 1500 pound pull out strength may be utilized in concrete.

C. Anchors for wood construction shall be lag bolts or power driven wood screws.

D. Anchors in hollow masonry shall be toggle bolts.

E. Anchors for steel attachment shall be machine screws, bolts, or beam clamps.

F. Equipment mounted to drywall construction shall be secured to power channel (13/16" x 1 5/8" minimum). Secure channel to a minimum of two (2) dry wall studs with drywall screws and washers.

2.04 SUPPORTS:

A. Furnish and install under this contract all angle iron, channel iron, rods, threaded rod, supports or hangers required to install or mount all electrical equipment, material or related devices. Conduit shall not be supported from steel decking, roof decking, bridging, ceiling or ceiling support wires.

2.05 IDENTIFICATION:

A. All equipment or devices specified in Division 16 shall be identified with an engraved plastic nameplate. Identification of flush equipment shall be on the inside of the cover. Surface equipment shall be identified on the outside. Plastic nameplates shall be multicolored laminated plastic with engraved lettering. Nameplates shall be provided as scheduled:

1. 240/120 volt emergency power equipment shall be white faceplate/red core (1 ½" x 8" with ½" high letters). Face plate shall read "Emergency - 240 Volts".

2. Junction boxes for emergency power, lighting, fire alarm systems, etc. shall have circuit numbers indicated and labeled as required.

3. Junction boxes for general power, lighting and mise, systems etc. shall have circuit numbers indicated and voltage (system) labeled as required.

2.06 AS-BUILT (RECORD) DRAWINGS:

A. Maintain on the job site at all times during construction a set of "As-Built" mylar sepias with all changes during construction marked thereon. This set shall be utilized for no other purpose. Include any addenda, change orders, field orders, project sketches or "marked-up" drawing prints as may be generated on the job site to assist in recording the changes.

B. The "As-Built" sepias shall show all changes and deviations from the Contract Drawings including relocation of outlets, conduit and equipment. Record final dimensioned locations of all equipment. Make sufficient measurements to locate all underground conduit. Show exact locations of underground cable and conduits, fully dimensioned from building column lines or permanent exterior structures. These drawings shall be available for reference at the time of final inspection.

C. At the completion of construction, the Contractor shall purchase a set of reproducibles from the Engineer at cost of printing and shipping. All changes noted above shall be incorporated thereon by the Contractor. The reproducible drawings, with one set of blueline prints thereof and the original sketches and marked-up "As-Built" prints shall be presented to the Owner.

2.07 MAINTENANCE AND INSTRUCTION MANUALS:

A. Submit to the Engineer/Owners Representative upon completion of the work and prior to final inspection, copies of maintenance and instruction manuals for equipment provided as outlined below:

1. Three sets of the following data are required:
   a. Operating and maintenance instructions.
   b. Spare parts list.
   c. Copies of approved submittal data.
   d. Test reports of all tests performed.
   e. Contact names and phone numbers for parts suppliers of submitted equipment.

B. Arrange each set of data in a orderly way and bind each set in a separate 3-ring hard-cover binder with appropriate label identifying the Project, Engineer, Contractor, Subcontractor and Date.

2.08 SUBMISSION OF DRAWINGS:

A. Submission of Engineer's drawings for shop drawings and unaltered Engineer's drawings for "As-Built" will not be acceptable.

PART 3 - EXECUTION

3.01 COORDINATION:

A. Before any piping, conduit, or equipment are located in any area, coordinate the space requirements with all trades. Such shall be arranged so that space conditions will allow all trades to install their work, and will also permit access for future maintenance and repair. Coordinate the installation of recessed electrical equipment with concealed ductwork, piping, insulation, structural appurtances and wall thickness.

B. Piping, ductwork, conduit and equipment installed at variance with the above requirements shall be relocated and/or revised to conform with the above requirements without incurring additions to the Contract.

C. Coordination of space requirements with all trades shall be performed so that:

1. No piping or ductwork, other than electrical, shall be run within 42" of panelboards, switchboards or transformers.

D. Do not scale drawings. Obtain dimensions for layout of equipment from the Electrical drawings.

E. Contractor for work under this division shall be fully responsible for determining in advance of purchase that proposed equipment and materials for installation shall fit into the confines indicated and allow sufficient clearance for maintenance and service of all equipment including other trades.

F. Clearances in front of equipment requiring maintenance while energized shall be installed in accordance with N.E.C. 110-162 condition number 2.

3.02 PROTECTION OF MATERIALS:

A. Refer to the general requirements section of the Specifications for storage, protection and handling requirements.

B. Provide dry, weathertight staging and storage for materials and equipment requiring protection from weather and moisture per manufacturer's recommendations. Install temporary lighting or heat sources to prevent moisture accumulation. Provide protection against direct sunlight, precipitation, wind, ice, fire or excessive heat. Store materials in original undamaged packaging with manufacturer's labels and seals intact. Containers which are broken, damaged or watermarked are not acceptable and are subject to rejection.

C. Materials and equipment will not be installed until the environmental conditions of the project are suitable to protect same per manufacturer's recommendations. Equipment or materials damaged or subjected to moisture, precipitation, direct sunlight, cold or heat are not acceptable and shall be removed from the project and replaced at no additional costs to the Owner.

D. All conduit and other openings shall be kept protected to prevent entry of foreign matter or construction debris. Fixtures, equipment, and apparatus shall be kept covered for protection against dirt, water, chemical or mechanical damage before and during construction.

E. The original finish, including shop coat of paint of fixtures, apparatus or equipment that has been damaged shall be restored without incurring additions to the Contract in time or price.

3.03 HOUSEKEEPING PADS:

A. Provide 8" minimum height concrete pad under all ground mounted electrical equipment or apparatus.

3.04 CUTTING AND PATCHING:

A. The Contractor is responsible for all cutting and patching, including escutcheon plates where necessary, whether or not such cutting and patching is shown or indicated.

3.05 CLEANING AND PAINTING:

A. Remove foreign materials, oil, dirt and grease from all raceway, fittings, supports, boxes, cabinets, pull boxes, and equipment to provide clean surfaces for painting. Remove surface oxidation and restore galvanized surfaces with cold process galvanizing compounds. Touchup marred or scratched surfaces of equipment enclosures with paint furnished by the equipment manufacturer specifically for that purpose. When touchup is required, provide one base coat over imperfection and subsequent coat over entire side or surface of equipment.

B. Do not paint trim hinges, latches, clamps, locks, device covers or trim covers. Mask or remove such items prior to finishing.

3.06 ACCESS TO ELECTRICAL ITEMS:

A. Install all concealed electrical equipment, junction and pull boxes, apparatus, or devices so as to maintain access for maintenance, operations and replacement. Access doors or covers shall be provided where required by NEC or LAHJ and shall be installed in accordance with manufacturer's instructions. Refer to the Architect for approved types, means, methods and appearance. Locate each access unit accurately in relation to electrical work requiring access.

3.07 ELECTRICAL SPACES:

A. Submit for review, prior to construction or purchase of any equipment, scaled drawings of spaces showing, in detail, planned installation locations of the equipment.

3.08 EQUIPMENT CONNECTIONS:

A. Review all divisions of specifications, where equipment requiring electrical service is specified, to determine the complete scope of work under this division of the specifications. Provide electrical connections and service to all equipment specified elsewhere requiring such connections or service.

B. Connect all equipment requiring electrical connections, in accordance with the equipment manufacturer's requirements. Where equipment connections require specific locations, determine and coordinate same with submittals. Provide concealed service to central plant equipment locations and pads.

3.09 NAMEPLATES AND IDENTIFICATION:

A. Provide and install nameplates for all unit equipment. Nameplates shall be affixed with epoxy cement. Refer to 16010-2.05 for additional requirements.

B. Install nameplates plumb and level.

C. Provide and install sleeve type wire markers on all conductors at all termination points and access points. Branch circuit identification (as LP-"21") shall be installed on hot and neutral conductors. Label junction and pull box covers with all circuit numbers contained therein.

3.10 EXCAVATION AND BACKFILLING:

A. Provide and perform all excavation required to install conduit, indicated on the drawings and/or specified. Trenches shall be of uniform width required with minimum 8" clearance on both sides. Remove and dispose of all materials not to be used for backfill. Maintain dry excavations for electrical work, by removing water. Grade areas to prevent surface water from entering excavation. Remove any accumulated water by pumping. Perform all excavation by open cut. Excavate with vertical-sided excavations where possible. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and LAHJ.

B. The bottom of all trenches and excavation shall be graded to provide uniform bearing surface for conduits or ductbanks on undisturbed soil at every point along entire length. Tamp over excavation with specified backfill materials. Remove unstable materials unsuitable for supporting equipment or installation and replace with specified materials for a minimum of twelve (12) inches below invert of equipment or installation.

C. Specified materials shall be utilized for backfilling, in not more than six (6) inch layers and tamped until the installation has cover of not less than the adjacent grade and not more than two (2) inches above same. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Equalize backfilling operation to avoid shifting of materials and equipment installed. Compaction of backfill materials shall be at least equal to surrounding undisturbed material. Backfill trenches with concrete where excavations pass within 18" of footings or other utility lines. Do not settle backfill with water. Conform to compaction requirements and methods specified elsewhere.

D. Electrical duct shall be installed a minimum of 24" below finished grade with bottom of duct below geographic frost line. Duct cark shall not be in direct contact with building structure (slab) except for vertical riser supports.

3.11 TESTS AND CERTIFICATIONS:

A. Upon completion of the electrical work and prior to final inspection, conduct an operating test in the presence of the Engineer or his designated representative.

B. The installation shall be demonstrated to operate in accordance with the Contract Documents. Any material or workmanship which does not meet with the approval of the Engineer shall be removed, repaired or replaced as directed without incurring additions to the Contract in time or cost. All electrical systems shall be tested for compliance with the specifications.

C. Furnish all instructions, tools, test equipment and personnel required for the test. Have sufficient tools and personnel available to remove equipment covers, cover plates, etc., as required for review of internal wiring and proper inspection. Provide hand tools, flashlights, ladders, outlet testers, VOM, meters and keys required to access and observe system operation and characteristics. Turn circuits on and off as directed and demonstrate operation of equipment as directed.

D. Contractor shall test all wiring and connections for continuity and grounds by megger testing. Upon indication of defective insulation, Contractor shall remove and replace the defective conductor and demonstrate by testing that the new conductor is acceptable. Record feeder load currents and line voltages measured at each transformer, switchboard and panelboard after installation of all equipment and lighting. Adjust transformer taps as required to provide optimum voltage levels. Adjust single phase load connections to balance feeder load and document on as-built drawings. Provide the Owner with full documentation of all testing for future reference.

E. The authorized manufacturer's service representative shall review systems and equipment for correct operation, conformance with specification requirements and manufacturer's requirements and submit certification indicating above mentioned conformances for the following systems:

1. Emergency Generator Set

2. Automatic Transfer Switches

3.12 DEMONSTRATION AND INSTRUCTION:

A. Present to the Owner and the Engineer or his designated representative a physical demonstration and oral instructions for proper operation and maintenance of each of the electrical equipment and systems installed. Authorized manufacturer's representatives familiar with the specified equipment shall conduct training for the following systems:

1. Emergency Generator Set

2. Automatic Transfer Switches

3.13 TEMPORARY WIRING:

A. Provide a temporary electrical lighting and power distribution system of adequate size to properly serve the construction requirements, including adequate feeder sizes to prevent excessive voltage drop. Temporary work to be installed in accordance with the National Electrical Code, Article 590, and as required by OSHA or applicable local safety codes, rules and regulations.

3.14 WARRANTY:

A. All systems and components shall be provided with a one-year warranty from the time of final acceptance. The warranty shall cover all defects in materials, design and workmanship. During this warranty period, all defects in materials and workmanship shall be corrected without incurring additions to the Contract. The correction shall include removing the defective part(s), replacing and installing the new parts (including shipping and handling), all required cutting, patching, repainting, or other work involved, including repair or restoration of any damaged sections or parts of the premises resulting from any fault included in the warranty, entirely at the expense of the Contractor.

B. In addition to this general warranty, present to the Engineer any other guarantees or warranties from equipment or system manufacturers. These supplemental guarantees or warranties shall not invalidate the general warranty.

END OF SECTION

## SECTION 16120 - WIRES AND CABLES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section shall comply with the provisions of Section 16010.

B. This Section covers the furnishing, installation and connections of the building wiring system. Power distribution, equipment, motor and exterior wiring systems extending beyond the building are included. The wiring system shall be complete from electrical service entrance to every electrical device requiring an electrical connection.

PART 2 - PRODUCTS

2.01 CONDUCTORS:

A. Conductors shall be copper of 98% conductivity, soft temper, 600 volt insulation. Sizes specified are American Wire Gage (AWG) for No. 4/0 and smaller and thousand circular mils (kcmil) for all sizes larger than No. 4/0. Service entrance conductors shall be 600 volt, type XHHW.

