

LEGAL NOTICE

Town of Branford
Request for Proposal

**GENERATOR / TRANSFER SWITCH
CLARK STREET PUMP STATION**

The Town of Branford is requesting proposals for the purchase of a Generator and Transfer Switch, for the Clark Street Pump Station. Specifications may be obtained from the Finance Department, Branford Town Hall, 1019 Main Street, Branford, Ct, or on the Town's website at **www.branford-ct.gov**.

Proposals are to be submitted in a sealed envelope marked "**Generator / Transfer Switch, Clark Street Pump Station**" to Town Hall, Finance Department, Attention, Purchasing Clerk, 1019 Main Street, Branford, Ct 06405 by Tuesday, November 1, 2011, 11:00 a.m. Proposals will be publicly opened at 11:30 a.m., Tuesday, November 1, 2011 in the Finance Department.

The Board of Selectmen or the majority reserves the right to select or reject any and/or all bids containing alternate proposals, to waive any informality in proposals and to reject and / or all bids or accept such bid as shall, in their judgment, be in the best interest of the Town of Branford.

Anna DelRosso
Purchasing Clerk

TOWN OF BRANFORD
OFFICE OF THE TREASUER



1019 Main Street
Post Office Box 150
Branford, CT 06405

(203) 488-8394
FAX: 315-3736

**General Requirements for Bidding
and
Instructions to Bidders**

NOTICE

Information provided in these specifications is ***CONFIDENTIAL*** and is to be used only for the purpose of preparing a proposal. It is further expected that each bidder will read these specifications with care, for failure to meet every one or a combination of specified conditions may invalidate the proposal.

The Town reserves the right to reject any or all bids or any portion thereof and to accept the bid deemed to be in the best interest of the Town of Branford.

Bidders are requested to submit quotations on the basis of these specifications. Alternate quotations will receive consideration providing such alternatives are clearly explained.

The information contained herein is believed to be accurate and is based upon the latest available information but is not to be considered in any way as a warranty.

Revised 8/2011
Standard Form

SECTION I - General Terms and Conditions

A. Compliance with Laws

The bidder shall at all times observe and comply with all laws, ordinances and regulations of the federal, state and local governments, which may in any way affect the preparation or the performance of the contract.

B. Timetable

Price quoted must be valid for **120** days. Delivery and installation completion dates must be included in the bid proposal.

C. Consideration of Proposals

The Board of Selectmen, or a majority of them, reserve the right to select or reject alternate proposals; to waive informality in proposals; and to reject any and all bids, or accept such bid as shall in its judgement be to the best interest of the Town of Branford.

D. Bid Bond **See Bid Proposal Sheet*

1. A certified check or bank draft made payable to the “Treasurer, Town of Branford”, or a satisfactory bid executed by the bidder and a surety company in an amount no less than five percent (5%) of the base bid, may be required with each proposal.
2. Checks or drafts will be returned to unsuccessful bidders within ten (10) business days of the bid award.

E. Performance Bond **See Bid Proposal Sheet*

Successful bidders may be required to furnish a Performance and Payment Bond in the amount of 100% of the contract sum.

F. Protection of Work and Property

Successful bidders shall be responsible for protection of their equipment and materials against theft, damage or deterioration on the site.

G. Competency of Bidders

1. Bidders shall have had proven experience in the field of work.
2. Bidders shall submit with their bid a listing of recent work performed within the State of Connecticut of the size equal to or greater than the work being bid.

H. Alternates

1. Any alternates to specified materials or workmanship must be separately listed and described in detail.
2. Alternates will be considered in awarding the contract only if they provide, as a minimum requirement, all features contained in the specifications.
3. The Town of Branford reserves the sole right to determine through its agents the equality of alternate products and/or installation procedures.

I. Bid Requirements

1. Each bidder shall return two (2) copies of the proposal sheet entitled "Bid Proposal".
2. Each bid proposal must be signed by an authorized agent of the bidder.
3. Successful bidders must obtain any required governmental approvals.

