

VILLAGE OF WELLSVILLE

WELLSVILLE, OHIO

SPECIFICATIONS FOR PUMP STATION #1 AND FORCE MAIN IMPROVEMENTS

ADDENDUM NO. 3

October 4, 2011

All prospective bidders are hereby notified that this addendum forms a part of the contract documents and modifies the original bidding documents dated SEPTEMBER, 2011. Acknowledge receipt of this addendum in the space provided in the bid proposal section of the specifications. Failure to do so may subject the bidder to disqualification.

PREPARED BY:

GGJ, INC.  
35585 Curtis Boulevard, Unit C  
Eastlake, Ohio 44095  
(440) 953-1567 (voice)  
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**\*\*THIS ADDENDUM IS BEING TRANSMITTED VIA  
FAX ONLY. NO "HARD COPY" WILL BE SENT.\*\***

**Please acknowledge receipt by signing below  
and faxing back this cover sheet only ASAP  
to (440)953-0580.**

**COMPANY** \_\_\_\_\_

**NAME** \_\_\_\_\_

**DATE** \_\_\_\_\_

### **GENERAL COMMENTS**

- Due to recent failures of the existing force main, the section between station 41+47.49 through to the start of the repairs at the WWTP (station 11+25) has required the Village to replace this line without delay. This section of force main will be conducted outside of the scope of these improvements and are intended to be completed prior to the start of this contract. The bid form has been updated to accommodate the change of scope. Please note that some bid items have now been ommitted

### **CONTRACT SPECIFICATIONS**

1. **SECTION 00300 (BID PROPOSAL FORM)**

**REMOVE:** Entire Section

**REPLACE:** Entire Section

2. **SECTION 16635 (AUTOMATIC TRANSFER SWITCH)**

**ADD:** Entire Section

**VILLAGE OF WELLSVILLE  
PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS**

**BASIS OF PAYMENT**

**GENERAL:** Payment for the work Items shall be at the total unit or lump sum price Bid for each unit of work completed and accepted in accordance with the Contract Documents.

The latest "State of Ohio, Department of Transportation, Construction and Material Specifications" manual shall govern the material and procedures used in this project, if not otherwise specified in the project Specifications or noted on the Drawings.

**PRICES TO INCLUDE:** For each Bid Item, the total unit price or lump sum price Bid shall be considered full compensation for the completed and accepted work, and shall include all labor, materials, tools, equipment and transportation needed to perform the work in accordance with the Contract Documents so as to provide a complete and properly functional system. The General Contractor shall be responsible for reviewing the contents and conditions of all Contract Documents as they may relate to the work under this Contract and comply with the requirement thereof.

**ITEM 1 - BONDS AND INSURANCE**

A. Payment:

1. The lump sum amount stated in the Bid Schedule for bonds and insurance shall include all bonds and insurance required to be in force at the commencement of the work. Successful bidder will be required to provide receipts verifying the actual costs of this item when known.
2. Subsequent expenses for bonds and insurance as may be necessary throughout the contract period for changes to the contract or for other occurrences, shall not be a part of this item.
3. Fees for bonds and insurance due to changes in the work shall be respectively a part of the cost of that work.

**ITEM 2 - MOBILIZATION**

A. Work included: As described in Section 00800 Supplementary Conditions SC-22 and other work incidental to this Item.

B. Payment: Lump Sum price with payments as specified in Section 00800 Supplementary Conditions SC-22.

**ITEM 3 – MAINTENANCE OF TRAFFIC**

A. Description: This work in this Item shall consist of work shall consists of maintaining and protecting vehicular and pedestrian traffic at the work area while the contract is in force, in accordance with the latest Ohio Department of Transportation Construction and Material Specifications, including all current supplemental specifications and standard construction drawings and all specifications and drawings in these Contract Documents and in this contract book.

B. Payment: The Lump Sum Price bid for Item Maintaining Traffic shall include the cost of removal of conflicting pavement markings and placement of interim markings, maintaining the existing roadways in a safe condition for public use, providing flaggers and their equipment, furnishing and maintaining and subsequently removing temporary traffic control items as required by the plans and specifications.