B. Conductors No. 10 and smaller shall be solid and type "THHN" / THWN" insulation. No. 8 and larger shall be stranded and type "THHN" / "THWN" or "XHHW" insulation.

C. All wire and cable shall be U. L. Listed and shall bear the U. L. Label.

D. All conductors shall have size, grade of insulation, voltage and manufacturer's name permanently marked on the exterior at maximum 24 inch intervals.

E. Conductor size shall be a minimum of No. 12 AWG. Conductor size shall be not less than indicated on the drawings. The minimum size of all emergency circuits shall be No. 10 AWG.

F. Control conductors for use on 120 volt control wiring shall be No. 14 AWG stranded Type THHN/THWN, unless indicated otherwise on the drawings or as required for compliance with voltage drop requirements.

2.02 CONNECTORS:

A. Terminations and connections shall be made with U. L. Listed connectors applied per manufacturer's recommendations.

B. Connections of #10 AWG and smaller size power and lighting branch circuit conductors shall be made with insulated spring steel wire nut connectors. Size #8 AWG and larger connections shall be made with hydraulically applied compression type connectors with insulated covers.

C. Connections of special system conductors shall be made via dedicated terminal strips labeled to indicate wire number and system type. Wire nut connections in system junction box are not acceptable.

2.03 ACCEPTABLE MANUFACTURERS:

A. Wire and Cable products:

1. Southwire Co.
2. Rome Cable
3. Alcan Cable
4. Carol Cable
5. AFC Cable Systems
6. American Insulated Wire
7. Cerro Wire & Cable
8. General Cable
9. Triangle PWC
10. Cabelec
11. Okonite

B. Signal Cable products:

1. Belden
2. Continental
3. Dekoron
4. West Penn

C. Connector products:

1. AMP
2. Burndy
3. Eagle
4. Gould
5. Ideal
6. Joslyn
7. O-Z Gedney
8. Thomas & Betts

9. Ilsco

10. Buchanan

11. King

D. Wire management products:

1. AMP

2. Thomas & Betts

3. Panduit

4. Wieland

E. Wire & Cable identification products:

1. Thomas & Betts SM series

2. Wieland C type

3. Brady type XC

F. Wire Pulling lubrication products:

1. Ideal Yellow 77

2. Electro Y ER EAS

3. Burndy Silkon

PART 3 - EXECUTION

3.01 WIRING:

A. All conductors shall be installed in conduit, unless noted otherwise. All conductors shall be pulled in at the same time. No conductors shall be pulled into the conduit until the conduit system is complete and plaster/drywall construction has dried. Clean, swab and evacuate conduit system before pulling in conductors. Do not exceed the manufacturer's maximum pulling tension.

B. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with proper U. L. Listed connectors. Where connection is made to any terminals of more than 30 amperes capacity and where conductors larger than No. 10 are connected to any terminal, copper terminal lugs shall be secured to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used.

C. Each conduit shall have a minimum of three (3) conductors pulled in unless that particular conduit is noted as being for systems other than electrical circuitry and/or future use or unless noted otherwise. Grounding conductors are not shown in wire count, but are required from circuit origin to last device.

D. Conductors for lighting and receptacle circuits shall have color coded jackets. The wiring shall be color coded with the same color used with its respective phase through the entire job as follows:

| 240/120 Volt Systems | Type |
|---|---|
| Black | Phase A |
| Red | Phase B |
| Blue | Phase C |
| White | Neutral |
| Green | Ground |
| White/Green Stripe | IG Neutral |
| Green/White Stripe | IG Ground |

E. The feeder and service entrance conductors shall be color coded by the use of one (1) inch wide colored plastic tape applied within 6" of each conductor end.

F. All conductors shall be identified with proper circuit numbers at all access points, terminals, junction boxes and at panelboards within 6" of conductor ends.

G. Special systems conductors shall be color coded in accordance with system manufacturer's recommendations or in a manner approved by the Engineer.

H. Maintain phase rotation established at service entrance point throughout entire project.

I. Taps and splices, where permitted by these specifications, shall be performed with an encapsulating watertight connection kit which insulates and moisture seals the connection.

J. Grounding conductors are not indicated in the wire count shown on the drawings, but are required in all branch circuit and feeder installations. Provide insulated ground conductor (sized per NEC requirements) in all raceways.

3.02 CONTROL WIRING:

A. Control wiring is defined as the wiring which provides connections between control circuit elements and does not provide the power circuit.

3.03 CONNECTIONS:

A. All connectors shall be U.L. Listed and shall be utilized in full accordance with manufacturer's requirements.

B. Splices shall be made only where specifically approved by the Engineer. Conductors shall be continuous from origin to equipment. Splices made exterior to the structure, or below grade, shall be compression type connections with insulated, waterproof covers. Submit splicing requests for review and approval prior to installation.

C. Termination lugs shall be applied to all single cables #8 and larger, and shall be compression type fittings. The use of mechanical type lugs, kerneys or other pressure type connections will not be permitted.

D. All compression connections shall be long barrel type installed using hydraulic tools designed for the purpose.

E. Insulated spring steel wire nut connectors shall be used for branch circuit connections of #10 and smaller conductors. Connections of #8 and larger sizes shall be made with compression type connections with insulated covers. Where exposed to moisture or corrosion spring steel wire nut connectors shall be silicone filled.

F. Control and special system riser and junction boxes shall be fitted with terminal strips and all conductors shall be labeled per system requirements. The installation of wirenuts in special system riser and junction boxes is not acceptable.

G. Phase rotation at service equipment shall be maintained throughout entire project, color coding of conductors shall be consistent for feeders and branch circuits through out entire project.

3.04 IDENTIFICATION:

A. All conductors shall be identified with full circuit number at all access points, boxes, and at equipment within 6 inches of conductor end. Identification shall be permanently marked PVC split sleeve or tubing type

B. Tape or laminated type wire markers are not acceptable

3.05 WIRE MANAGEMENT:

A. Power and control wiring within all special system cabinets and enclosures, and within switchboards and electrical equipment shall be bundled or routed within slotted wiring duct in a workmanlike manner.

B. Any knockout, cutout or slot containing wiring shall be fitted with bushing or continuous grommet strip to avoid fraying or abrasion.

C. Train and lace all conductors within control enclosures with cable ties or spiral wrapping.

D. Spare conductors installed shall be identified and capped.

END OF SECTION

## SECTION 16130 - BOXES AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section shall comply with the provisions of Section 16010.

B. This Section covers the installation of all outlet boxes, pull boxes, junction boxes and wiring troughs or other boxes throughout the wiring system, including supports.

PART 2 - PRODUCTS

2.01 GENERAL MATERIAL REQUIREMENTS:

A. All boxes shall be U. L. Listed and labeled.

B. Boxes shall be of one-piece construction, fabricated from NEC gauge galvanized steel, unless rustproof cast metal boxes are specified or required by NEC, or unless otherwise shown on the drawings.

2.02 JUNCTION AND PULL BOXES:

A. Dimensions of pull boxes and junction boxes shall not be less than those dimensions required by the National Electrical Code (NEC) Article 314 for the number, size and position of conductors and raceway entering the box. Only a single extension ring shall be permitted on a box to increase the volume.

B. Provide box covers for all junction and pull boxes of same materials and construction as box. Identify feeder or branch circuit conductors contained within on outside of cover for surface mounted boxes and within cover on flush mounted boxes.

2.03 EXTERIOR PULL BOXES & HANDHOLES:

A. Exterior pull boxes shall be Quazite "PC" style Gasketed boxes, resistant to sunlight exposure, weathering and chemicals, with solid base, penta-head security bolts, heavy duty rated cover with logo to suit purpose, with compressive strength of 11,000 psi, or approved equal. Size shall be minimum 12"w x 18"d x 12"h unless noted otherwise. Set assembly at final finished grade elevation.

B. Exterior handholes shall be Quazite "PG" style stackable service box assemblies resistant to sunlight exposure, weathering and chemicals, with solid base, penta-head security bolts, heavy duty rated cover with logo to suit purpose, with compressive strength of 11,000 psi, or approved equal. Size shall be minimum 24"w x 36"d x 18"h unless noted otherwise. Provide extensions as required to bring assembly to final finished grade elevation.

2.04 CONDUIT BODIES & FITTINGS:

A. Conduit bodies and fittings shall be NEMA FB-1 zinc coated steel or malleable iron, taper threaded type, of material matching conduit type with gasketed cover containing captive screws.

2.05 PULL BOXES & ENCLOSURES:

A. Pull boxes for feeder and power conductors shall be NEMA 1 with 14 or 12 gauge galvanized steel bodies and 12 or 10 gauge galvanized steel screw covers. Seams shall be continuously welded and ground smooth. Cover screws shall be captive, stainless steel type. Provide oil-resistant gasket and adhesive. Size pullboxes as specified.

B. Enclosures for termination of special systems wiring shall be NEMA 1 panel enclosures with 14 gauge steel bodies and removable hinged doors. Provide back panel of 14 gauge steel construction and wiring terminal blocks. Enclosures shall be painted ANSI 61 and panels shall be white enamel. Size enclosures for quantity of terminations required plus 25% spare capacity.

2.06 ACCEPTABLE MANUFACTURERS:

A. Outlet boxes:

1. Steel City
2. Hubble/RACO
3. Crouse-Hinds
4. Appleton

B. Exterior junction boxes:

1. Quazite
2. Nelson
3. Killark
4. Associated Plastics

C. Conduit bodies & fittings:

1. Adalet-PLM
2. Myers
3. O-Z Gedney
4. Appleton
5. Efcor
6. Crouse-Hinds

D. Pull boxes & enclosures:

1. Hoffman
2. Electromate
3. Wiegmann
4. Universal
5. American Electric
6. Crouse-Hinds
7. Square D

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Provide galvanized steel or cast type boxes for all outlets, and for junction or pull boxes. All boxes shall be accessible and sized per NEC requirements.

B. Remove only knockouts required and plug all unused openings per NEC Article 314.17 requirements.

C. Extend branch circuit grounding conductor to each box. Provide grounding pigtail via dedicated fastener.

D. Install pull boxes only in unfinished spaces. Provide pull boxes when any of the following conditions apply:

1. Where indicated on the drawings.
2. Where conduit run exceeds 150 feet from access point to access point.
3. Where conduit run contains in excess of 360 degrees bend or offset.
4. To facilitate conductor installation or to insure that manufacturer's maximum pulling tension is not exceeded.
5. Where requirements of the special system or controls dictate raceway access or provisions.

E. Do not splice conductors in pull boxes. Splices are not permitted in pull boxes except where specifically approved in writing by the Engineer. Where splices are permitted, make splices as specified in Wire & Cable Specifications.

F. Where pull boxes are required, multiple circuits within pull box shall:

1. Circuit conductors and feeders shall be individually laced with nylon straps and nylon identification tabs. Conduits shall enter pull box in such manner that conduits enter and exit in the same plane (both horizontal and vertical).

2. Feeder circuits shall be separated by full height and length sheet metal (NEC gage) or polyester resin barrier secured with angle brackets.

G. Where exterior junction or pull boxes are required, install in the following manner:

1. Exterior junction or pull boxes shall be mounted flush with finished grade, unless noted otherwise. Coordinate with the final grade elevation.

2. Heavy traffic rated covers shall be provided in sidewalks, paved areas or within six (6) feet of same.

3. Seal conduit entries into boxes with duct seal to prevent entrance of water, after conductors are installed.

4. Taps and splices, where permitted by these specifications, shall be performed with an encapsulating watertight connection kit which insulates and moisture seals the connection.

H. After completion, clean all work of dirt, construction debris, paint and refuse.

3.02 COVERS:

A. All junction boxes, outlet boxes, multi-gang switch boxes, utility boxes, etc., shall be covered with a coverplate. The coverplate shall be a finished plate as specified elsewhere unless designated otherwise.

B. Coverplates shall be mounted vertically unless designated otherwise.

C. Permanently mark each junction box and pull box cover with the circuit numbers for all conductors contained within. Utilize indelible ink black marker for normal power and red marker for emergency power and fire alarm.

3.03 EQUIPMENT ANCHORING:

A. Support all boxes from structure:

1. Secure to wood with wood or sheet metal screws.

2. Secure to hollow masonry with toggle bolts.

3. Secure to light gage metal with sheet metal screws.

4. Secure to heavy gage metal with bolts or clamps.

5. Anchors for solid masonry and concrete shall be self-drilling or insert expansion shields with bolts or powder actuated drive pin studs (except in post-tension construction).

6. Secure outlet boxes to dry wall studs with steel mounting bracket screwed into stud having support leg to restrain box.

7. Where box is suspended below structure, support from structure with threaded steel rod secured with double nuts. Pull boxes larger than 18" x 18" x 8" shall be supported from power strut and threaded steel rod suspension. Provide seismic bracing where required by local authority.