J. Specifications – General

The contract shall include all labor and materials, tools and equipment and services required for proper performance of the work as specified hereinafter and as may be required for proper completion of the work in accordance with the highest standards of the trades involved.

K. Examination of Site

Prior to submission of the bid, contractor shall visit the site, consult with the supervisor, and become thoroughly familiar with all conditions under which the work will be installed. The contractor will be responsible for any assumptions made regarding the site for the work to be performed.

SECTION II - Insurance Requirements

Bidder shall agree to maintain in force at all times during which services are to be performed the following coverage and shall name the Town of Branford as an Additional Insured on a primary and non-contributory basis to the Bidder’s Commercial General Liability and Automobile Liability policies. **These requirements shall be clearly stated in the remarks section on the bidders Certificate of Insurance.** Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum Best’s Rating of A-. In addition, all Carriers are subject to approval by the Town of Branford.

		(Minimum Limits)
General Liability	Each Occurrence	\$1,000,000
	General Aggregate	\$2,000,000
	Products/Completed Operations	\$2,000,000
	Aggregate	
	-Include Waiver of Subrogation	
Auto Liability	Combined Single Limit	
	Each Accident	\$1,000,000
Umbrella (Excess Liability)	Each Occurrence	\$1,000,000
	Aggregate	\$1,000,000
Workers’ Compensation and Employers’ Liability	WC Statutory Limits	
	EL Each Accident	\$500,000
	EL Disease Each Employee	\$500,000
	EL Disease Policy Limit	\$500,000

Original, completed Certificates of Insurance must be presented to the Town of Branford prior to purchase order/contract issuance. Bidder agrees to provide replacement/renewal certificates at least 60 days prior to the expiration of the policy.

Hold Harmless Requirements

The contractor shall, at all times, indemnify and save harmless the Town of Branford, its officers, agents, and servants on account of any and all claims, damages, losses, litigation expense, counsel fees and compensation arising out of injuries (including death) sustained by or alleged to have been sustained by the public, any or all persons affected by the contractor’s work, or by the contractor, any subcontractor, material, men or anyone directly or indirectly employed by them or any one of them while engaged in the performance of this contract. The Town of Branford shall be named as an additional insured on said policy of public liability insurance to cover all claims against the Town arising out of said contract.

CODE OF THE TOWN OF BRANFORD

Chapter 75 – Purchasing

Article II – Bidding

75-2 Advertising, bidding and requests for proposal

- A. All goods and services purchased by the Town, including but not limited to the Board of Education, Sewer Authority and capital project funds established for the benefit of the James Blackstone Memorial Library (collectively referred to hereinafter as the Town), when the amount of the purchase exceeds \$7,500, shall be awarded through a sealed bid process, including public opening of such bids, to the lowest responsible bidder after posting a bid notice on the Town website and either advertising the same in a newspaper with general circulation or posting on the Connecticut Department of Administrative Services website.
- B. In lieu of bid specifications, a request for proposal may be issued. A request for proposal may be issued when a desired outcome is sought, but the method for achieving that outcome is not defined in a detailed specification, or allows for presenting different options for achieving the desired outcome beyond proposed specifications. Services or goods purchased by request for proposal shall be awarded based on a variety of factors, including project approach, experience, price, and such other criteria as shall be defined and specifically set forth in the request for proposal. Requests for proposal shall be posted in the same manner as bid specifications, and responses shall be sealed in the same manner as bids.
- C. The requirement of advertising and sealed bidding shall not apply to:
 - 1. Purchases less than \$7,500, provided the price is consistent with the price offered to the general public for the same goods and/or services and that procedures as may be defined by the First Selectman are followed.
 - 2. Emergency situations, where the First Selectman or his designee authorizes the emergency purchase and the department head or his or her designee, as soon as reasonably possible, provides a report on the nature of the emergency and the reason for such emergency purchase to the Board of Selectmen, to be included in such Board's minutes.
 - 3. Contracts in the amount of \$75,000 or less for legal services, accounting, actuarial and auditing services, medical and dental services, architectural services, engineering services and labor negotiators.