**ITEM 4 – RESTORATION: TOPSOIL, SEEDING & MULCHING**

A. Description: The quantity of each type of restoration: topsoil, seeding and mulching will be measured for unit price payment purposes will be the number of square yards of topsoil, seeding and mulching acceptably placed

and compacted when required per detail as specified over an area within the contract (pay) limits. Areas outside of pay limits will be the Contractor's responsibility

- B. Payment: The unit price stipulated to be paid per square yard of restoration: topsoil, seeding and mulching work performed and measured for payment purposes shall be full compensation for the actual number of square yards furnished and installed which is directly or indirectly caused by the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 5 – REMOVE AND RESET EXISTING PLAY EQUIPMENT, BENCHES, FENCE, AND REPLACE SHRUBS**

- A. Description: This work in this Item shall consist of removing and resetting existing play equipment, benches, fencing, and shrubs as shown in the Drawings and/or specified in the Contract Documents.
- B. Payment: The unit price stipulated shall be a lump sum for all work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 6 – REMOVE AND RESET EXISTING BRICK WALKWAY**

- A. Description: This work in this Item shall consist of removing and resetting existing brick walkway as shown in the Drawings and/or specified in the Contract Documents.
- B. Payment: The unit price stipulated shall be full compensation for each square foot of brick walkway removed and reset as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 7 – SANITARY PUMP STATION - COMPLETE**

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum price stipulated to be paid for the pump station installation shall be full compensation for the complete installation including all work beginning with the connection of the new sanitary sewers and the furnishing and installation of the wet well vault, valve vault, pumps and all accessories, D.I. piping and fittings (originating in the wet well through the valve vault to the mechanical joint outside the valve vault), sump pit, sheeting, shoring, bypass pumping, sump pump with discharge piping, valves and fittings, discharge valves (check and plug), manhole steps, access doors, vent pipe, concrete pads, foundations, slabs, fencing, stoned drive areas, control building, etc., dehumidifier, unit heater, all electrical work pertaining to the Pump Station including all components, controls, and appurtenances necessary as shown on electrical drawings and specified in the electrical specifications and restoration of all disturbed areas and utilities, and other work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 8 – EXISTING PUMP STATION MODIFICATIONS**

- A. Measurement: Shall be on an allowance basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum price stipulated to be paid for the pump station modifications shall be full compensation for the modification of the existing sanitary pump station #1 to an overflow pump station. Work shall include depowering existing sanitary pumps from the existing control panel and running new power feed into building to connect to existing control panel. Conduit and wiring from the proposed building to a foot outside of the existing building will be paid under other bid item. Work under this item will include the work from 1 foot outside of building through the building to existing control panel.

**ITEM 9 – ELECTRICAL**

- A. Measurement: Shall be made on a lump sum basis for the actual work performed under this item.
- B. Payment: The unit price stipulated to be paid for the electrical shall be full compensation for electrical work related to pump station and control building construction. It shall also include providing and installing an emergency generator, transformers, switches, and all appurtenances related to providing a standby power to the pump station. The lump sum price shall be for all the electrical work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 10 – 24" POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE – ASTM D-3034, SDR 26 (SANITARY)**

- A. Description: The work in this Item shall consist of furnishing and installing PVC Sanitary Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a lump sum basis for the actual work performed under this item.
- B. Payment: The unit price stated on the Bid Schedule shall be compensation for the lump sum price of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, coring, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 11 – 12" PVC OVERFLOW IN EXISTING SANITARY MANHOLE**

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum price stipulated to be paid for this item shall be full compensation for the complete installation of the PVC overflow pipe including all work, materials and appurtenances necessary as shown on drawings and specified in the specifications for a complete and ready-for-use installation.

**ITEM 12 – AIR RELEASE AND CLEANOUT STATIONS**

- A. Description: The unit bid price shall be made on each Air Release and Cleanout Station performed under this item.
- B. Payment: The unit price stated for each Air Release and Cleanout Station shall be full compensation for the manholes, furnished, installed, and connected in accordance with the Drawings and Specifications including excavation, backfill, labor, material, equipment, and restoration. The unit price stated in the Bid Schedule shall include precast sections, waterproofing, steps, grade adjusting, labor, construction, backfill, compaction, frame and covers, restoration of all disturbed areas and utilities, air release valve, isolation and drain valve, DIP Class 52 tee with blind flanged branch, DIP Class 52 wye with blind flanged branches, and all other appurtenances for the work shown on the Drawings and/or specified in the Construction Documents for a complete and ready-for-use installation.

**ITEM 13 – 12" HDPE FORCE MAIN (DR17)**

- A. Description: The work in this Item shall consist of furnishing and installing a 12" HDPE Forcemain as shown on the Drawings and/or specified. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe. Price includes the installation of tracer wire, metallic tape, and 6 tracing wire stations.
- B. Payment: The unit price in the Bid Schedule shall be full compensation for each linear foot of forcemain installed and measured for payment. The price shall include furnishing, all fittings required including the cost of fittings, pipe fusion, excavation, backfill, compaction, laying sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-to-use installation.