B. All items of electrical equipment, such as enclosures, etc., shall be securely anchored to the building structure. The anchoring shall be accomplished by utilizing a minimum size of 3/8" steel anchor bolts in the structure and to the item of equipment. A minimum of two (2) anchor bolts shall be provided on each side of each item of equipment with the following exceptions:

Exception No. 1: If the equipment manufacturer includes more than two (2) anchor holes per side in the base or base frame of the equipment item, then there shall be one anchor for each anchor hole.

Exception No. 2: If the equipment manufacturer recommends a particular quantity greater than two (2) per side, then that quantity of anchors shall be provided.

END OF SECTION

## SECTION 16430 - EMERGENCY POWER SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section shall comply with the provisions of Section 16010.

B. This section covers the Emergency Power System which shall consist of one engine-driven generator set which contains an engine directly coupled to an electric generator, together with the necessary controls, accessories, critical silencer, engine jacket heater, battery charger, remote alarm panel, weatherproof enclosure, transfer devices to provide electric power in the event of a failure of the normal power supply.

1.02 QUALITY ASSURANCE:

A. The following specifications and standards are incorporated into and become a part of this specification by reference. Except where a specific date is given, the issue in effect (including amendments, addenda, revisions, supplements, and errata on the date of invitation for bids, shall apply. In text, such specifications and standards are referenced by basic designation only.

1. National Fire Protection Association (NFPA):
NFPA-110 - Emergency and Stand-By Power Systems.
The generator set must be available with the Underwriters Laboratories listing (UL2200) for a stationary engine generator assembly.

2. Electrical Generating Systems Association: (ESGA) Standards:
EGS A CEP2 - Codes for Emergency Power by States and Major Cities
EGS A GTD3 - Glossary of Standard Industry Terminology and Definition.
EGS A ECB1 - Performance Standard for Engine Cranking Batteries
EGS A TSS1 - Performance Standard for Transfer Switches for use with Engine Generator Sets
EGS A BCES1 - Performance Standard for Battery Chargers
EGS A ICAE - Performance Standard for Electric Generator Set Instrument Control and Auxiliary Equipment.

3. Institute of Electrical and Electronics Engineers (IEEE) Standards:
IEEE 446 - IEEE Recommended practices for Emergency and Standby Power Systems
IEEE 472 - Voltage Surge Withstand Capabilities

4. National Electric Manufacturers Association (NEMA) Standards:
MG-1 - Motors and Generators
ICSI-109 - Test and Test Procedures for Automatic transfer Switches
ICS2-447 - A.C. Automatic Transfer Switch

5. Underwriters Laboratories Inc. (U.I.) Publications:
UL 1008 - Automatic Transfer Switches

6. American National Standards Institute (A.N.S.I.):
C37.90a - Voltage Surge Withstand Capability

1.03 SUBMITTALS:

A. Refer to Section 16010 for submittal requirements.

B. Manufacturer's Product Data: Submit material specifications and installation data for products specified under Section 2 - Products to include:

1. Product data for the engine driven generator sets shall contain not less than the information listed as follows:
   a. Certification that the engine driven generator set(s) furnished will serve electrical loads indicated including motor starting loads with type(s) of starting indicated.
   b. Continuous and stand-by rating of engine driven generator set(s) including voltage and phase.
   c. Frequency and voltage regulation with maximum instantaneous voltage dip and time of recovery to stable operation.
   d. Output voltage adjustment range in percentage of rated plant voltage.
   e. Alternator type and method of connection to prime mover.
   f. Components contained in engine instrument panel.
   g. Rating of engine at operating speed, engine cycle and number of cylinders.
   h. Type of engine lubrication system and verification of components specified.
   i. Type of engine governor.
   j. Components contained in engine instrument panel.
   k. Fuel consumption at rated load.
   l. Starting batteries including ampere hour rating.
   m. Verification that all accessories specified are to be provided. This includes cold weather starting aid with rating and voltage indicated, exhaust system with muffler type indicated.
   n. Prototype test Report.

2. Product data for the transfer switch shall contain not less than the information listed as follows:
   a. List of accessories contained in the control panel.
   b. Withstand rating in RMS symmetrical amperes.
   c. Transfer time.
   d. Switch nominal ampere rating.

C. Shop Drawings: Submit shop drawings to indicate information not fully described by the product data to indicate compliance with the contract drawings. Include layout of all equipment.

D. Submittals shall include the nearest location of permanent parts outlet from which parts may be obtained and written assurance that trained service personnel will be available on 24 hours' notice.

E. Operation and Maintenance Data: Include in each operation and maintenance manual, one set of operating, maintenance and parts manuals covering all components for the EGS. Provide instructions to the owner in operation and maintenance of his equipment, both in written form and with on-site personnel including a factory technician from the paralleling switchboard manufacturer.

PART 2 - PRODUCTS

2.01 ENGINE GENERATOR SET:

A. General: This system shall include one engine generator set and as represented in the published specifications for that model. Each set shall be rated for KW as indicated on the plans at 1.0 PF, 60 Hz, 1 phase, 3 wire, 120/240 volts (as indicated on plans) on a continuous standby basis. Each engine generator set shall be mounted on a heavy duty steel base to maintain proper alignment between components, and each set shall incorporate vibration isolators of the type and quantity as specified by the set manufacturer.

B. Engine: Engine shall be stationary, liquid cooled, spark ignited for natural gas. Engine shall be capable of driving the generator of this rating on a continuous standby basis for the duration of normal source interruptions per SAE J1349 conditions. The electrical contractor shall be responsible for field coordinating the provision and installation of gas pipe size, length, pressure requirements and point of termination.

C. Engine components shall include the following:

1. A 12 volt DC, solenoid shift, electric starter(s) as required by manufacturer.

2. Positive displacement, mechanical full pressure lubrication oil pump, full flow lubrication oil filter with replaceable element, pressure relief valve, dipstick oil level indicator.

3. Dry element air cleaner with replaceable element.

4. Engine speed isochronous governing system to control generator frequency +/ 0.25% of rated frequency under steady state load conditions, and capable of parallel operation with load sharing controls. Where electronic governing systems are factory installed as standard equipment, and without additional cost, the mechanical governing system shall not be required.

5. Engine mounted thermostatically controlled water jacket heater to aid in quick starting. Heater shall be rated as recommended by engine manufacturer and be disconnected whenever the engine starts. Contractor shall provide proper circuit from normal utility power source.

6. Engine protection devices shall have sensing elements located on the engine to initiate the following alarms and engine shutdowns:
   a. Low lubrication oil pressure shutdown with indicator
   b. High coolant temperature shutdown with indicator
   c. Overspeed shutdown with indicator
   d. Overcrank lockout with indicator

7. Provide low coolant shutdown, which shall activate high engine temperature lamp and shutdown.

8. Engine starter battery charging alternator, with solid state voltage regulator.

D. Engine Cooling System:

1. Engine shall be radiator cooled by engine mounted radiator system including belt driven pusher fan, coolant pump, and thermostat temperature control. Performance of components shall be as required by the manufacturer.

2. The generator equipment supplier shall provide and install 50% ethylene glycol antifreeze solution to fill engine cooling system at start-up.

E. Engine Exhaust System:

1. Exhaust muffler shall be provided for each engine of size(s) as recommended by manufacturer. Muffler to be mounted in the discharge hood enclosure. Due to Engineer concerns, silencers mounted on the top of the generator enclosure are not acceptable. Gemsets with silencers mounted inside the main generator compartment are acceptable only if the silencer is thermally wrapped to minimized heat stress on the surrounding components.

2. Flexible exhaust connection shall be provided as required for connection between engine exhaust manifold and exhaust line, in compliance with applicable codes and regulations.

3. All exhaust system components shall be properly sized to assure proper operation without excessive back pressure when installed. Make provisions as required for pipe expansion and contraction.

F. Engine Fuel System:

1. The electrical contractor shall coordinate the fuel consumption rate with the natural gas piping contractor. The generator will be served from the natural gas line provided by others.

G. Generator:

1. Generator shall be single bearing, self aligning, four pole, synchronous type, revolving field, with amortisseur windings, with direct drive centrifugal blower for proper cooling and minimum noise, with temperature compensated solid state voltage regulator, with brushless rotating rectifier exciter system. No brushes will be allowed. Generator shall be directly connected to engine flywheel housing and driven through a flexible coupling to insure permanent alignment. Insulation shall meet NEMA standards for Class H type. The maximum temperature rise shall not exceed 150 degrees C at 40 degree C ambient. Generator design shall prevent potentially damaging shaft currents.

2. The single phase 4 lead dedicated generator to allow user to obtain full single phase output.

3. Voltage regulator shall be solid state design and shall function by controlling the exciter magnetic field between stator and rotor to provide no load to full load regulation of rated voltage within +/- 2% during steady state conditions. The engine generator set and regulator must sustain at least 90% of no load voltage for ten (10) seconds with 250% of rated load at near zero power factor connected to its terminals. A rheostat shall provide a minimum of + 5% voltage adjustment from rated value.

4. The generator, exciter, and voltage regulator shall be designed and manufactured by the engine generator set manufacturer so that the characteristics shall be matched to the torque curve of the prime mover. This design allows the prime mover to use its fullest power producing capacity (without exceeding it or over compensating) at speeds lower than rated, to provide the fasted possible system recovery from transient speed dips.

5. Exciter shall be full wave, rectified, with heavy duty silicon diodes mounted on the common rotor shaft and sized for maximum motor starting loads.

6. Generator design shall be of the self protecting type, as demonstrated by the prototype short circuit test as described under "Testing" herein. All other generator performance criteria shall be equal to that of the specified equipment.

H. Engine-Generator Set Controls:

1. Provide a digital, unit mounted control module that is factory built, wired, tested, and mounted by the generator manufacturer.

2. Engine generator set control shall include the following:
   a. Gauges and meters: oil pressure gauge, coolant temperature gauge, charge rate voltmeter and running time meter.
   b. Manual selector switch: RUN OFF/RESET-AUTO

3. Remote, two wire controls start up terminals, controllable by two different transfer switches.

4. Manual reset safeguard breaker.

5. Automatic engine shut down for the following fault conditions:
   a. Overcrank
   b. Overspeed
   c. Low oil pressure
   d. High engine temperature

6. Indicator lamps shall be provided to signal the following functions:
   a. SYSTEM READY indicates system is in "AUTO" mode
   b. PRE LOW OIL PRESSURE indicates oil pressure is marginally low
   c. PRE HIGH ENGINE TEMPERATURE indicates engine temperature is marginally high
   d. LOW OIL PRESSURE indicates engine has shutdown because of critically low oil pressure
   e. HIGH ENGINE TEMPERATURE indicates engine has shut down because of critically high temperature

f. OVERSPEED indicates engine has shut down because of excessive r/min

g. OVERCRANK indicates the starter has been locked out because cranking time was excessive

h. GENERATOR NOT IN AUTO indicates control switch is not in the "AUTOMATIC" position.

i. Provide two additional fault condition lamps to be designated later.

7. A fault reset switch shall be provided to clear fault indications and allow restarting of the engine after shut down faults. The control design shall be such that the fault indication shall remain until reset. The fault indicator memory shall not be dependent on the presence of either A C or D C voltage and shall retain the fault status memory even through complete removal and replacement of the starting batteries. The fault reset function shall operate only when the RUN STOP REMOTE switch is in the STOP position.

8. A locking screwdriver type potentiometer shall be provided to adjust the voltage + 5% from rated value.

9. Manual reset exciter field circuit breaker.

10. A locking screwdriver type potentiometer (electronic governor) shall be provided to adjust the speed + 2% from rated value.

11. Frequency meter 45 65 Hz., 90 degree scale, 2 1/2" (61.25mm) flange, +0.6 Hz panel meter.

12. Three position AC meters phase selector switch to read line current and voltage in each phase with off position.

I. Auxiliary Equipment:

1. Starting Battery: One (1) battery system, consisting of Lead Acid batteries, shall be supplied for each engine and shall be mounted in a battery rack within the engine generator set skidbase.

2. Battery Charger: The genset shall have an automatic dual rated, float equalize, 10 amp battery charger. The charger must be protected against a reverse polarity connection. The chargers charging current shall be monitored within the generator controller to support remote monitoring and diagnostics. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

3. Vibration Isolators: Each engine generator set shall be mounted on vibration isolators either internal or external to the set skid base.

4. Electrical contractor shall provide necessary circuits from normal utility source as required for both the heater and battery charger.

5. The genset shall be packaged with a sound attenuated enclosure made of steel with a minimum thickness of 14 gauge with a sound level of 75dBA at 23ft based on the configuration specified. The enclosure is to have hinged, removable doors to allow access to the engine, alternator and control panel. The hinges shall allow the door fit to be adjustment. Hinges and all exposed fastners will be stainless steel of JS5000, the use of pop-rivets weakens the paint system and not allowed on the external painted surfaces. Each door swill have lockable hardware with identical keys.

6. Provide generator output breaker(s) as shown on the drawings. There shall be one (1) 200AMP/2P load breaker feeding the automatic transfer switch feeding each building for each 50 kw generator.