4. Any purchases made at or below prices obtained by the State of Connecticut or the United States through competitive bidding.
5. Sole source purchases, such as utilities or legal notices, and including purchases where the purchase of an item or service is required to match an existing installation or equipment, and there are no competitive products available that would function equally well, or if the maintenance costs would be unduly increased by having different makes installed. Sole source purchases for reasons other than a true lack of second possible vendor shall be approved by the First Selectman.
6. Work on bridges, sidewalks, roads, curbing or other pavement, when the State of Connecticut Department of Transportation has obtained bids for such work and the Town is able to pay the state price for such work, or the Town solicits no fewer than three price quotations for such work from qualified contractors, businesses or persons, as such qualifications are set forth in a request for qualifications prepared by the Town and the Town awards such work to the qualified contractor, business or person submitting the lowest price quote, provided that the cost of work, material and supplies does not exceed the sum of \$400,000.

Town of Branford Clark Street Pump Station

Section 1.0: Specifications

1.1 Scope

Provide, install, and acceptance test a complete and operable Emergency/Standby electric generating system, including all devices and equipment specified herein, as shown on the drawings, or required for the service. Equipment shall be new, factory tested, and delivered ready for installation.

1.2 Approved Manufacturers:

Equipment, documentation, and services described in this specification and shown on the plans are as provided by Cummins Power Generation, Minneapolis, Minnesota.

Proposed substitutions shall include complete submittal data, as specified herein, clearly denoting any and all deviations and/or exceptions to the equipment specified. The complete proposal must be submitted to the engineer or architect for approval/disapproval not less than 10 days prior to the scheduled bid date. If approved, the Contractor is responsible for the charges for all necessary revisions.

Submit the following information with the proposal package for review and evaluation 10 days prior to scheduled bid date:

- A paragraph by paragraph specification compliance statement, describing the differences between the specified and the proposed equipment.
- Dimensions of the generator sets, transfer switches and accessory hardware, including plan and elevation drawings.
- Sequence of the operations if required to enhance the description included in this specifications.
- Indication of the nearest field service office staffed with factory trained technicians. Provide service organization data and manpower. Indicate typical response time for emergency calls. Provide typical scenario for an emergency service call.

1.3 Submittals:

Within 10 days after award of contract, provide six sets of the following information for review:

- Manufacturer's product literature and performance data, sufficient to verify compliance to specification requirements.
- A paragraph by paragraph specification compliance statement, describing the differences between the specified and the proposed equipment.
- Manufacturer's certification of prototype testing.
- Manufacturer's published warranty documents.
- Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
- Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner.
- Manufacturer's installation instructions.

1.4 Warranty:

Shall be provided for all products against defects in materials and workmanship for two year period from the start-up date.

1.5 Single Supplier:

The supplier shall be the manufacturer's authorized distributor, who shall provide initial start-up services, conduct field acceptance testing, and warranty service. The supplier shall have 24-hour service availability and factory-trained service technicians authorized to perform warranty service on all products provided.

1.6 Manuals:

Three (3) Sets Operators and spare parts manuals shall be provided for all system equipment. The manuals shall include outline, interconnection, wiring, and control drawings accurately describing the equipment provided. Provide ladder logic for all programmable logic controllers in the system.

Section 2.0: Products

2.1 Natural Gas Engine-Generator Set:

4-cycle, 1800 rpm, Natural Gas engine generator set. Generator set ratings: 35 kW, 44 kVA at 0.8 PF, standby rating, based on site conditions noted below. System voltage of: 120/208 Volts AC, Three phase, Four-wire, 60 hertz. Site Conditions: Altitude 200 ft., ambient temperatures up to 131 degrees F.

Cummins Power Generation model 35 GGPA

The engine must be EPA Certified.

Complete package shall be UL 2200 listed.

2.1.1 Prototype Tests and Evaluation:

Prototype tests shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement. Prototype testing shall comply with the requirements of NFPA 110 for level 1 system.