**ITEM 14 – OMITTED**

**ITEM 15 – 24" DUCK BILL VALVE**

- A. Description: The unit bid price shall be made on each 24" Duck Bill Valve installed under this item.
- B. Payment: The unit price stated for each 24" Duck Bill Valve shall be full compensation for each valve, furnished, installed, and connected in accordance with the Drawings and Specifications including removal and disposal of existing flap gate, excavation, backfill, labor, material, equipment, restoration, and all other appurtenances for the work shown on the Drawings and/or specified in the Construction Documents for a complete and ready-for-use installation.

**ITEM 16** – VERTICAL CURB, TYPE 6

- A. Description: This work shall consist of the construction of Type 6 Vertical Curb and shall conform to the plans and specifications.
- B. Payment: The unit price stipulated to be paid for each linear foot of Type 6 Curb shall be full compensation for the actual number of linear feet installed including all labor, laying, restoring all disturbed areas, and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 17** – OMITTED

**ITEM 18** – TYPE C PAVEMENT REPLACEMENT

- A. Description: The work in this Item shall consist of the Type C pavement replacement in the areas shown on the Drawings.
- B. Payment: The unit price stipulated to be paid for each square yard of Type C Pavement Replacement shall be full compensation for the actual number of square yards, calculated from payment limits as called for in the contract drawings, completed in compliance with the contract drawings and specifications and accepted for payment purposes and shall include furnishing all labor, materials, tools, appliances and equipment necessary thereto and, in connection with same, restore all disturbed site features and other items plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

**ITEM 19** – 4" CONCRETE SIDEWALK

- A. Description: This item of work shall consist of constructing concrete walks in reasonable close conformity with lines, grades and dimensions shown on the plans or established by the Engineer.
- B. Payment: The unit price stated for 4" concrete sidewalk walk shall be full compensation for the actual number of square foot, calculated from pay limits, including labor, excavation, backfill, base course, expansion joint, truncated dome pavers, forming, and excavation and removal of all excavated material, completed in compliance with the contract Drawings and Specifications.

**ITEM 20** – OMITTED

PROPOSAL TO THE VILLAGE OF WELLSVILLE, OHIO  
PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS

TO: MAYOR JOSEPH SURACE  
VILLAGE OF WELLSVILLE  
1200 MAIN STREET  
WELLSVILLE, OHIO 43968

Gentlemen:

Proposal of \_\_\_\_\_(hereinafter called "BIDDER"), organized and existing under the laws of the State of Ohio doing business as \_\_\_\_\_.  
To the VILLAGE OF WELLSVILLE (hereinafter called "Owner").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submitting this BID, the BIDDER, or in the case of a joint BID, each party thereto, certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

The undersigned have full knowledge of the project site, Drawings, and the conditions of the proposal. The undersigned also, hereby agrees to furnish all the services, labor, materials and equipment necessary to complete these projects according to the Drawings and Specifications and to accept as full compensation the lump sum or unit prices stated in the Bid Schedule for the work and for use when calculating the price of a deduction or an increase in quantities.

BIDDER hereby agrees to commence WORK under this Contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the period stipulated in the INSTRUCTIONS TO BIDDERS. BIDDER further agrees to pay as liquidated damages and that the CITY may retain from monies that are, or which may become due. The amount of such liquidated damages shall be as stipulated in the CONTRACT AGREEMENT FORM (Section 00500 herein).

- Insert "a corporation", "a partnership", or "an individual" as applicable.

The Bidder hereby acknowledges receipt of the following addenda:

ADDENDUM NO.

DATE

_____	_____
_____	_____
_____	_____

We further agree that the Owner may reject any or all bids.

SUBMITTED BY:

\_\_\_\_\_  
Firm, Corporation or Individual

\_\_\_\_\_  
Address

\_\_\_\_\_  
Telephone Number

Contractor License Number \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

NOTE: Evidence of authority to sign and the corporate seal must be affixed and attested by the Secretary.

COMPLETION DATE: 240 Calendar Days commencing on the date as shown on Notice to Proceed for Final Completion.



