

COPY NO. _____

**WESTERN AVE PUMP STATION 2 GENERATOR
REPLACEMENT**

**CITY OF SOUTH PORTLAND
SOUTH PORTLAND, MAINE**

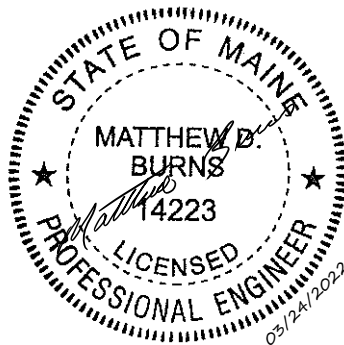
**BIDDING AND CONTRACT REQUIREMENTS
AND SPECIFICATIONS**

MARCH 2022

20654

CITY OF SOUTH PORTLAND
SOUTH PORTLAND, MAINE
BIDDING AND CONTRACT REQUIREMENTS
AND SPECIFICATIONS
FOR
WESTERN AVE PUMP STATION 2 GENERATOR REPLACEMENT

MARCH 2022



Prepared By:

Wright-Pierce
75 Washington Avenue, Suite 202
Portland, Maine 04101
Phone: 207-761-2991

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SECTION 00100
ADVERTISEMENT FOR BIDS
CITY OF SOUTH PORTLAND
SOUTH PORTLAND, MAINE
WESTERN AVE PUMP STATION 2 GENERATOR REPLACEMENT

General Notice

City of South Portland (Owner) is requesting Bids for the construction of the following Project:

Western Ave Pump Station 2 Generator Replacement

Bids for the construction of the Project will be received at the Purchasing Office, South Portland City Hall located at 25 Cottage Road, South Portland, Maine 04106, until Tuesday, April 26th at 2:00 PM local time. At that time the Bids received will be publicly opened and read. Each bidder must submit a single sealed envelope, the outside of which must be clearly marked "Bid for Western Ave Pump Station 2 Generator Replacement (Bid 32-22)".

The Project includes the following Work:

Replacement of the standby power system including natural gas generator, automatic transfer switch, weather protection enclosure, and all associated appurtenances at Western Ave Pump Station 2.

Obtaining the Bidding Documents

The Issuing Office is the Purchasing Office, City of South Portland.

Pre-bid Conference

No pre-bid conference will be held for this project. Contractors are encouraged to visit the site located at 257 Western Avenue, South Portland, Maine prior to bidding. Any contractor wishing to view the project site may contact the Owner directly to set up a time for a site visit.

This Advertisement is issued by:

Owner: City of South Portland

By: Brad Weeks

Title: Water Resource Protection Director

Date: March 28th, 2022

END OF SECTION

SECTION 00410BID FORM FOR CONSTRUCTION CONTRACT

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

Purchasing Office, City of South Portland

25 Cottage Road

South Portland, Maine 04106

Western Ave Pump Station 2 Generator Replacement (Bid 32-22)

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. List of Proposed Subcontractors;
- C. List of Proposed Suppliers;
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- E. Required Bidder Qualification Statement with supporting data;

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

Base Bid Items

- A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum, unit price and allowance items.
- B. Bidder acknowledges that:
 - 1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
 - 2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents (estimated "**").

Item No.	Description	Unit	Quantity	Bid Unit Price	Bid Amount
1	Western Ave Pump Station 2 Generator Replacement	Lump Sum	1	-	\$
Total Base Bid					\$

ARTICLE 4—DELETED

ARTICLE 5—DELETED

ARTICLE 6—TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with the dates indicated in the Agreement.
- 6.02 Deleted.
- 6.03 Deleted.
- 6.04 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7—BIDDER’S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

7.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

7.02 Deleted.

7.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 8—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

8.01 *Bidder’s Representations*

- A. In submitting this Bid, Bidder represents the following:
 1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work, including all American Iron and Steel requirements.

4. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Contract Documents or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
5. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
6. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
7. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
8. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
9. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

8.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

- c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
- d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(typed or printed)

Address for giving notices:

Bidder's Contact:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Phone: _____

Email: _____

Address: _____

Bidder's Contractor License No.: (if applicable) _____

Bidder's EIN/FEIN Number: _____

END OF SECTION

SECTION 00510

NOTICE OF AWARD

Date of Issuance:
Owner: City of South Portland
Engineer: Wright-Pierce
Project: Western Ave Pump Station 2 Generator Replacement
Contract Name:
Bidder:
Bidder's Address:

Owner's Project No.:
Engineer's Project No.: 20654A

You are notified that Owner has accepted your Bid dated _____ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

Western Ave Pump Station 2 Generator Replacement

The Contract Price of the awarded Contract is \$_____. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

Four unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award or has been transmitted or made available to Bidder electronically.

Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner four counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) insurance documentation, as specified in the Agreement.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents.

Owner: City of South Portland
 By (signature): _____
 Name (printed): _____
 Title: _____

Copy: Engineer

END OF SECTION

SECTION 00520AGREEMENT BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between City of South Portland ("Owner") and _____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: Replacement of the standby power system including natural gas generator, automatic transfer switch, weather protection enclosure, and all associated appurtenances at Western Ave Pump Station 2.

ARTICLE 2—THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Western Ave Pump Station 2 Generator Replacement located at 257 Western Avenue, South Portland, Maine.

ARTICLE 3—ENGINEER

- 3.01 The Owner has retained Wright-Pierce ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by Wright-Pierce.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Days*

- A. The Work will be substantially complete within 400* days of the date issued in the Notice to Proceed and completed and ready for final payment within 415* days of the date issued in the Notice To Proceed.

*Substantial and final completion days have been determined assuming a 48-week lead time for an 80-kW natural gas generator. Schedule will be adjusted *if need be* based on updated generator lead time information provided upon order of equipment.

4.03 *Milestones*

- A. The following Interim Milestones shall be met:
1. Interim Milestone 1: Generator to be ordered within one month of signed Agreement
 2. Interim Milestone 2: Generator to be installed within one month of delivery

4.04 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
1. *Substantial Completion*: Contractor shall pay Owner \$250 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
 2. *Completion of Remaining Work*: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$250 for each day that expires after such time until the Work is completed and ready for final payment.
 3. *Milestones*: Contractor shall pay Owner \$250 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Interim Milestone 1 and 2, until Interim Milestone 1 and 2 are achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.
 4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

ARTICLE 5—CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:
- A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment (refer to Specification 00620).

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the last day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
 - a. 90 percent of the value of the Work completed (with the balance being retainage).
 - b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion of the entire construction to be provided under the Contract Documents, Owner shall pay an amount sufficient to increase total payments to Contractor to 98 percent of the Work completed, less such amounts set off by Owner and less 150 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment. The final 2 percent of the value of the Work shall be retained for the one-year Warranty Period established from the date of Substantial Completion.
- C. The City may continue to withhold retainage from Applications for Payment until all required submittals have been provided to the Engineer and approved as required by the Contract Documents.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price as recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

6.04 *Interest*

- A. All amounts not paid when due shall not bear interest.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

1. The Contract Documents consist of all of the following:
 - a. This Agreement
 - b. Bid
2. Insurance Certificates
3. Special Conditions
4. Specifications as listed in the table of contents of the project manual
5. Addenda (numbers __ to __, inclusive).
6. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid
7. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

- a. Notice to Proceed.
 - b. Change Orders.
8. There are no Contract Documents other than those listed above in this Article 7.
9. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Contract Documents or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
 5. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
 6. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
 7. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
 8. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

9. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 9—MISCELLANEOUS

9.01 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.02 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.03 *Severability*

- A. Any provisions or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part *thereof* with a valid and

enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.04 *Insurance*

- A. Provide insurance certificate showing proof of public liability and automotive liability insurance coverage with an insurance company licensed to do business in the State of Maine each in an amount not less than four hundred thousand dollars (\$400,000.00) single limit coverage or such greater amount as may be amended from time to time, and shall also provide such workers' compensation coverage as is required by law.

9.05 *Permits*

- A. Contractor shall be responsible for obtaining road opening and electrical permits, and any other permit required through the City of South Portland and complying with all requirements. The fees for such shall be waived by the City.

9.06 *Actual Damages*

- A. The Contractor shall pay actual damages incurred by Owner for Contractor's failure or neglect and other damaged related thereto.

9.07 *Final Resolution of Disputes*

- A. All claims, disputes, and other matters in question arising out of, or relating to, the Contract Documents or a breach thereof, that cannot be resolved first between the Owner and Contractor shall be settled by litigation in a court of competent jurisdiction. Except as otherwise expressly agreed by the parties in writing, exclusive venue for any civil action shall be in Cumberland County, Maine.