7. Provide a Remote Annunciator to be placed in the Building (exact location to be determined later.) This Annunciator shall incorporate all the same readout capabilities as the unit mounted on the generator. Provide all conduit and cabling necessary to connect this unit to the Generator.

2.02 AUTOMATIC TRANSFER SWITCHES:

A. Furnish and install service entrance rated automatic transfer switches with number of poles, ampere rating, and voltage and withstand ratings as shown in plans. This shall be 3-pole with switched neutral, 200 ampere, 120/240 volt, single phase with minimum 100,000 AMP withstand. This system shall be the product of one manufacturer. The system shall be listed to the latest requirements of Underwriters' Laboratories Standard UL-1008 and rated for Total System Load.

B. Electrical operation shall be accomplished by a momentarily energized single solenoid operating mechanism which receives power from the source to which the load is being transferred. Fuse or thermal protection of the main operator is prohibited. The operating transfer time shall be one-sixth of a second or less. Mechanical locking in each position shall be accomplished without the aid of permanent magnets, latching solenoid, or motor operators.

C. Operation shall be inherently double-throw whereby all contacts move simultaneously and with no programmed delay in a neutral position. Electrical spacings shall be equal to or exceed those listed in table 15.1 of UL-1008. Only those main contact structures specifically manufactured for transfer switch service shall be acceptable. An overload or short circuit shall not cause the switch to go to a neutral position.

D. Inspection of all contacts (movable and stationary) shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The maintenance handle shall permit the operator to stop the contacts at any point throughout the entire travel to properly inspect and service the contacts when required.

E. The transfer switch shall have fully rated neutral transfer contacts which momentarily interconnect the neutrals of the sources and load for 100 milliseconds maximum, during the transfer/ retransfer operation. The neutrals shall remain so interconnected until the line contacts close on the alternate source. Line and neutral contacts shall be driven by a single main operator.

F. The automatic transfer switch shall include a separately mounted control panel with adjustable solid state sensing and timing functions. The following operational characteristics shall be provided:

1. Time delay on momentary dips in normal source (0.5-6.0 seconds) factory set at 1.0 second.

2. Time delay on transfer to emergency for controlled loading of generator (0-5 minutes), factory set at 0 minutes or as shown on plans.

3. Time delay on retransfer to normal (0-30 minutes), factory set at 0 minutes.

4. Toggle switch to manually bypass time delay on retransfer.

5. Time delay on engine shutdown after retransfer to normal (0-5 minutes), factory set at 5 minutes.

6. Close differential voltage sensing of all normal source phases (pickup 85-100% of nominal and dropout 75-98%), factory set at 85% dropout and 95% pickup of nominal.

7. Independent single phase voltage (85-100%) and frequency (90-100% pickup) sensing of the emergency source to prevent premature transfer, factory set at 90% voltage and 95% frequency of nominal.

8. Test switch (momentary type). To simulate failure of normal source.

9. Gold plated 10 amp contact which closes to initiate engine starting.

10. Pilot lights to indicate switch positions.

11. Auxiliary contacts (1 closed on "Normal" and 1 closed on "Emergency") rated 10 amps, 240 VAC.

12. An in phase monitor shall be provided. The monitor shall control transfer/retransfer operation between live sources so that closure on the alternate source will occur only when the two sources are approaching synchronism and the two sources are within 15 electrical degrees maximum so that inrush currents do not exceed normal starting currents. The monitor shall function over a frequency difference range of up to +2.0 Hz. with a maximum operating transfer time of one-sixth of a second. If the voltage of the load-carrying source falls below 70%, the in phase function shall be automatically bypassed. The monitor shall not require interwiring with the generator controls, or active control of the governor.

13. All time delay and sensing functions shall be adjustable over the ranges indicated and operated with minimum drift (not to exceed 3%) over -20 degrees C. to +70 degrees C. The control panel shall be provided with a protective cover. The control panel shall not draw more than 15 volt-amperes continuously under normal operating conditions.

G. The switch must comply with UL-1008 and NEMA Std. Pub. ICS2-447. In addition, the switch must meet or exceed the following requirements and if so requested, by verified by certified laboratory test report:

1. Temperature Rise: Measurements shall be made after the overload and the endurance tests.

2. Withstand: UL listed to withstand the magnitude of fault current available at the switch terminals when coordinated with respective protective devices as shown on the plans at an X/R ratio or 6.6 or less. The main contacts of the transfer switch shall not trip open or weld when subjected to fault currents.

3. Dielectric: Test, following the withstand current rating test, at 1960 VAC rms minimum.

4. Transient Withstandability: Control panel voltage surge withstand capability test per IEEE Std. 472-1974 and voltage impulse withstand test per NEMA Std. Pub. ICS-1-109.

2.03 ACCEPTABLE MANUFACTURERS:

A. Products of the following manufacturers, which comply with these specifications, are acceptable:

1. Engine driven generator sets: Kohler, Taylor, Caterpillar.

2. Transfer Switches: Taylor, Caterpillar, Kohler, Cutler Hammer, ASCO, Rus Electric, Zenith

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION:

A. Installation: Emergency generator and all components shall be installed, including all connections, at locations and as indicated on drawings, and in accordance with approved shop drawings, manufacturer's instructions, and manufacturer's standard specification and dimension sheets.

B. Instruction, Drawings, Parts and Operation Information: Two copies of complete instructions shall be in booklet form and shall consist of operating and maintenance of the equipment and major components supplied.

C. Owner Orientation: A representative of the supplier shall meet with representative of the owner at the time of final acceptance tests, shall review the operation and parts books, correct starting and control methods, and recommend preventive maintenance procedure.

3.02 SPECIAL TESTING:

A. The assembled engine-generator set is to be tested at the Engine manufacturer's location to ensure proper operation of the individual components, subassemblies, and the complete assembly. The test shall be run under the same conditions that will exist at the site, i.e. physical constraints such as louvers, grates, etc. and environment. All electrical and mechanical defects shall be remedied during testing.

1. The following procedure shall be used:
   a. Confirm all variable settings to engine-generator switchgear specifications.
   b. Start unit and run at no load for five minutes, making an audible and visual check for abnormal noises, vibration, water, and oil leaks.
   c. Increase to 50% load for a minimum of thirty minutes. Record test data at end of run, at steady state.
   d. Increase to 100% load for a minimum of thirty minutes. Record test data at end of run, at steady state.
   e. Drain all water and oil.
   f. Apply nucle oil or equivalent preservative to intake manifolds and oil pan sufficient for one year's engine protection.
   g. Required test data:
      1) Time and reading
      2) Ambient air temperature
      3) rpm
      4) KW
      5) AC voltage, phase-to-phase
      6) AC amperes
      7) Frequency
      8) Exciter field voltage
      9) Exciter field amperes
      10) Jacket water temperature from engine
      11) Lubrication oil pressure to engine
      12) Lubrication oil temperature from engine
      13) Intake manifold pressure/vacuum
      14) Crankcase pressure
   h. All safety shutdown points shall be set, tested, and recorded. Recorded charts shall be made of voltage and frequency for all load change.

2. Testing
   a. An installation check, start-up, and load test shall be performed by the engine manufacturer's local representative at a time agreed upon by site engineer, operators, and maintenance staff. This representative must have received factory training within the previous two years. Resistive load banks shall be provided. Test shall be minimum four hours at full load.
   b. The test shall consist of the engine manufacturer's standard procedures. All associated auxiliary systems shall be tested for proper connections and interaction with the engine-generator set.

3.03 TRAINING:

A. The engine manufacturer's representative shall provide on-site training to Owner. Training shall include maintenance, parts ordering, safety, automatic operation, manual operation, engine safeties, protective relaying, complete system operation, troubleshooting, and a complete review of operation and service manuals.

END OF SECTION

## SECTION 16450 - GROUNDING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. All work specified in this Section shall comply with the provisions of Section 16010.

B. This section covers the installation of the emergency grounding system. The grounding system shall be established with equipment grounding conductors; the use of metallic raceways as the only method of equipment grounding is not acceptable.

PART 2 - PRODUCTS

2.01 GROUNDING CONDUCTORS:

A. Grounding electrode conductors shall be bare or green insulated copper conductor sized as indicated on the drawings, or as required by the National Electrical Code (NEC).

B. Equipment grounding conductors shall be green insulated type THHN/THWN, or XHHW conductors sized as indicated on the drawings. Where size is not indicated on the drawings, conductor size shall be determined from the National Electrical Code table on sizes of equipment grounding conductors.

C. Bonding jumpers shall be flexible copper bonding jumpers sized in accordance with the National Electrical Code tables for grounding electrode conductors.

2.02 EQUIPMENT:

A. Provide a conductor termination grounding lug bonded to the enclosure of each equipment item.

2.03 GROUND RODS:

A. Ground rods shall be 3/4" x 10'-0 copper clad steel.

B. Sectional ground rods shall be hot dip galvanized 5/8" x 10' sections with an internal stainless steel splined coupling pin.

2.04 HYDRAULIC AND MECHANICAL TERMINATIONS:

A. Acceptable manufacturers for hydraulically applied terminations are Square D, Burndy and Thomas and Betts (T & B).

B. Acceptable manufacturers for mechanically applied terminations are Ideal, Burndy and Thomas and Betts (T & B).

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Ground all non-current carrying parts of the electrical system, i.e. raceways, equipment enclosures and frames, junction and outlet boxes, machine frames and other conductive items in close proximity with electrical circuits, to provide a low impedance path for potential grounded faults.

B. Service entrance and separately derived electrical systems, grounding electrode system:

1. The neutral conductor of the electrical service serving the premises wiring system shall be grounded to the ground bus bar in the service equipment which shall be grounded to the cold water system, the ground rod system, and other grounding electrodes specified herein or indicated on the drawings. Grounding electrode conductors shall be installed in rigid, nonmetallic conduit to point of ground connection, unless subject to physical damage in which case it shall be installed in galvanized rigid steel. Where metallic conduit is permitted, bond conduit at both ends to grounding electrode conductor with a U.L. bonding busing.

2. Ground the neutral and frame of the emergency generator to building steel and the ground rod system, which shall serve as the grounding electrode for the separately derived system.

3. Grounding Electrode connections to structural steel, reinforcing bars, ground rods, or where indicated on the drawings shall be with chemical exothermic weld connection devices recommended for the particular connection type. Connections to piping shall be with U.L. listed mechanical ground clamps.

4. Bonding shall be in accordance with the National Electrical Code.

5. Install ground rods where indicated on the drawings with the top of the ground rods 12 inches below finished grade.

C. Equipment Grounding Conductor:

1. Grounding conductors for branch circuits are not shown on the drawings; however, grounding conductors shall be provided in all branch circuit raceways and cables. Grounding conductors shall be the same AWG size as branch circuit conductors.

2. Grounding conductors for feeders are typically indicated on the drawings and the raceway is sized to accommodate grounding conductor shown. Where grounding conductor size is not indicated on the drawings, conductor shall be in accordance with the equipment grounding conductor table of the National Electrical Code.

3. A grounding conductor shall be installed in all flexible conduit installations. For branch circuits, grounding conductor shall be sized to match branch circuit conductors.

4. The equipment grounding conductor shall be attached to equipment with bolt or sheet metal screw used for no other purpose. Where grounding conductor is stranded, attachment shall be made with lug attached to grounding conductor with crimping tool.

3.02 TESTING:

A. Upon completion of the ground rod installation, the Contractor shall test the installation. Ground resistance readings shall not be taken within forty-eight hours of rainfall. Results of ground resistance readings shall be forwarded, in writing, immediately to the Project Engineer.