PROPOSAL TO THE VILLAGE OF WELLSVILLE, OHIO  
PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS

**BID SCHEDULE**

Bid Item	Item Description	Est. Qty.	Unit	Unit Cost Material	Unit Cost Labor	Total Unit Cost	Total Cost
1	BONDS AND INSURANCE	1	Lump Sum				
2	MOBILIZATION	1	Lump Sum				
3	MAINTENANCE OF TRAFFIC	1	Lump Sum				
4	RESTORATION: TOPSOIL, SEEDING & MULCHING	4000	SY				
5	REMOVE AND RESET EXISTING PLAY EQUIPMENT, BENCHES, FENCE, AND SHRUBS	1	Lump Sum				
6	REMOVE AND RESET EXISTING BRICK WALKWAY	50	SF				
7	SANITARY PUMP STATION – COMPLETE	1	Lump Sum				
8	EXISTING PUMP STATION MODIFICATIONS	1	Allowance			\$10,000.00	\$10,000.00
9	ELECTRICAL	1	Lump Sum				
10	24" POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE – ASTM D-3034, SDR 26 (SANITARY)	1	Lump Sum				
11	12" PVC OVERFLOW IN EXISTING SANITARY MANHOLE	1	Lump Sum				
12	AIR RELEASE AND CLEANOUT STATIONS	2	Each				
13	12" HDPE FORCE MAIN (DR17)	5977	LF				
14	<b>OMITTED</b>	0	LF				
15	24" DUCK BILL VALVE	1	Each				
16	VERTICAL CURB, TYPE 6	675	LF				
17	<b>OMITTED</b>	0	SY				
18	TYPE C PAVEMENT REPLACEMENT	1320	SY				
19	4" CONCRETE SIDEWALK	30	SF				
20	<b>OMITTED</b>	0	LF				
<b>TOTAL</b>							

**TOTAL AMOUNT OF PROJECT (IN FIGURES)**

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**TOTAL AMOUNT OF PROJECT (IN WORDS)**

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**AUTOMATIC TRANSFER SWITCH****1.1. GENERAL**

- 1.1.1. The automatic transfer switch shall be furnished by the manufacturer of the engine-generator set so as to maintain system compatibility and local service responsibility for the complete emergency power system. It shall be listed by Underwriter's Laboratory, Standard 1008 with fuse or circuit breaker protection. Representative production samples of the transfer switch supplied shall have demonstrated through tests the ability to withstand at least 10,000 mechanical operation cycles. One operation cycle is the electrically operated transfer from normal to emergency and back to normal. Wiring must comply with NEC table 312.6. The manufacturer shall furnish schematic and wiring diagrams for the particular automatic transfer switch and a typical wiring diagram for the entire system.

**1.2. RATINGS & PERFORMANCE**

- 1.2.1. The automatic transfer switch shall be four pole, 277/480 volts, 150 amps. It shall be rated for continuous operation in ambient temperatures of -20 degrees Fahrenheit (-30 degrees Celsius) to +140 degrees Fahrenheit (+60 degrees Celsius). Main power switch contacts shall be rated for 600 V AC minimum. These RMS symmetrical fault current ratings shall be the rating listed in the UL listing or component recognition procedures for the transfer switch. All withstand tests shall be performed with the over current protective devices located external to the transfer switch.

**1.3. CONSTRUCTION**

- 1.3.1. The transfer switch shall be double throw construction, positively electrically and mechanically interlocked to prevent simultaneous closing and mechanically held in both normal and emergency positions. Independent break before make action shall be used to positively prevent dangerous source to source connections. When switching the neutral, this action prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs. The transfer switch shall be approved for manual operation. The electrical operating means shall be by electric solenoid. Every portion of the contactor is to be positively mechanically connected. No clutch or friction drive mechanism is allowed, and parts are to be kept to a minimum. This transfer switch shall not contain integral over current devices in the main power circuit, including molded case circuit breakers or fuses.
- 1.3.2. The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching. Maximum electrical transfer time in either direction shall be 160 milliseconds, exclusive of time delays. Main switch contacts shall be high pressure silver alloy with arc chutes to resist burning and pitting for long life operation.
- 1.3.3. The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching. Maximum electrical transfer time in either direction shall be 160 milliseconds, exclusive of time delays. Main switch contacts shall be high pressure silver alloy with arc chutes and separate arcing contacts to resist burning and pitting for long life operation.

**1.4. CONTROLS**

- 1.4.1. All control equipment shall be mounted on the inside of the cabinet door in a metal lockable enclosure with transparent safety shield to protect all solid state circuit boards. This will allow for ease of service access when main cabinet lockable door is open, but to prevent access by unauthorized personnel. Control boards shall have installed cover plates to avoid shock hazard while making control adjustments. The solid state voltage sensors and time delay modules shall be plug-in circuit boards with silver or gold contacts for ease of service.
- 1.4.2. A solid state under voltage sensor shall monitor all phases of the normal source and provide adjustable ranges for field adjustments for specific application needs. Pick-up and drop-out settings shall be adjustable from a minimum of 70% to a maximum of 95% of nominal voltage. A utility sensing interface shall be used, stepping down system voltage to 24VAC, helping to protect the printed circuit board from voltage spikes and increasing personnel safety when troubleshooting.