9.08 *Choice of Law*

- A. The Contract Documents shall be construed and enforced in accordance with and governed by the laws of the State of Maine, excluding choice of law principles.

AGREEMENT BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

Owner:

Contractor:

(typed or printed name of organization)

(typed or printed name of organization)

By: _____
(individual's signature)

By: _____
(individual's signature)

Date: _____
(date signed)

Date: _____
(date signed)

Name: _____
(typed or printed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

Address for giving notices:

Designated Representative:

Designated Representative:

Name: _____
(typed or printed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Address:

Phone: _____

Phone: _____

Email: _____

Email: _____

(If [Type of Entity] is a corporation, attach evidence of authority to sign. If [Type of Entity] is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

License No.: _____
(where applicable)

State: _____

END OF SECTION

SECTION 00500NOTICE TO PROCEED

Owner: City of South Portland Owner's Project No.: _____
 Engineer: Wright-Pierce Engineer's Project No.: 20654A
 Contractor: _____ Contractor's Project No.: _____
 Project: Western Ave Pump Station 2 Generator Replacement
 Contract Name: _____
 Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on _____ pursuant with the Agreement.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

The number of days to achieve Substantial Completion is _____ from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of _____; and the number of days to achieve readiness for final payment is _____ from the commencement date of the Contract Times, resulting in a date for readiness for final payment of _____.

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner: City of South Portland
 By (signature): _____
 Name (printed): _____
 Title: _____
 Date Issued: _____
 Copy: Engineer

END OF SECTION

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

APPLICATION FOR PAYMENT

Prepared By



Endorsed By



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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

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Contractor's Application for Payment

Owner: _____	Owner's Project No.: _____
Engineer: _____	Engineer's Project No.: _____
Contractor: _____	Contractor's Project No.: _____
Project: _____	
Contract: _____	
Application No.: _____	Application Date: _____
Application Period: From _____	to _____

1. Original Contract Price	\$	-
2. Net change by Change Orders	\$	-
3. Current Contract Price (Line 1 + Line 2)	\$	-
4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total)	\$	-
5. Retainage		
a. _____ X \$ - Work Completed	\$	-
b. _____ X \$ - Stored Materials	\$	-
c. Total Retainage (Line 5.a + Line 5.b)	\$	-
6. Amount eligible to date (Line 4 - Line 5.c)	\$	-
7. Less previous payments (Line 6 from prior application)		
8. Amount due this application	\$	-
9. Balance to finish, including retainage (Line 3 - Line 4)	\$	-

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:

(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;

(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor: _____

Signature: _____ Date: _____

<p>Recommended by Engineer</p> <p>By: _____</p> <p>Title: _____</p> <p>Date: _____</p>	<p>Approved by Owner</p> <p>By: _____</p> <p>Title: _____</p> <p>Date: _____</p>
<p>Approved by Funding Agency</p> <p>By: _____</p> <p>Title: _____</p> <p>Date: _____</p>	<p>By: _____</p> <p>Title: _____</p> <p>Date: _____</p>

Progress Estimate - Lump Sum Work

Contractor's Application for Payment

Owner: _____	Owner's Project No.: _____
Engineer: _____	Engineer's Project No.: _____
Contractor: _____	Contractor's Project No.: _____
Project: _____	
Contract: _____	

Application No.: _____ Application Period: From _____ to _____ Application Date: _____

A	B	C	D	E	F	G	H	I
Item No.	Description	Scheduled Value (\$)	Work Completed		Materials Currently Stored (not in D or E) (\$)	Work Completed and Materials Stored to Date (D + E + F) (\$)	% of Scheduled Value (G / C) (%)	Balance to Finish (C - G) (\$)
			(D + E) From Previous Application (\$)	This Period (\$)				
Original Contract								
			-			-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
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						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
	Original Contract Totals	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -

Progress Estimate - Lump Sum Work

Contractor's Application for Payment

Owner: _____
Engineer: _____
Contractor: _____
Project: _____
Contract: _____

Owner's Project No.: _____
Engineer's Project No.: _____
Contractor's Project No.: _____

Application No.: _____ Application Period: From _____ to _____ Application Date: _____

A	B	C	D	E	F	G	H	I
Item No.	Description	Scheduled Value (\$)	Work Completed		Materials Currently Stored (not in D or E) (\$)	Work Completed and Materials Stored to Date (D + E + F) (\$)	% of Scheduled Value (G / C) (%)	Balance to Finish (C - G) (\$)
			(D + E) From Previous Application (\$)	This Period (\$)				
Change Orders								
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
		Change Order Totals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Original Contract and Change Orders								
		Project Totals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