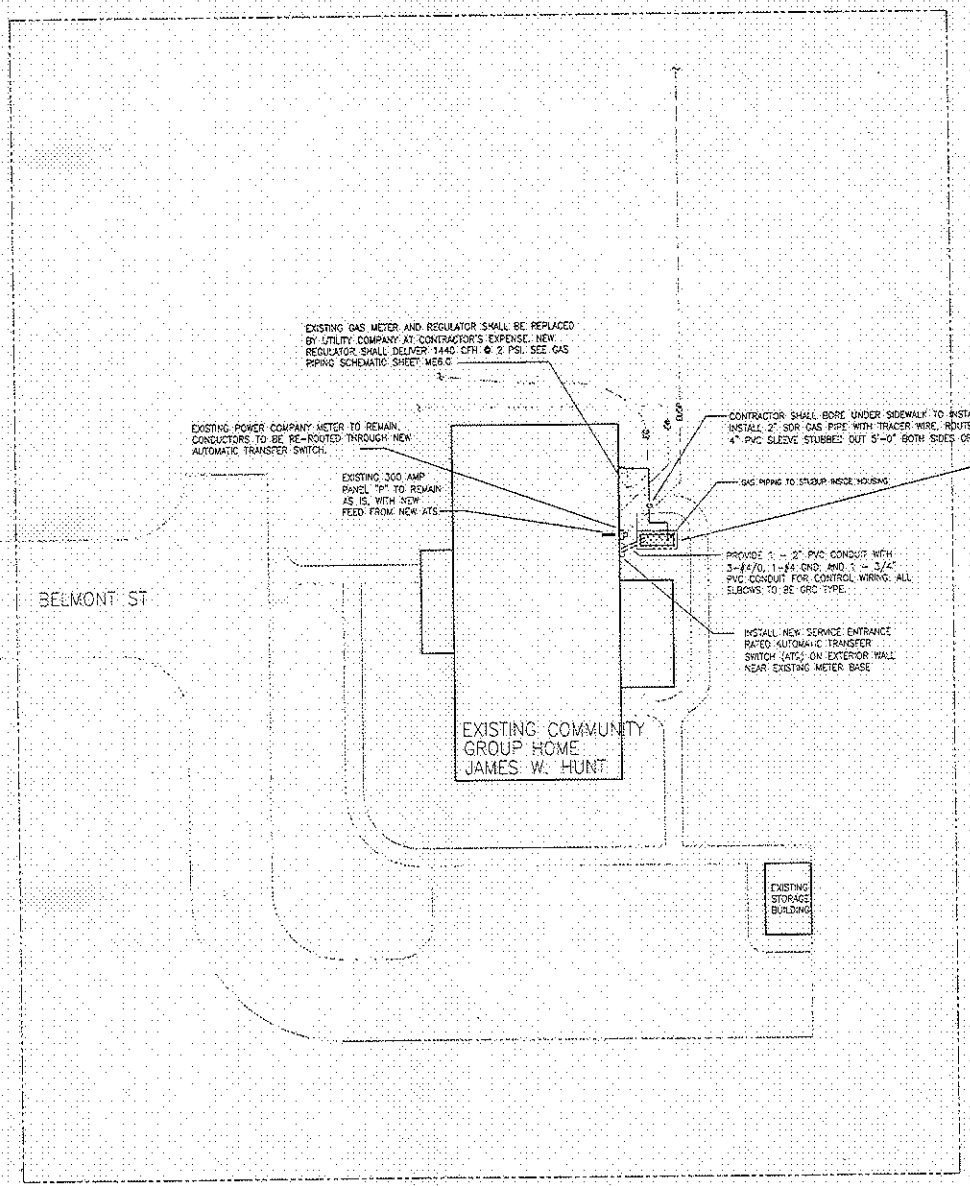
B. If the resistance to ground exceeds 5 ohms, additional rods shall be driven and bonded together, until a reading of 5 ohms or less to ground is obtained. After completion of the grounding system, measure the system ground resistance with a "Megger Earth Tester". Submit directly to the Project Engineer two (2) copies of each test report certified by the testing technician and the electrical contractor.

C. All grounding electrode conductors and ground bus shall be measured by the Contractor for objectionable levels of current, and to detect any inadvertent connection of neutral to ground.

D. If the ground current exceeds 10% of the rating of the conductor ampacity, all devices on that feeder or circuit shall be rechecked for proper connection.

E. All grounding system connections shall be rechecked at final checkout for correct wiring termination methods and mechanical strength.

END OF SECTION




## COLUMBUS SITE NOTES

1. PRIOR TO BIDDING, CONTRACTORS SHALL VISIT SITE AND EXAMINE ALL SURROUNDING CONDITIONS. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO VISIT SITE, OR FAILURE TO UNDERSTAND ALL ASPECTS OF THE PROJECT.
2. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR METER TIE-IN AND UNDERGROUND POWER LINE LOCATION. CONTACT COLUMBUS LIGHT AND WATER @ 662-328-7182.
3. CONTRACTOR SHALL COORDINATE WITH LOCAL NATURAL GAS UTILITY FOR TIE-IN TO REGULATOR. CONTACT LARRY TAYLOR WITH ATMOS ENERGY @ 662-769-2691.
4. COORDINATE GAS SHUTDOWN WITH COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5836 BEFORE BEGINNING OF WORK.
5. UTILITY COMPANY NEEDS A MINIMUM OF 3 WEEKS NOTIFICATION PRIOR TO INSTALLATION OF GAS LINE. CALL LOCAL UTILITY CO. FOR EXACT LOCATION OF EXISTING GAS LINE, AND SCHEDULING FOR NEW LINE.
6. THIS CONTRACTOR TO NOTIFY THE COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5836 A MINIMUM OF 48 HOURS BEFORE POWER IS TO BE DISRUPTED FROM HOUSE. MAXIMUM ALLOWABLE DURATION OF ANY POWER OUTAGE IS 4 HOURS.
7. THIS CONTRACTOR TO BE AWARE OF EXISTING TREES, SHRUBS, FLOWERS, LANDSCAPING ETC. AND PRESERVE AS MUCH AS POSSIBLE IN AREAS OF WORK.
8. THIS CONTRACTOR TO VERIFY ALL EXISTING UTILITIES IN AREA OF WORK BEFORE CONSTRUCTION BEGINS.
9. THIS CONTRACTOR TO PROVIDE SAFETY FENCING AROUND CONSTRUCTION AREAS AND DITCHES, AND HAVE DITCHING SECURED AT END OF EACH WORK DAY.
10. IN ALL AREAS WHERE EARTH WORK IS TO TAKE PLACE, CONTRACTOR SHALL RESTORE ALL SURFACES TO THE SAME GOOD CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE, BUT NOT BE LIMITED TO, TAMPING, DIRT FILL, AND RE-SODDING.
11. CONTRACTOR TO REMOVE EXISTING GENERATOR, TRANSFER SWITCH AND CONCRETE PAD AND TURN OVER TO OWNER.
12. SEE SHEET ME6.0 FOR POWER RISER AND GAS PIPING MODIFICATIONS
13. VERIFY LOCATION & DEPTH OF NEW CONDUIT & ANY EXISTING UTILITIES IN THIS AREA
14. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY AND GAS COMPANY FOR METER TIE-IN AND UNDERGROUND SERVICE LINE LOCATION. CONTACT MISSISSIPPI ONE-CALL SYSTEM TO HAVE ALL UNDERGROUND LINES LOCATED.

NORTH

1 / ME1.0 COLUMBUS SITE PLAN (JAMES W. HUNT HOME) – ELECTRICAL & GAS PIPING
SCALE: 1/16" = 1'-0" INSTALLED UNDER BASE BID

817 RENAISSANCE WAY
SUITE 100
RIDGELAND, MS 39157
(601) 856-5135
HESMGA P.N. JA02019

HESMGA
CONSULTING ENGINEERS

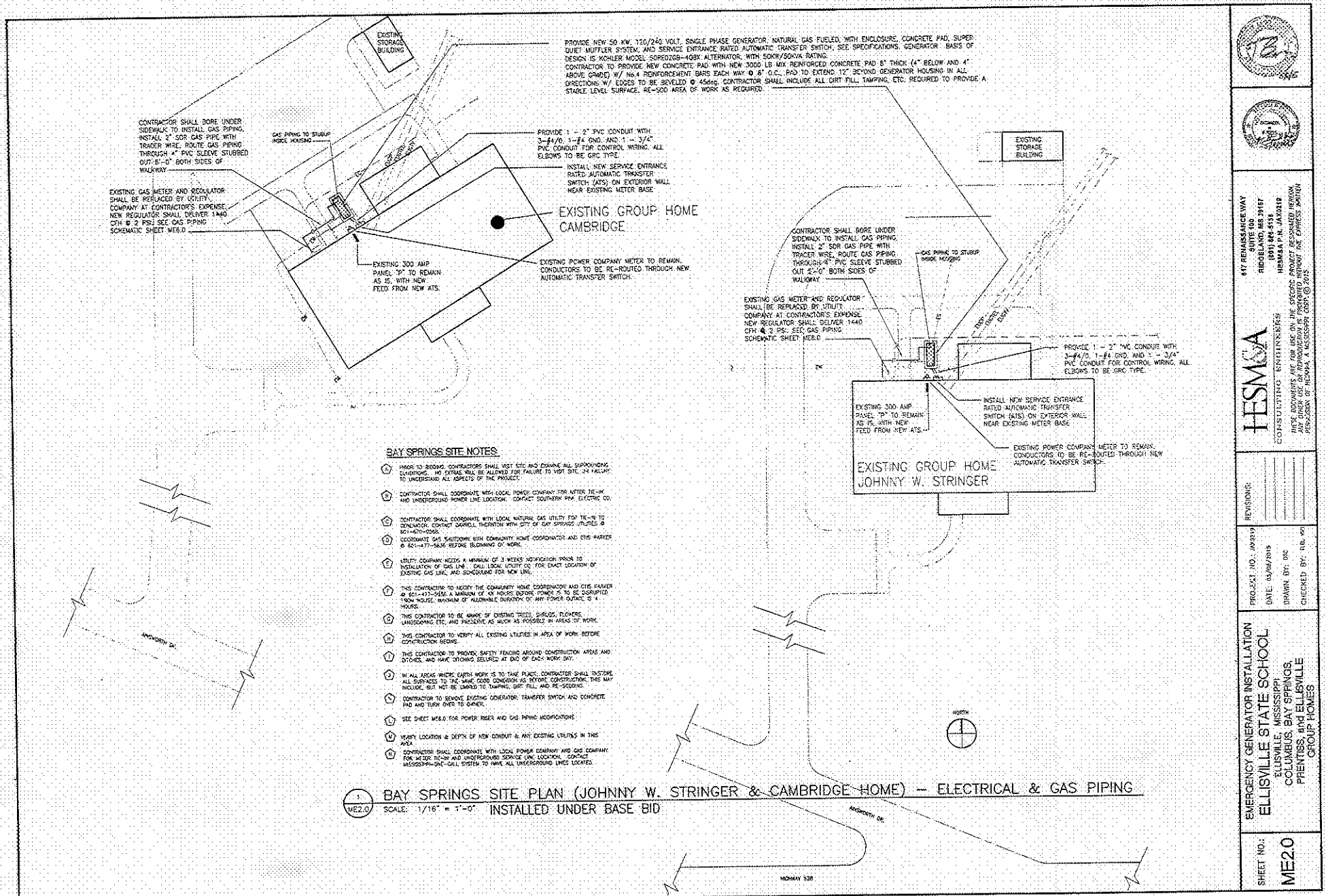


REVISIONS:

PROJECT NO.: JA02019
DATE: 05/07/2015
DRAWN BY: DTC
CHECKED BY: TJS, WH

SHEET NO.: ME1.0

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS,
PRENTISS, and ELLISVILLE
GROUP HOMES




## BAY SPRINGS SITE NOTES:

A. PRIOR TO BIDDING, CONTRACTORS SHALL VISIT SITE AND EXAMINE ALL SURROUNDING CONDITIONS. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO VISIT SITE, OR FAILURE TO UNDERSTAND ALL ASPECTS OF THE PROJECT.

B. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR METER TIE-IN AND UNDERGROUND POWER LINE LOCATION. CONTACT SOUTHERN PINE ELECTRIC CO.

C. CONTRACTOR SHALL COORDINATE WITH LOCAL NATURAL GAS UTILITY FOR TIE-IN TO DEMLACOR. CONTACT DARRELL THORNTON WITH CITY OF BAY SPRINGS UTILITIES @ 601-670-0268.

D. COORDINATE GAS SHUTDOWN WITH COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5636 BEFORE BEGINNING OF WORK.

E. UTILITY COMPANY NEEDS A MINIMUM OF 3 WEEKS NOTIFICATION PRIOR TO INSTALLATION OF GAS LINE. CALL LOCAL UTILITY CO. FOR EXACT LOCATION OF EXISTING GAS LINE, AND SCHEDULING FOR NEW LINE.

F. THIS CONTRACTOR TO NOTIFY THE COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5636, A MINIMUM OF 48 HOURS BEFORE POWER IS TO BE DISRUPTED FROM HOUSE. MAXIMUM OF ALLOWABLE DURATION OF ANY POWER OUTAGE IS 4 HOURS.

G. THIS CONTRACTOR TO BE AWARE OF EXISTING TREES, SHRUBS, FLOWERS, LANDSCAPING ETC. AND PRESERVE AS MUCH AS POSSIBLE IN AREAS OF WORK.

H. THIS CONTRACTOR TO VERIFY ALL EXISTING UTILITIES IN AREA OF WORK BEFORE CONSTRUCTION BEGINS.

I. THIS CONTRACTOR TO PROVIDE SAFETY FENCING AROUND CONSTRUCTION AREAS AND DITCHES, AND TANK DITCHES SECURED AT END OF EACH WORK DAY.

J. IN ALL AREAS WHERE EARTH WORK IS TO TAKE PLACE, CONTRACTOR SHALL RESTORE ALL SURFACES TO "AS - WAS" GOOD CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE, BUT NOT BE LIMITED TO TAMPING, DIRT FILL, AND RE-SODDING.