- 1.4.3. A solid state under voltage sensor shall monitor all phases of the normal source and provide adjustable ranges for field adjustments for specific application needs. Pick-up and drop-out settings shall be adjustable from a minimum of 70% to a maximum of 95% of nominal voltage. A utility sensing interface shall be used, stepping down system voltage to 24VAC, helping to protect the printed circuit board from voltage spikes and increasing personnel safety when troubleshooting.
- 1.4.4. Signal the engine-generator set to start in the event of a power interruption. A set of contacts shall close to start the engine and open for engine shutdown. A solid state time delay start, adjustable, .1 to 10 seconds, shall delay this signal to avoid nuisance start-ups on momentary voltage dips or power outages.
- 1.4.5. Transfer the load to the engine-generator set after it reached proper voltage, adjustable from 70-90% of system voltage, and frequency, adjustable from 80-90% of system frequency. A solid state time delay, adjustable from 5 seconds to 3 minutes, shall delay this transfer to allow the engine-generator to warm-up before application of load. There shall be a switch to bypass this warm-up timer when immediate transfer is required.
- 1.4.6. Retransfer the load to the line after normal power restoration. A return to utility timer, adjustable from 1-30 minutes, shall delay this transfer to avoid short term normal power restoration.
- 1.4.7. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred. Controls shall provide an automatic retransfer of the load from emergency to normal if the emergency source fails with the normal source available.
- 1.4.8. Signal the engine-generator to stop after the load retransfers to normal. A solid state engine cool down timer, adjustable from 1-30 minutes, shall permit the engine to run unloaded to cooldown before shutdown. Should the utility power fail during this time, the switch will immediately transfer back to the generator.
- 1.4.9. Provide an engine minimum run timer, adjustable from 5-30 minutes, to ensure an adequate engine run period.
- 1.4.10. The transfer switch shall have a time delay neutral feature to provide a time delay, adjustable from .1-10 seconds, during the transfer in either direction, during which time the load is isolated from both power sources. This allows residual voltage components of motors or other inductive loads (such as transformers) to decay before completing the switching cycle. A switch will be provided to bypass all transition features when immediate transfer is required.
- 1.4.11. As well as the time delay neutral feature, the transfer switch shall have an in phase monitor which allows the switch to transfer between live sources if their voltage waveforms become synchronous within 20 electrical degrees within 10 seconds of transfer initiation signal. A switch must be provided to bypass this feature if not required.
- 1.4.12. If the in phase monitor will not allow such a transfer, the control must default to time delay neutral operation. Switches with in phase monitors which do not default to time delay neutral operation are not acceptable.
- 1.4.13. Front mounted controls shall include a selector switch to provide for a NORMAL TEST mode with full use of time delays, FAST TEST mode which bypasses all time delays to allow for testing the entire system in less than one minute, or AUTOMATIC mode to set the system for normal operation.
- 1.4.14. Provide bright lamps to indicate the transfer switch position in either UTILITY (white) or EMERGENCY (red). A third lamp is needed to indicate STANDBY OPERATING (amber). These lights must be energized from utility or the engine-generator set.
- 1.4.15. Provide manual operating handle to allow for manual transfer. This handle must be mounted inside the lockable enclosure so accessible only by authorized personnel.
- 1.4.16. Provide a maintenance disconnect switch to prevent load transfer and automatic engine start while performing maintenance. This switch will also be used for manual transfer switch operation.
- 1.4.17. Provide LED status lights to give a visual readout of the operating sequence. This shall include utility on, engine warm-up, standby ready, transfer to standby, in phase monitor, time delay neutral, return to utility, engine cool down and engine minimum run. A "signal before transfer" lamp shall be supplied to operate from optional circuitry.

## **1.5. MISCELLANEOUS TRANSFER SWITCH EQUIPMENT**

- 1.5.1. The transfer switch mechanism and controls are to be mounted in a NEMA 4X enclosure. Enclosure shall be a secure design with controls behind a lockable door.
- 1.5.2. The following options are to be provided by the transfer switch manufacturer.
- 1.5.3. A second set of DPDT(form C), 10 ampere, 250 volt auxiliary contacts, operated by the transfer switch mechanism shall be installed.
- 1.5.4. An exerciser clock shall be provided for programmed testing of the system with and without load.