SECTION 00810SPECIAL PROVISIONSPART 1 - GENERAL1.1 CONSTRUCTION SEQUENCE

- A. Construction of the work will meet the following sequencing requirements:
1. Submittal Review: No on-site construction will be allowed until individual submittal work items have been reviewed and approved by the Engineer. All submittals shall meet "No Exceptions Taken" or "Make Corrections Indicated" to be considered complete.
 2. Mobilization: Upon approval of the project schedule, Contractor will be allowed to begin mobilization and project coordination work in coordination with the engineer and City at the project start.

1.2 WORKING HOURS

- A. Regular Working Hours shall be 7:00 A.M. to 3:30 P.M., Monday through Friday. If the Contractor or Subcontractors wish to work outside of these hours, written authorization must be obtained in advance from the City of South Portland. Authorization for work from 7:00 P.M. to 9:00 P.M. can be authorized by the Owner's representative with 48 hours advance notice.
- B. Night work from 9:00 P.M. until 7:00 A.M. requires approval by the South Portland City Council. A written request for night work must be submitted by the contractor a minimum of 7 days in advance of the regularly scheduled City Council meeting at which the request is to be considered. No additional payment will be made for night work.
- C. The Contractor shall be responsible for the hourly cost of the Resident's observation of work performed outside of normal working hours.
- D. The Contractor shall not work during holiday weekends without written authorization obtained in advance from the City of South Portland.

1.3 CONTRACTOR STAGING AREAS

- A. City of South Portland-owned property may be available for the contractor's use as a staging area during construction. Restoration of the staging area shall be completed at the end of the project. All costs associated with the use and maintenance of the staging area during construction is incidental to the Contractor's mobilization and no separate payment will be made.

1.4 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall meet the requirements specified in the specifications. Equals shall be considered so long as the Contractor can supply sufficient product material and testing data to show that the equal meets or exceeds the performance data of the product identified on the contract documents. The Engineer will determine if a product is equal.

1.5 OCCUPATIONAL SAFETY AND HEALTH

- A. The Contractor is hereby advised that all work to be furnished to the City shall be performed with equipment, methods, and use of personnel in conformance with the pertinent Occupational Safety and Health Act requirements of the State of Maine and with the regulations for construction as specified by the Department of Labor and Occupational Safety and Health Administration (OSHA) as currently amended.

1.6 COVID-19 SAFETY PROTOCOLS

- A. General – The City of South Portland follows the guidelines set by the Maine Center for Disease Control and Prevention (CDC). All Contractor and Subcontractor personnel shall follow Maine CDC guidelines.
- B. In addition to Maine CDC guidelines, the following safety protocols should be maintained on site:
1. Contractor shall be responsible for collecting all information necessary to conduct contact tracing of Contractor and Subcontractor personnel entering and leaving the project site.
 2. Any person found to not follow the protocols outlined above will be issued a warning for their first violation and banned from the project site after a subsequent second violation.

1.7 SANITARY FACILITIES

- A. The Contractor shall provide self-contained toilet units in sufficient numbers for use of all persons involved in the work.

1.8 UTILITY COORDINATION

- A. The Contractor will be responsible for all utility coordination, protection of existing infrastructure and any damages to existing utilities as a result of the work at no additional cost to the City.
- B. Utility Coordination:
1. The Contractor must exercise every reasonable precaution to prevent damage to Utility Facilities or interruption to utility services known to or discovered by the Contractor. Such precautions must include notice to Utility Companies before undertaking Work that could damage Utility Facilities. The Contractor must provide each Utility Company with notice at least three Business Days before the date a Utility Company will have to support any pole.
 2. The Contractor must take all reasonable precautions to determine the presence of underground Utility Facilities before commencing any excavation Work and must provide all affected Utility Companies with at least 72-hour prior notice of the proposed excavation. The Contractor must comply with 23 M.R.S.A. § 3360-A, entitled "Protection of Underground Facilities," Maine's "Dig Safe" statute.
 3. The Contractor shall ascertain the location of existing utilities and any other necessary information by direct inquiry at the office of the following utility owners. The completeness of this listing is not guaranteed by the City of South Portland:

Electric:
Central Maine Power Company
162 Canco Road
Portland, ME 04103
Attn: Gary Hawkes
(207) 791-1022