2.1.2 Performance:

Voltage regulation shall be +/- 1.0 percent for any constant load between no load and rated load.

Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.

The natural gas engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.

Motor starting capability shall be a minimum of 155 kVA. The generator set shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set.

2.1.3 Engine:

The engine shall be fueled by natural gas fuel, 4 cycle, radiator and fan cooled. Minimum displacement shall be 305 cubic inches, with 8 cylinders. The horsepower rating of the engine at its minimum tolerance level shall be sufficient to drive the alternator and all connected accessories. Engine accessories and features shall include:

Skid-mounted radiator and cooling system rated for full load operation in 131 degrees F (55 degrees C) ambient as measured at the generator air inlet. Radiator shall be provided with a duct adapter flange. The cooling system shall be filled with 50/50 ethylene glycol/water mixture by the equipment supplier. Rotating parts shall be guarded against accidental contact per OSHA requirements.

An electric starter(s) capable of three complete cranking cycles without overheating.

Positive displacement, mechanical, full pressure, lubrication oil pump.

Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.

Replaceable dry element air cleaner with restriction indicator.

Flexible supply fuel line.

Engine mounted battery charging alternator, 100 ampere minimum, and solid-state voltage regulator.

Provide a crankcase emission control system that shall remove a minimum of 99% of crankcase emissions. The crankcase emission control system shall reduce Nox, hydrocarbon and oil from the crankcase emissions.

2.1.4 AC Generator:

The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, dripproof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 105 degrees Centigrade.

A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.

AC Generator shall be a 12 lead reconnectable at three phase voltages while still providing the full output rating of the generator.

2.1.5 Generator set Control. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.

The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.

The generator set mounted control shall include the following features and functions:

A. Control Switches

1. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or Manual position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
2. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.
3. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
4. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

B. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:

1. Digital metering set, 0.5% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.
2. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.
3. The control system shall log total number of operating hours, total kWh, and total control on hours, as well as total values since reset.
4. Both analog and digital metering is required. The analog and digital metering equipment shall be driven by a single microprocessor, to provide consistent readings and performance.

C. Generator Set Alarm and Status Display.

1. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition

shall be clearly apparent under bright room lighting conditions.
Functions indicated by the lamps shall include:

- The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for function, color, and control action (status, warning, or shutdown).
- The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.
- The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
- The control shall include an amber common warning indication lamp.

2. The generator set control shall indicate the existence of the following alarm and shutdown conditions on an alphanumeric digital display panel:

- Low oil pressure (alarm)
- Low oil pressure (shutdown)
- Oil pressure sender failure (alarm)
- Low coolant temperature (alarm)
- High coolant temperature (alarm)
- High coolant temperature (shutdown)
- High oil temperature (warning)
- Engine temperature sender failure (alarm)
- Low coolant level (alarm or shutdown--selectable)
- Fail to crank (shutdown)
- Fail to start/over crank (shutdown)
- Overspend (shutdown)
- Low DC voltage (alarm)
- High DC voltage (alarm)
- Weak battery (alarm)
- High AC voltage (shutdown)
- Low AC voltage (shutdown)
- Under frequency (shutdown)
- Over current (warning)
- Over current (shutdown)
- Short circuit (shutdown)
- Over load (alarm)
- Emergency stop (shutdown)

3. Provisions shall be made for indication of four customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The non-automatic indicating lamp shall be red,

and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

4. The control shutdown fault conditions shall be configurable for fault bypass.

D. Engine Status Monitoring.

1. The following information shall be available from a digital status panel on the generator set control:

- Engine oil pressure (psi or kPA)
- Engine coolant temperature (degrees F or C)
- Engine oil temperature (degrees F or C)
- Engine speed (rpm)
- Number of hours of operation (hours)
- Number of start attempts
- Battery voltage (DC volts)

2. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

E. Engine Control Functions:

1. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
2. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.
3. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
4. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
5. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

F. Alternator Control Functions:

1. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from disoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.
2. Controls shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445.
3. Controls shall be provided to individually monitor all three phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445.
4. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
5. An AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage

shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds.