K. CONTRACTOR TO REMOVE EXISTING GENERATOR, TRANSFER SWITCH AND CONCRETE PAD AND TURN OVER TO OWNER.

L. SEE SHEET ME6.0 FOR POWER RISER AND GAS PIPING MODIFICATIONS

M. VERIFY LOCATION & DEPTH OF NEW CONDUIT & ANY EXISTING UTILITIES IN THIS AREA

N. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY AND GAS COMPANY FOR METER TIE-IN AND UNDERGROUND SERVICE LINE LOCATION. CONTACT MISSISSIPPI ONE-CALL SYSTEM TO HAVE ALL UNDERGROUND LINES LOCATED.

1 / ME2.0 BAY SPRINGS SITE PLAN (JOHNNY W. STRINGER & CAMBRIDGE HOME) - ELECTRICAL & GAS PIPING
SCALE: 1/16" = 1'-0" INSTALLED UNDER BASE BID

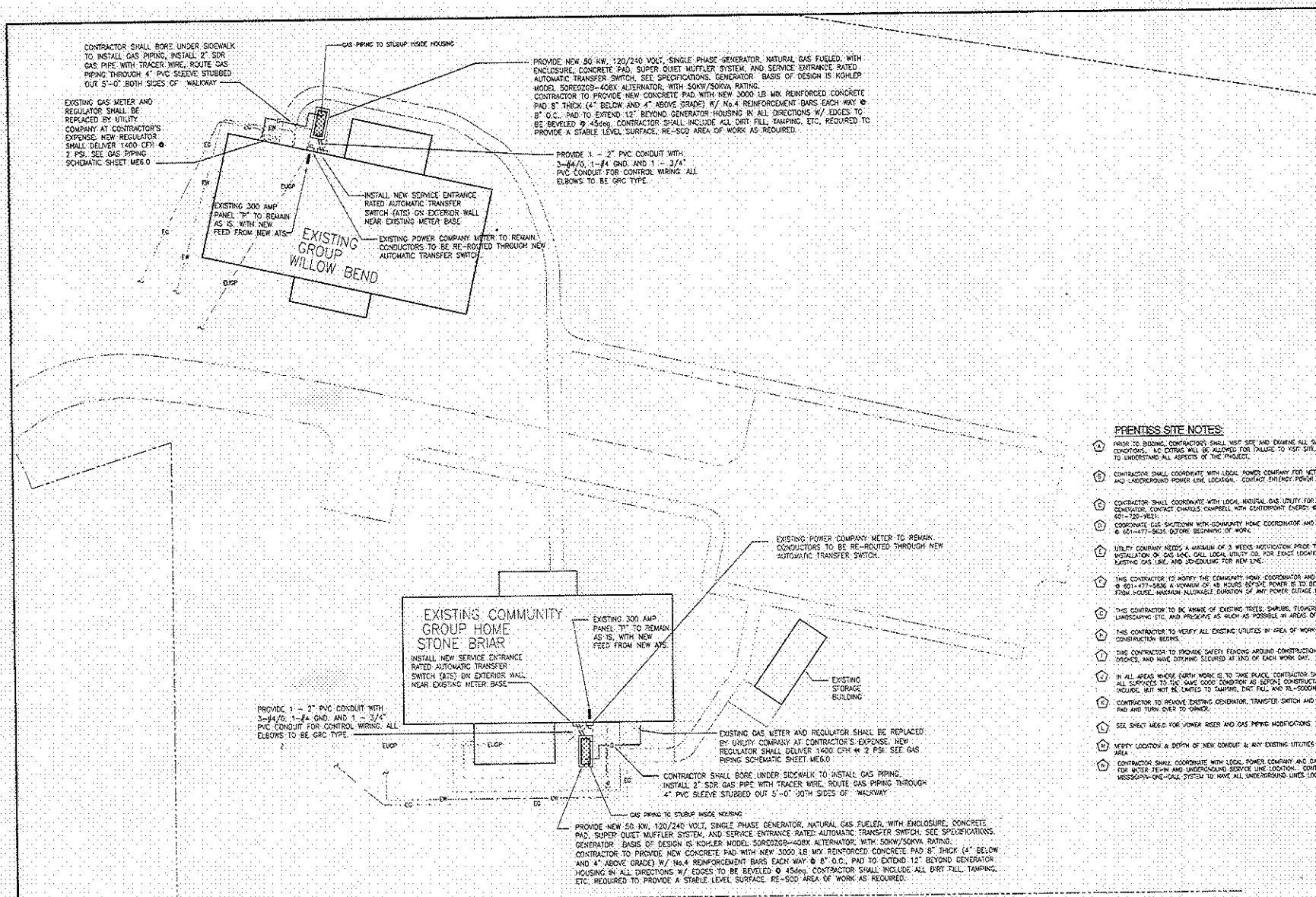
617 RENAISSANCE WAY
SUITE 100
RIDGELAND, MS 39157
(601) 825-5155
HESM&A P.N. JAX0219
CONSULTING ENGINEERS


REVISIONS:

PROJECT NO.: JAX0219
DATE: 03/06/2019
DRAWN BY: DJC
CHECKED BY: RLB, PE

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS,
PRENTISS, and ELLISVILLE
GROUP HOMES

SHEET NO.: ME2.0




## PRENTISS SITE NOTES:

A. PRIOR TO BIDDING, CONTRACTOR'S SHALL VISIT SITE AND EXAMINE ALL SURROUNDING CONDITIONS. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO VISIT SITE, OR FAILURE TO UNDERSTAND ALL ASPECTS OF THE PROJECT.

B. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR METER TIE-IN AND UNDERGROUND POWER LINE LOCATION. CONTACT ENTERGY PEARL CO.

C. CONTRACTOR SHALL COORDINATE WITH LOCAL NATURAL GAS UTILITY FOR TIE-IN TO GENERATOR. CONTACT CHARLES CAMPBELL WITH CENTERPOINT ENERGY @ 601-720-4021.

D. COORDINATE GAS SHUTDOWN WITH COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5636 BEFORE BEGINNING OF WORK.

E. UTILITY COMPANY NEEDS A MINIMUM OF 3 WEEKS NOTIFICATION PRIOR TO INSTALLATION OF GAS LINE. CALL LOCAL UTILITY CO. FOR EXACT LOCATION OF EXISTING GAS LINE, AND RE-ROUTING FOR NEW LINE.

F. THIS CONTRACTOR TO NOTIFY THE COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5636 A MINIMUM OF 48 HOURS BEFORE POWER IS TO BE DISRUPTED FROM HOUSE. MAXIMUM ALLOWABLE DURATION OF ANY POWER OUTAGE IS 4 HOURS.

G. THIS CONTRACTOR TO BE AWARE OF EXISTING TREES, SHRUBS, FLOWERS, LANDSCAPING ETC, AND PRESERVE AS MUCH AS POSSIBLE IN AREAS OF WORK.

H. THIS CONTRACTOR TO VERIFY ALL EXISTING UTILITIES IN AREA OF WORK BEFORE CONSTRUCTION BEGINS.

I. THIS CONTRACTOR TO PROVIDE SAFETY FENCING AROUND CONSTRUCTION AREAS AND DITCHES, AND HAVE DITCHING SECURED AT END OF EACH WORK DAY.

J. IN ALL AREAS WHOSE EARTH WORK IS TO TAKE PLACE, CONTRACTOR SHALL RESTORE ALL SURFACES TO THE SAME GOOD CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE, BUT NOT BE LIMITED TO TAMPING, DIRT FILL, AND RE-SODDING.

K. CONTRACTOR TO REMOVE EXISTING GENERATOR, TRANSFER SWITCH AND CONCRETE PAD AND TURN OVER TO OWNER.

L. SEE SHEET ME6.0 FOR POWER RISER AND GAS PIPING MODIFICATIONS.

M. VERIFY LOCATION & DEPTH OF NEW CONDUIT & ANY EXISTING UTILITIES IN THIS AREA.

N. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY AND GAS COMPANY FOR METER TIE-IN AND UNDERGROUND SERVICE LINE LOCATION. CONTACT MISSISSIPPI ONE-CALL SYSTEM TO HAVE ALL UNDERGROUND LINES LOCATED.

## PRENTISS SITE PLAN (WILLOW BEND & STONE BRIAR HOME) – ELECTRICAL & GAS PIPING

SCALE: 1/16" = 1'-0"

INSTALLED UNDER BASE BID


517 RENAISSANCE WAY
SUITE 100
RIDGELAND, MS 39157
(601) 898-5135
HESMAA P.M. JAX0219

HESM&A
CONSULTING ENGINEERS

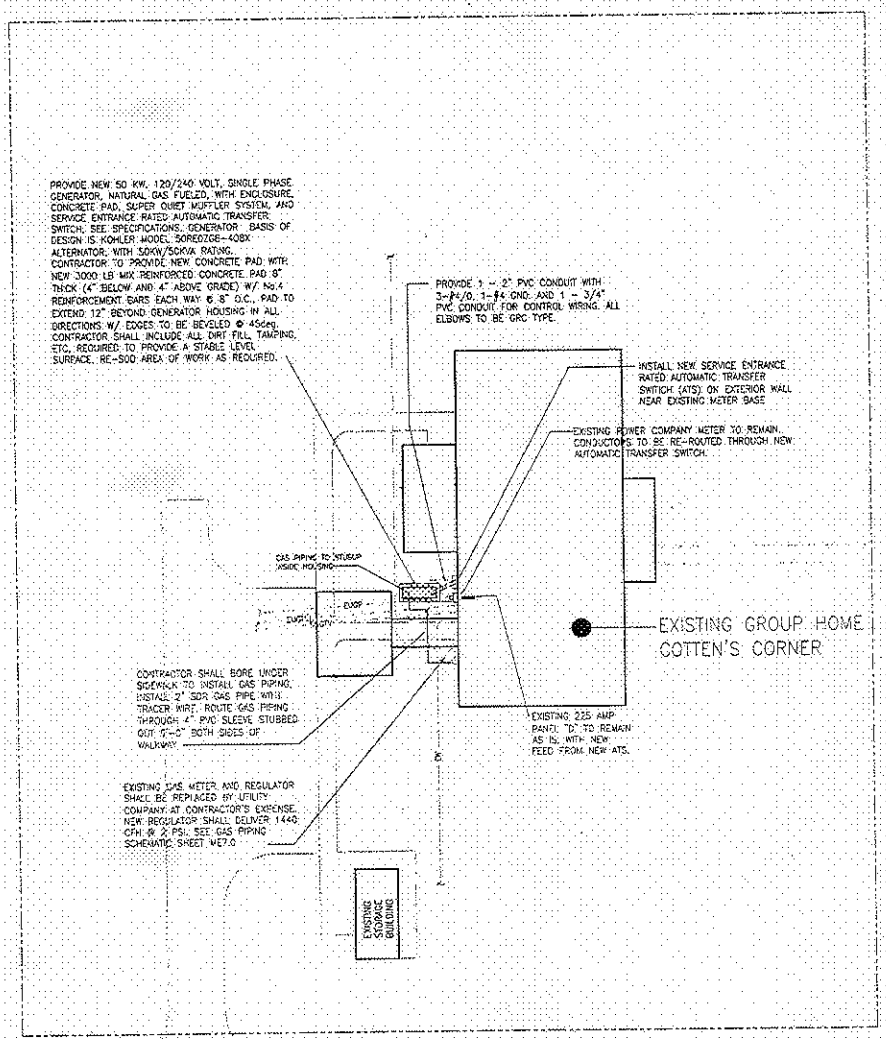



REVISIONS:

PROJECT NO.: JAX0219
DATE: 05/06/2015
DRAWN BY: DTC
CHECKED BY: TLR, MW

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS,
PRENTISS, and ELLISVILLE
GROUP HOMES

SHEET NO.: ME3.0




NORTH

1 / ME4.0 ELLISVILLE SITE PLAN (COTTEN'S CORNER HOME) – ELECTRICAL & GAS PIPING

SCALE: 1/16" = 1'-0"

INSTALLED UNDER ADD ALTERNATE # 1

## ELLISVILLE SITE NOTES:

A. PRIOR TO BIDDING, CONTRACTORS SHALL VISIT SITE AND EXAMINE ALL SURROUNDING CONDITIONS. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO VISIT SITE, OR FAILURE TO UNDERSTAND ALL ASPECTS OF THE PROJECT.

B. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR METER TIE-IN AND UNDERGROUND POWER LINE LOCATION. CONTACT MISSISSIPPI POWER CO.

C. CONTRACTOR SHALL COORDINATE WITH LOCAL NATURAL GAS UTILITY FOR TIE-IN TO GENERATOR. CONTACT BRETT LIVINGSTON WITH CENTERPOINT ENERGY @ 601-319-3657.

D. COORDINATE GAS SHUTDOWN WITH COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5636 BEFORE BEGINNING OF WORK.

E. UTILITY COMPANY NEEDS A MINIMUM OF 3 WEEKS NOTIFICATION PRIOR TO INSTALLATION OF GAS LINE. CALL LOCAL UTILITY CO. FOR EXACT LOCATION OF EXISTING GAS LINE, AND SCHEDULING FOR NEW LINE.