Water:
Portland Water District
225 Douglass Street
Portland, ME 04101
Attn: Ned Pierce
(207) 774-5961 x 3043

Telephone:
Consolidated
Communications, Inc.
13 Davis Farm Road
Portland, ME 04103
Attn: Marty Pease
(207) 797-1119

Natural Gas:
Unitil, Inc.
1075 Forest Avenue
Portland, ME 04103
Attn: Kelly Fowler – Municipal Rep
(207) 541-2505

Cable TV:
Spectrum
118 Johnson Road
Portland, ME 04102
Attn: Chip Dean
(207) 415-5286

Sewer:
City of South Portland
111 Waterman Drive
South Portland, ME 04106
Attn: Brad Weeks
(207) 767-7675 x 7581

Portland Pipe Line Corporation
PO Box 2590
South Portland, ME 04116
(207) 767-0419

4. The Contractor agrees to indemnify, defend, and hold harmless the City from and against any and all claims or causes of action arising from any act or omission of the Contractor, the Subcontractors or their respective agents, representatives, or employees for failure to comply with this Section.
- C. Temporary Relocations: The Contractor may request temporary changes of location of Utility Facilities for the Contractor's convenience. The Contractor must satisfy the City that the proposed temporary change will not interfere with the Work, the Work of Utility Companies, or the Work of other Contractors and will not impede the free and safe flow of traffic. If acceptable to the City, the Contractor may make its own request to the Utility Company or other party affected by such temporary changes. The expense and risk of temporary changes will be borne solely by the Contractor; no changes to compensation or time will be made.
- D. No Separate Payment: The cost of all Work related to utility coordination is Incidental to the Contract and no separate payment will be made.

1.9 CONTRACTOR PARKING

- A. The Contractor will be permitted to park onsite at the Pump Station site.
- B. Contractor to ensure City staff have access to pump station at all times.

END OF SECTION

SECTION 00920

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: City of South Portland
Engineer: Wright-Pierce
Contractor:
Project: Western Ave Pump Station 2 Generator Replacement
Contract Name:

Owner's Project No.:
Engineer's Project No.: 20654A
Contractor's Project No.:

This Preliminary Final Certificate of Substantial Completion applies to:
 All Work The following specified portions of the Work:

Date of Substantial Completion: _____

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: None As follows:

Amendments to Contractor's Responsibilities: None As follows:

The following documents are attached to and made a part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By (signature): _____
Name (printed): _____
Title: _____

END OF SECTION

SECTION 00937

CONTRACTOR'S AFFIDAVIT

STATE OF MAINE

COUNTY OF CUMBERLAND

Before me, the undersigned, a _____

(Notary Public, Justice of Peace, Alderman)

in and for said County and State personally appeared, _____

(Individual, Partner or duly

_____ who being duly sworn according to law

(Authorized Representative of Corporate Contractor)

deposes and says that the cost of all the Work, and outstanding claims and indebtedness of whatever nature arising out of the performance of the contract between

(Owner)

and _____ of _____

(Contractor)

dated _____ for the construction of the _____

(Agreement Date)

(Project)

_____ and necessary appurtenant installations have been paid in full.

(Individual, Partner, or duly authorized representative of corporate contractor)

Sworn to and subscribed before me

This _____ day of _____, 20____

END OF SECTION

SECTION 00938CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that _____
 _____ (Contractor)
 of _____, County of _____ and State of _____
 do hereby acknowledge that _____ has this day had, and received of
 _____ (Contractor)
 and from _____ the sum of One Dollar and other valuable considerations in
 _____ (Owner)
 full and complete satisfaction and payment of all sums of money owed, payable and belonging to
 _____ by any means whatsoever, for on account of a Contract
 _____ (Contractor)
 Agreement between _____ and _____
 _____ (Owner) _____ (Contractor)
 dated _____ for _____
 _____ (Agreement Date) _____ (Project)

NOW, THEREFORE, the said _____
 _____ (Contractor)

(for myself, my heirs, executors and administrators) (for itself, its successors and assigns)
 do/does, by these presents remise, release, quit-claim and forever discharge _____
 _____ (Owner)
 , of and from all claims and demands, arising from or in connection
 with the said contract dated _____, and of and from all, and all manner of action
 _____ (Agreement Date)
 and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of
 money, accounts, reckonings, bonds, bills, specialties, covenants, contracts, agreements,
 promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in
 law or equity, or otherwise, against _____ its successors and assigns, which (I,
 _____ (Owner)
 my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or
 which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can,
 shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the
 beginning of recorded time to the date of these presents.