G. Other Control Functions

1. The generator set shall be provided with a network communication module to allow Lon Mark compliant communication with the generator set control by remote devices. The control shall communicate all engine and alternator data, and allow starting and stopping of the generator set via the network in both test and emergency modes.
2. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 13VDC or more than 17 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.

H. Control Interfaces for Remote Monitoring:

1. The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown, (4) load shed command.
2. A fused 10 amp switched 12VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
3. A fused 10 amp 12VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.
4. The control shall be provided with a direct serial communication link for the Lon Works communication network interface as described elsewhere in this specification and shown on the drawings.

2.1.6 Base:

The engine-generator set shall be mounted on a heavy duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.

2.1.7 Generator Set Auxiliary Equipment and Accessories:

2.1.7.1 Water Jacket Heater

Engine mounted, thermostatically controlled, water jacket heater for each engine. The heater shall be sized as recommended by the generator set manufacturer. Heater voltage shall be 120 VAC. Provide proper power

supply circuits for the heater as required for the voltage and load of the heater, connected to a normally served distribution circuit.

2.1.7.3 Exhaust Silencer

Exhaust muffler shall be provided for each engine, size and type as recommended by the generator set manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed prior to shipment by the manufacturer. Silencer shall be inside the housing, Silencers on the enclosure roof are NOT Acceptable.

2.1.7.4 Starting and Control Batteries

Starting battery bank, lead acid type, 12 volt DC, sized as recommended by the generator set manufacturer, shall be supplied for each generator set with battery cables and connectors.

2.1.7. Generator Set Main Circuit Breaker

Generator main circuit breaker: set-mounted and wired, UL listed, molded case type, rated at 150 amps, 3 pole, 600 volts. Submittals shall demonstrate that the circuit breaker provides proper protection for the alternator by a comparison of the trip characteristic of the breaker with the thermal damage characteristic of the alternator. Field circuit breakers shall not be acceptable for generator overcurrent protection.

2.1.7. Weather-Protective Housing

The generator set housing shall be provided factory-assembled to generator set base and radiator cowling. Housing shall provide ample airflow for generator set operation. The housing shall have hinged side-access doors and rear control door. All doors shall be lockable. All sheetmetal shall be primed for corrosion protection and finish painted using a Powder Coat Paint process with the manufacturer's standard color; standard painting systems are NOT acceptable. Provide oil and coolant drain extension with shut off valve to the exterior of the enclosure.

2.2 Transfer Switch Equipment:

Part 2. PRODUCTS

2.01 Power Transfer Switch

A. Ratings

1. The automatic transfer switch shall be a Cummins/Onan OTEC-225, 3 pole, 4 wire, 120/208, 3 phase, in a Nema 4 cabinet. The switch shall have a minimum withstand rating of 30,000 amps @ 600 volt.

2. Main contacts shall be rated for 600 Volts AC minimum.
3. Transfer switches shall be rated to carry 100 percent of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C, relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000M).
4. Transfer switch equipment shall have withstood and closing ratings (WCR) in RMS symmetrical amperes greater than the available fault currents shown on the drawings. The transfer switch and its upstream protection shall be coordinated. The transfer switch shall be third party listed and labeled for use with the specific protective device(s) installed in the application.

B. Construction

1. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the source 1 and source 2 positions. The transfer switch shall be specifically designed to transfer to the best available source if it inadvertently stops in a neutral position.
2. Transfer switches rated through 1000 amperes shall be equipped with permanently attached manual operating handles and quick-break, quick-make over-center contact mechanisms. Transfer switches over 1000 amperes shall be equipped with manual operators for service use only under de-energized conditions.
3. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
4. Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism.
5. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with line voltage components.
6. Transfer switches designated on the drawings as 4-pole shall be provided with a switched neutral pole. The neutral pole shall be of the same construction and have the same ratings as the phase poles. All poles shall be switched simultaneously using a common crossbar. Equipment using overlapping neutral contacts is not acceptable.
7. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

C. Connections

1. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.
2. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the generator set.