F. THIS CONTRACTOR TO NOTIFY THE COMMUNITY HOME COORDINATOR AND OTIS PARKER @ 601-477-5636 A MINIMUM OF 48 HOURS BEFORE POWER IS TO BE DISRUPTED FROM HOUSE. MAXIMUM ALLOWABLE DURATION OF ANY POWER OUTAGE IS 4 HOURS.

G. THIS CONTRACTOR TO BE AWARE OF EXISTING TREES, SHRUBS, FLOWERS, LANDSCAPE ETC. AND PRESERVE AS MUCH AS POSSIBLE OF AREAS OF WORK.

H. THIS CONTRACTOR TO VERIFY ALL EXISTING UTILITIES IN AREA OF WORK BEFORE CONSTRUCTION BEGINS.

I. THIS CONTRACTOR TO PROVIDE SAFETY FENCING AROUND CONSTRUCTION AREAS AND DITCHES, AND HAVE DITCHING SECURED AT END OF EACH WORK DAY.

J. IN ALL AREAS WHERE EARTH WORK IS TO TAKE PLACE, CONTRACTOR SHALL RESTORE ALL SURFACES TO THE SAME GOOD CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE, BUT NOT BE LIMITED TO TAMPING, DIRT FILL, AND RE-SODDING.

K. SEE SHEET ME7.0 FOR POWER RISER AND GAS PIPING MODIFICATIONS

L. VERIFY LOCATION & DEPTH OF NEW CONDUIT & ANY EXISTING UTILITIES IN THIS AREA

M. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY AND GAS COMPANY FOR METER TIE-IN AND UNDERGROUND SERVICE LINE LOCATION. CONTACT MISSISSIPPI ONE-CALL SYSTEM TO HAVE ALL UNDERGROUND LINES LOCATED.

617 RENAISSANCE WAY
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(601) 856-5136
HESMEA P.M. JAN2019

HESM&A CONSULTING ENGINEERS

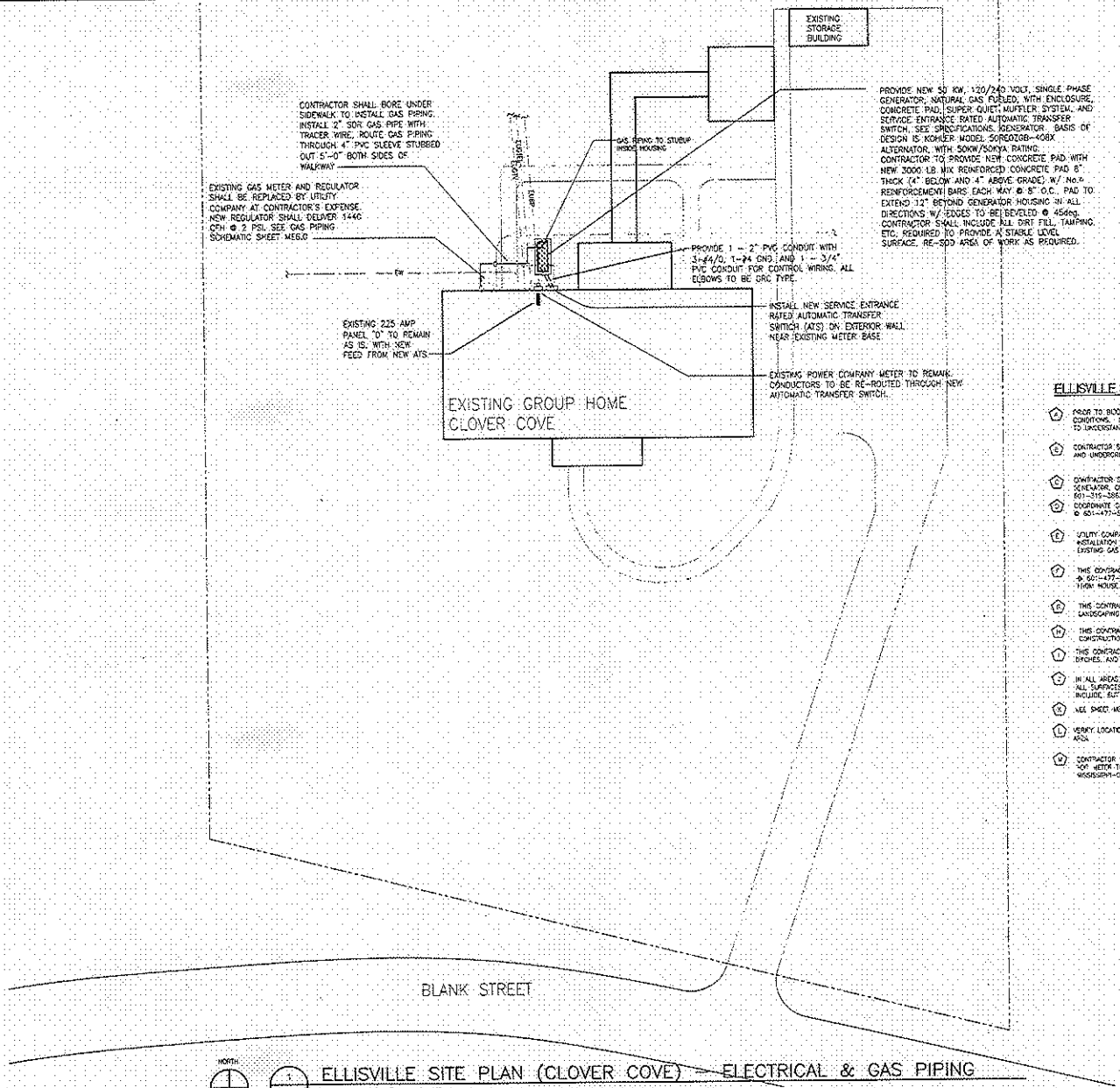


REVISIONS:

PROJECT NO.: JAN2019
DATE: 05/08/2015
DRAWN BY: DJC
CHECKED BY: TJB, P.E.

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS,
PRENTISS, and ELLISVILLE
GROUP HOMES

SHEET NO.: ME4.0




## ELLISVILLE SITE NOTES

A. PRIOR TO BIDDING, CONTRACTORS SHALL VISIT SITE AND EXAMINE ALL SURROUNDING CONDITIONS. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO VISIT SITE, OR FAILURE TO UNDERSTAND ALL ASPECTS OF THE PROJECT.

B. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR METER TIE-IN AND UNDERGROUND POWER LINE LOCATION. CONTACT MISSISSIPPI POWER CO.

C. CONTRACTOR SHALL COORDINATE WITH LOCAL NATURAL GAS UTILITY FOR TIE-IN TO GENERATOR. CONTACT BRETT LIVINGSTON WITH CENTERPOINT ENERGY @ 601-315-3863.

D. COORDINATE GAS SHUTDOWN WITH COMMUNITY HOME COORDINATOR AND JOHN PARKER @ 601-497-5836 BEFORE BEGINNING OF WORK.

E. UTILITY COMPANY NEEDS A MINIMUM OF 3 WEEKS NOTIFICATION PRIOR TO INSTALLATION OF GAS LINE. CALL LOCAL UTILITY CO. FOR EXACT LOCATION OF EXISTING GAS LINE, AND SCHEDULING FOR NEW LINE.

F. THIS CONTRACTOR TO NOTIFY THE COMMUNITY HOME COORDINATOR AND JOHN PARKER @ 601-497-5836 A MINIMUM OF 48 HOURS BEFORE POWER IS TO BE DISRUPTED TO THE HOUSE. MAXIMUM ALLOWABLE DURATION OF ANY POWER OUTAGE IS 4 HOURS.

G. THIS CONTRACTOR TO BE AWARE OF EXISTING TREES, SHRUBS, FLOWERS, LANDSCAPING ETC. AND PRESERVE AS MUCH AS POSSIBLE IN AREAS OF WORK.

H. THIS CONTRACTOR TO VERIFY ALL EXISTING UTILITIES IN AREA OF WORK BEFORE CONSTRUCTION BEGINS.

I. THIS CONTRACTOR TO PROVIDE SAFETY FENCING AROUND CONSTRUCTION AREAS AND DITCHES, AND HAVE DITCHING SECURED AT END OF EACH WORK DAY.

J. IN ALL AREAS WHERE EARTH WORK IS TO TAKE PLACE, CONTRACTOR SHALL RESTORE ALL SURFACES TO THE SAME GOOD CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE, BUT NOT BE LIMITED TO, TAMPING, DIRT FILL, AND RE-SODDING.

K. SEE SHEET ME7.0 FOR POWER RISER AND GAS PIPING MODIFICATIONS

L. VERIFY LOCATION & DEPTH OF NEW CONDUIT & ANY EXISTING UTILITIES IN THIS AREA

M. CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY AND GAS COMPANY FOR METER TIE-IN AND UNDERGROUND SERVICE LINE LOCATION. CONTACT MISSISSIPPI ONE-CALL SYSTEM TO HAVE ALL UNDERGROUND LINES LOCATED.

1 ME5.0 ELLISVILLE SITE PLAN (CLOVER COVE) - ELECTRICAL & GAS PIPING
SCALE: 1/16" = 1'-0" INSTALLED UNDER ALTERNATE No.2

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HESM&A P.N. JAX0218

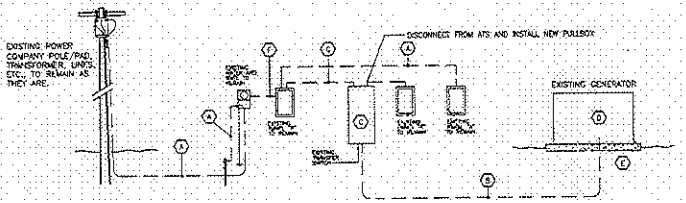


REVISIONS:

PROJECT NO.: JAX2119
DATE: 05/08/2015
DRAWN BY: DTC
CHECKED BY: HB, WT

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS, PRENTISS, and ELLISVILLE GROUP HOMES

SHEET NO.: ME5.0

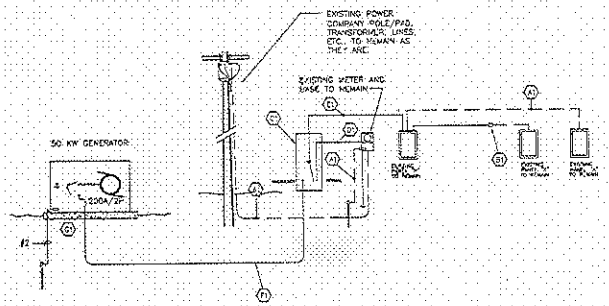



POWER RISER WIRING NOTES:

- (A) EXISTING CONDUIT AND WIRING TO REMAIN
- (B) REMOVE EXISTING WIRING FROM CONDUIT AND SEAL CONDUIT AT FLOOR IN EQUIPMENT ROOM.
- (C) EXISTING TRANSFER SWITCH TO BE REMOVED AND TURNED OVER TO OWNER
- (D) EXISTING GENERATOR TO BE REMOVED AND TURNED OVER TO OWNER
- (E) EXISTING CONCRETE PAD TO BE REMOVED
- (F) EXISTING CONDUIT AND WIRING TO BE REMOVED PLUG HOLES IN PANEL AND METER BOX
- (G) EXISTING CONDUIT AND WIRING TO BE REMOVED

## EXISTING POWER RISER DIAGRAM – DEMOLITION

COLUMBUS GROUP HOME, BAY SPRINGS GROUP HOMES, AND PRENTISS GROUP HOMES




POWER RISER WIRING NOTES:

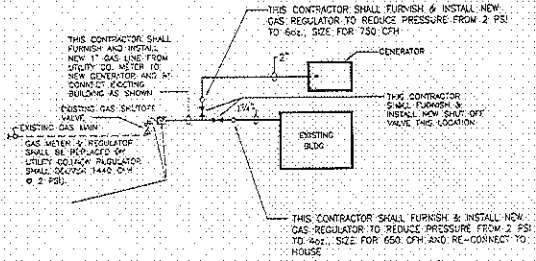
- (A1) EXISTING CONDUIT AND WIRING TO REMAIN
- (B1) INSTALL NEW PULL BOX AND RUN NEW CONDUIT AND WIRING FROM PULL BOX TO PANEL "P" AND RE-CONNECT TO EXISTING 100 AMP, 2P, BREAKER
- (C1) INSTALL NEW AUTOMATIC TRANSFER SWITCH, 240 VOLT, 1 PHASE 200 AMP, 3-POLE, SWITCHED NEUTRAL
- (D1) INSTALL 2 1/2"C. WITH 3-#350KCMIL, 1-#4, GND (COPPER) WIRE BETWEEN METER AND NEW AUTOMATIC TRANSFER SWITCH, INSTALL NEW WIRING TO INSURE PROPER CONDUCTOR LENGTHS AND FIT.
- (E1) INSTALL 2 1/2"C. WITH 3-#350 KCMIL, 1-#4GND (COPPER) BETWEEN NEW AUTOMATIC TRANSFER SWITCH AND EXISTING PANEL "P". INSTALL NEW WIRE TO INSURE PROPER CONDUCTOR LENGTH AND FIT.
- (F1) INSTALL 2 1/2"C. WITH 3-#4/0, 1-#4GND (COPPER) BETWEEN NEW AUTOMATIC TRANSFER SWITCH AND NEW GENERATOR
- (G1) NEW 3000LB MIX CONCRETE PAD 8" THICK (4" BELOW GRADE AND 4" ABOVE GRADE) W/ No.4 REINFORCEMENT BARS EACH WAY @ 8" O.C., PAD TO EXTEND 12" BEYOND GENERATOR HOUSING IN ALL DIRECTIONS W/ EDGES TO BE BEVELED @ 45deg. VERIFY WITH MANUFACTURER'S SPECIFICATION

## EXISTING POWER RISER DIAGRAM MODIFICATION – FOR NEW GENERATOR

COLUMBUS GROUP HOME, BAY SPRINGS GROUP HOMES, AND PRENTISS GROUP HOMES

GENERAL NOTES:

1. EXISTING WIRING FROM METER TO TRANSFER SWITCH, AND FROM TRANSFER SWITCH TO PANELBOARD IS TO BE REPLACED WITH NEW TO INSURE PROPER CONDUCTOR LENGTHS AND FIT WITH NEW SWITCH. EXISTING CONDUIT MAY BE RE-USED.
2. DO NOT TIE GENERATOR GROUNDS TO BUILDING GROUND(S). GENERATOR TO BE A SEPARATELY DERIVED SYSTEM.
3. CONTRACTOR TO RESTORE ALL SURFACES TO THE SAME CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE BUT NOT LIMITED TO TAMPING, DIRT FILL, AND RE-SODDING.




## GAS PIPING RISER SCHEMATIC – MODIFICATIONS

NO SCALE

## COLUMBUS, BAY SPRINGS, & PRENTISS SITE PLANS

SEE SHEET ME1.0 FOR COLUMBUS SITE PLAN
SEE SHEET ME2.0 FOR BAY SPRINGS SITE PLANS
SEE SHEET ME3.0 FOR PRENTISS SITE PLANS

817 RENAISSANCE WAY
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HESM&A
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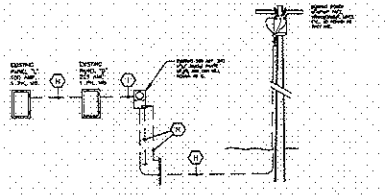
REVISIONS:

PROJECT NO.: JAX0219
DATE: 05/08/2015
DRAWN BY: DDC
CHECKED BY: RJB, MPS

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS,
PRENTISS, and ELLISVILLE
GROUP HOMES

SHEET NO.:
ME6.0



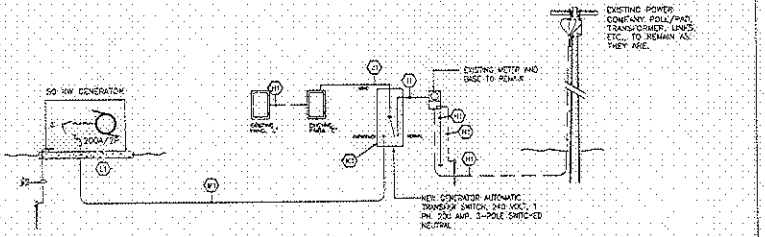
EXISTING POWER RISER DIAGRAM – DEMOLITION

ELLISVILLE GROUP HOMES

**POWER RISER WIRING NOTES:**

(E) EXISTING CONDUIT AND WIRING TO REMAIN

(1) EXISTING CONDUIT AND WIRING TO BE REMOVED. PLUG HOLES IN PANEL AND METER BOX.




POWER RISER DIAGRAM – MODIFIED WITH GENERATOR

ELLISVILLE GROUP HOMES SITE SHEET ME4.0 FOR COTTEN'S CORNER SITE PLAN & SHEET ME5.0 FOR CLOVER COVE SITE PLAN

**GENERAL NOTES:**

(1) EXISTING WIRING FROM METER TO TRANSFER SWITCH, AND FROM TRANSFER SWITCH TO PANELBOARD IS TO BE REPLACED WITH NEW TO INSURE PROPER CONDUCTOR LENGTHS AND FIT WITH NEW SWITCH. EXISTING CONDUIT MAY BE RE-USED.

(2) DO NOT TIE GENERATOR GROUNDS TO BUILDING GROUND(S). GENERATOR TO BE A SEPARATELY DERIVED SYSTEM.

(3) CONTRACTOR TO RESTORE ALL SURFACES TO THE SAME CONDITION AS BEFORE CONSTRUCTION. THIS MAY INCLUDE BUT NOT LIMITED TO: TAMPING, UNIT FILL, AND RE-SODDING.

**POWER RISER WIRING NOTES:**

(E) EXISTING CONDUIT AND WIRING TO REMAIN

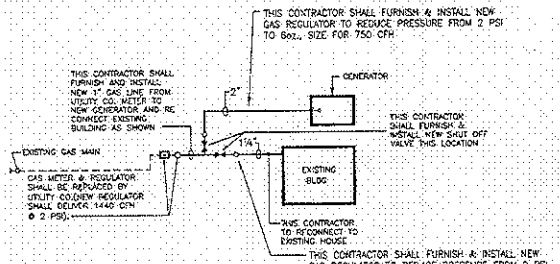
(1) INSTALL 3-1/2"C. WITH 3-#4/0, 1-#4 GND. (COPPER) BETWEEN METER AND NEW AUTOMATIC TRANSFER SWITCH.

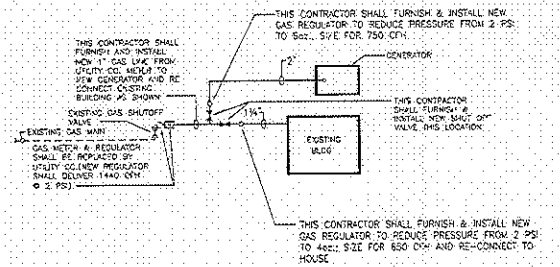
(2) INSTALL 2-3/2"C. WITH 3-#4/0, 1-#4 GND. (COPPER) BETWEEN NEW AUTOMATIC TRANSFER SWITCH AND EXISTING PANEL "D"

(3) INSTALL NEW AUTOMATIC TRANSFER SWITCH, 240 VOLT, 1 PHASE 200 AMP, 3-POLE SWITCHED NEUTRAL

(4) NEW 3000LB MIX CONCRETE PAD 6" THICK (4" BELOW GRADE AND 4" ABOVE GRADE) W/ #6-4 REINFORCEMENT BARS EACH WAY @ 8" O.C., PAD TO EXTEND 12" BEYOND GENERATOR HOUSING IN ALL DIRECTIONS W/ EDGES TO BE BEVELED @ 45deg.

(5) INSTALL 2-1/2"C. WITH 3-#4/0, 1-#4 GND (COPPER) BETWEEN NEW AUTOMATIC TRANSFER SWITCH AND NEW GENERATOR




GAS PIPING RISER SCHEMATIC – MODIFICATIONS

NO SCALE

ELLISVILLE SITE PLANS

SEE SHEET ME4.0 FOR COTTEN'S CORNER SITE PLAN
SEE SHEET ME5.0 FOR CLOVER COVE SITE PLAN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HESM&A
CONSULTING ENGINEERS




REVISIONS:

PROJECT NO.: JAX02310

DATE: 03/09/2015

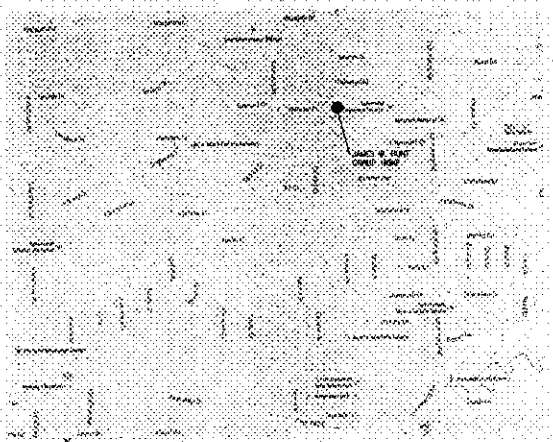
DRAWN BY: DSC

CHECKED BY: TAB, NPH

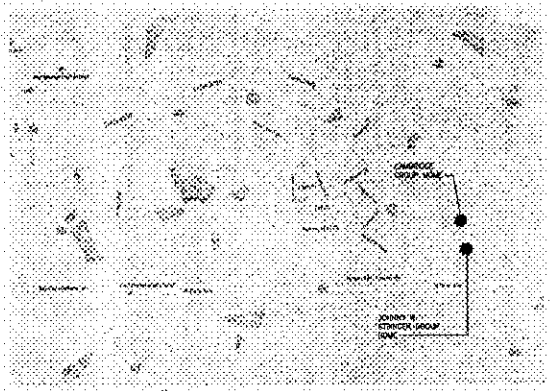
EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS,
PRENTISS, and ELLISVILLE
GROUP HOMES

SHEET NO.: ME7.0

# EMERGENCY GENERATOR INSTALLATION
# ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
# COLUMBUS, BAY SPRINGS, PRENTISS & ELLISVILLE GROUP HOMES

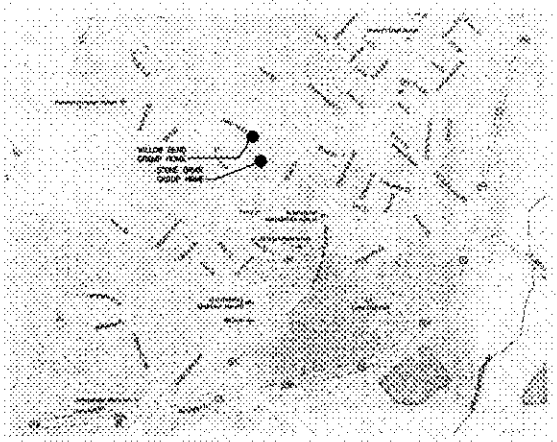


VICINITY MAP – COLUMBUS, MS

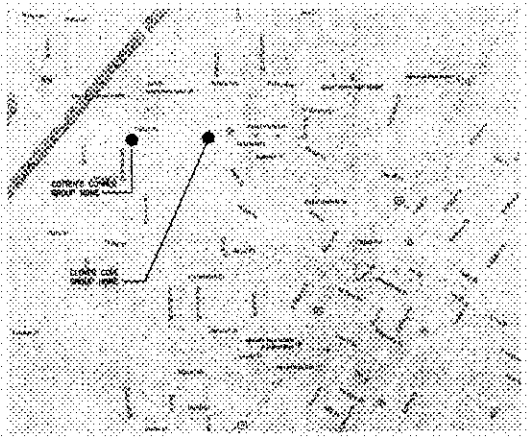


VICINITY MAP – BAY SPRINGS, MS

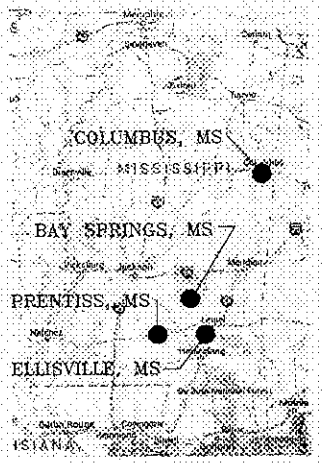
| INDEX OF DRAWINGS | |
|---|---|
| SHEET NO. | DESCRIPTION |
| T1.0 | COVER SHEET |
| ME1.0 | 1 GROUP HOME - COLUMBUS, MS BASE BID |
| ME2.0 | 2 GROUP HOMES BAY SPRINGS, MS BASE BID |
| ME3.0 | 3 GROUP HOMES PRENTISS, MS BASE BID |
| ME4.0 | 1 GROUP HOME ELLISVILLE, MS ADD ALTERNATE #1 |
| ME5.0 | 1 GROUP HOME ELLISVILLE, MS ADD ALTERNATE #2 |
| ME6.0 | POWER & GAS RISER DIAGRAMS FOR COLUMBUS, BAY SPRINGS, & PRENTISS |
| ME7.0 | POWER & GAS RISER DIAGRAMS FOR ELLISVILLE |



VICINITY MAP – PRENTISS, MS



VICINITY MAP – ELLISVILLE, MS




LOCATION MAP

617 RENAISSANCE WAY
SUITE 103
RIDGELAND, MS 39157
(601) 956-6188
HESMA P.A. LA#0219
CONSULTING ENGINEERS
HESMA



REVISIONS:

PROJECT NO.: JA0219
DATE: 05/09/2016
DRAWN BY: GBD
CHECKED BY: TJB, WH

EMERGENCY GENERATOR INSTALLATION
ELLISVILLE STATE SCHOOL
ELLISVILLE, MISSISSIPPI
COLUMBUS, BAY SPRINGS, PRENTISS, and ELLISVILLE GROUP HOMES

SHEET NO.: T1.0