2.02 Enclosure

- A. Enclosures shall be UL listed. The enclosure shall provide NEC wire bend space. The cabinet door shall be key-locking.
- B. Transfer switches shall be mounted in enclosures of the types as designated on the drawings. Separate enclosures shall be the NEMA type 4. The cabinet shall provide code-required wire bend space at point of entry as shown on the drawings. Manual operating handles and all control switches (other than key-operated switches) shall be accessible to authorized personnel only by opening the key-locking cabinet door. Transfer switches with manual operating handles and/or non key-operated control switches located on outside of cabinet do not meet this specification and are not acceptable.
- C. Construction
 1. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the source 1 and source 2 positions.
 2. Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism.
 3. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with line voltage components.
 4. Transfer switches shall be 3-pole or 4-pole as shown on the drawings. 3-Pole equipment shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating. 4-Pole equipment shall include a neutral contact mechanism that is sized and designed exactly like the phase contacts, and connected on a common operating bar so that the neutral and phase contacts all operate at the same time.
 5. Enclosures shall be UL tested and NEMA 1 type rated. The enclosure shall provide NEC wire bend space when both sources and the load are

all connected from either the top or bottom of the transfer switch. The cabinet door shall be key-locking.

D. Connections

1. Field control connections shall be made on terminal blocks that are clearly and permanently labeled.
2. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the transfer switch.

2.03 Transfer Switch Control

- A. Solid-state under voltage sensors shall simultaneously monitor both sources. Pick-up and drop-out settings shall be adjustable.
- B. Automatic controls shall signal the engine-generator set to start upon signal from normal source sensor. Solid-state time delay start, adjustable from 0 to 10 seconds (factory set at 3 seconds) shall avoid nuisance start-ups. Battery voltage starting contacts shall be gold-flashed dry type contacts, factory wired to a field wiring terminal block.
- C. The switch shall transfer when the emergency source reaches the set point. Provide a solid-state time delay on transfer, adjustable from 0 to 300 seconds, factory set at 5 seconds.
- D. The switch shall retransfer the load to the normal source after a time delay retransfer, adjustable from 0 to 30 minutes, factory set at 10 minutes. Retransfer time delay shall be immediately bypassed if the emergency power source fails.
- E. Controls shall signal the engine-generator set to stop after a time delay, adjustable from 0 to 10 minutes, and factory set at 5 minutes, beginning on return to the normal source.
- F. The control system shall include field adjustable provisions to control the speed of operation of the transfer switch power contacts. In addition, the control shall include a field-configurable in-phase monitor function that causes the transfer to be initiated only when the sources are in phase. When in-phase transfer is enabled and transfer does not occur within 120 seconds, the control shall automatically transfer the load using delayed transfer.
- G. Provide a field-configurable exercisor clock with provisions for operating the generator set for a test period at 7, 14, 21, or 28-day intervals in either with-load or without-load configuration. Operation time of the generator set shall be field configurable. Exercisor clock functions that require setting the test time by pressing an exercise button at the desired time of exercise (only) shall not be acceptable.
- H. Power for the transfer switch operation shall be derived from the source to which the load is being transferred.

- I. The transfer switch shall be provided with a battery charger for the generator set starting batteries. The battery charger shall be a float type charger rated 2 amps. The battery charger shall include an ammeter for display of charging current and shall have fused DC outputs.

2.04 Front Panel Devices:

Provide control switches mounted on cabinet front for:

- A. Test - Simulates normal power loss to control for testing of generator set. Controls shall provide for a test with or without load transfer.
- B. Override - Momentary position to override retransfer time delay and cause immediate return to normal source, if available.
- C. Provide LED-type switch position and source available indicator lamps on the front of the transfer switch cabinet.

2.05 Control Interface

- A. The transfer switch will provide an isolated relay contact for starting of a generator set. The relay shall be normally held open, and close to start the generator set.
- B. Provide one set Form C auxiliary contacts, operated by transfer switch position, for remote indication of transfer switch position. Contacts shall be rated 10 amps at 250 VAC.

2.06 Enclosure

- A. The cabinet door shall be key-locking.
- B. Transfer switch equipment shall be provided in a NEMA 4 or better enclosure, as indicated on the drawings or by the installation location.
- C. The cabinet shall provide code-required wire bend space at point of entry as shown on the drawings. Manual operating handles shall be accessible to authorized personnel only by opening the key-locking cabinet door. Transfer switches with manual operating handles located on outside of cabinet do not meet this specification and are not acceptable.

Part 3. OPERATION

3.01 Open Transition Sequence of Operation

- A. Transfer switch normally connects an energized utility power source (source 1) to loads and a generator set (source 2) to the loads when normal source fails. The normal position of the transfer switch is source 1 (connected to the utility), and no start signal is supplied to the genset.
- B. Generator Set Exercise (Test) With Load Mode. The control system shall be configurable to test the generator set under load. In this mode, the transfer switch shall control the generator set in the following sequence:

- C. Transfer switch control shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator (test).
 - 1. When the control systems senses the generator set at rated voltage and frequency, it shall operate to connect the loads to the generator set by opening the normal source contacts, and closing the alternate source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.
 - 2. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period, the transfer switch shall automatically reconnect the generator set to the normal service.
 - 3. On completion of the exercise period, the transfer switch control shall operate to connect the loads to the normal source by opening the alternate source contacts, and closing the normal source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.
 - 4. The transfer switch shall operate the generator set unloaded for a cool down period, and then remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.
- D. Generator Set Exercise (Test) Without Load Mode. The control system shall be configurable to test the generator set without transfer switch load connected. In this mode, the transfer switch shall control the generator set in the following sequence:
 - 1. Transfer switch control shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.
 - 2. The control system shall operate the generator set unloaded for the duration of the exercise period.
 - 3. At the completion of the exercise period, the transfer switch control shall remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

Part 4. OTHER REQUIREMENTS

4.01 Factory Testing. The transfer switch supplier shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be available on request. Test process shall include calibration of voltage sensors.

4.02 *Execution*

4.03 *Installation:*

Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.

Equipment shall be initially started and operated by representatives of the manufacturer.

All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to final testing of the system.

4.04 *Factory Tests:*

Equipment supplied shall be fully tested at the factory for function and performance.

Generator set factory tests on the equipment shall be performed at rated load and rated PF. Generator sets that have not been factory tested at rated PF will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

Transfer equipment factory tests: Each transfer switch supplied shall be factory tested before shipment. Factory tests shall include a complete functional test of the transfer switch controls, including calibration of the voltage sensors.

4.05 *On-Site Acceptance Test:*

The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor.

Installation acceptance tests to be conducted on-site shall include a "cold start" test.

Complete Installation:

- Remove and dispose of old Generator & ATS
- Set new generator on existing concrete pad
- Install new ATS on existing rack
- Connect Conduits and cable, replace cable as needed.
- Install Receptacle for Coolant Heater
- Secure Generator to concrete pad
- Connect Natural Gas Fuel Piping
- Test system with station load

TOWN OF BRANFORD

Bid Proposal Sheet

BID PROPOSAL FOR: Generator and Transfer Switch for Clark Street Pump Station.

IN ACCORDANCE WITH THE INSTRUCTION TO BIDDERS AND SPECIFICATIONS.

WE HEREBY PROPOSE TO FURNISH ALL LABOR AND MATERIALS REQUIRED BY THE CONTRACT DOCUMENTS AS FOLLOWS:

TOTAL DELIVERED PRICE (truck and body) : _____

DATE(S) OF DELIVERY: _____

COMPANY NAME: _____

COMPANY ADDRESS: _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____

DATE: _____ TITLE: _____

BID BOND REQUIRED **NO**

PERFORMANCE BOND REQUIRED **NO**