IN WITNESS WHEREOF, _____
(Contractor)

has caused these presents to be duly executed this _____ day of _____ 20_____

Signed, Sealed and Delivered in the presence of:

(Individual -Contractor) (seal)

(Partnership - Contractor) (seal)

_____ By _____ (seal)
(Partner)

Attested:

(Corporation)

_____ By _____
(Secretary) (President or Vice President)

(Corp. Seal)

END OF SECTION

SECTION 00941

CHANGE ORDER NO.: [Number of Change Order]

Owner: City of South Portland
 Engineer: Wright-Pierce
 Contractor:
 Project: Western Ave Pump Station 2 Generator Replacement
 Contract Name:
 Date Issued:

Owner's Project No.:
 Engineer's Project No.: 20654A
 Contractor's Project No.:
 Effective Date of Change Order:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments:

Change in Contract Price	Change in Contract Times [as days or dates]
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. [Number of previous CO]: \$ _____	[Increase] [Decrease] from previously approved Change Orders No.1 to No. [Number of previous CO]: Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: \$ _____	[Increase] [Decrease] this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

<p>Recommended by Engineer (if required)</p> <p>By: _____ Title: _____ Date: _____</p> <p style="text-align: center;"><u>Authorized by Owner</u></p> <p>By: _____ Title: _____ Date: _____</p>	<p>Accepted by Contractor</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: center;"><u>Approved by Funding Agency (if applicable)</u></p> <p>_____</p> <p>_____</p> <p>_____</p>
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END OF SECTION

SECTION 01010SUMMARY OF WORKPART 1 - GENERAL1.1 DESCRIPTION

Work Included: Replacement of the standby generator at Western Ave Pump Station 2 located at 257 Western Avenue, South Portland, Maine. The major proposed work under this Contract includes:

1. Furnish to the project site a new 80 kW natural gas generator and all associated appurtenances. Generator shall be installed by Owner.
 2. Furnish a new Automatic Transfer Switch (ATS) and all associated appurtenances. ATS shall be installed by Owner.
 3. ATS shall be configured by the manufacturer's authorized representative.
 4. Provide startup and testing of the Generator and ATS per Section 16620N.
 5. Other appurtenances as specified herein.
- B. Related Work Specified Elsewhere:
1. Special Provisions: Section 00810
 2. Standby Power System – Natural Gas: Section 16620N

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION3.1 WORK SEQUENCING AND COORDINATION

A. Coordination:

1. Coordinate with Engineer and Owner's Operations staff.
2. Ensure the facilities are maintained and remain in service at all times unless otherwise noted or approved by the Owner.
 - a. Obtain written approval of the Engineer and Owner for shutdowns (if any). Notify the Engineer a minimum of two weeks prior to any required shutdowns.
 - b. If a shutdown is required, prepare a Shutdown Plan for each requested shutdown indicating what existing valves or gates must be operated by Owner personnel during the shutdown.
 - c. Coordinate Work with the Owner and provide public notice, as required.
3. Maintain access to facilities for the Owner.

END OF SECTION

SECTION 01150MEASUREMENT AND PAYMENTPART 1 - GENERAL1.1 DESCRIPTION

- A. For lump sum items, payment shall be made to the Contractor in accordance with an accepted Progress Schedule and Schedule of Values on the basis of actual work completed.

1.2 SCOPE OF PAYMENT

- A. The Contractor shall accept compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer, and for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the work as herein authorized.
- B. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

- A. When alterations in the quantities of work not requiring supplemental agreements, as hereinbefore provided for, are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.4 OMITTED ITEMS

- A. Should any items contained in the bid form be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.5 PARTIAL PAYMENTS

- A. Partial payments shall be made monthly as the work progresses.

1.6 PAYMENT FOR MATERIAL DELIVERED

- A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used, and have been delivered to the construction site or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the Agreement.

- B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures or other work of any kind which are not a permanent part of the Contract.

1.7 FINAL PAYMENT

- A. The Engineer will make, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the Work performed and the value of such Work. Owner shall make final payments of the sum found due less retainages subject to the provisions of the Agreement.

1.8 INCIDENTAL WORK

- A. Incidental work items for which separate payment is not made include (but are not limited to) the following items:
 1. Coordination with the Owner, Utilities and others, including related inspection cost
 2. Project record documents
 3. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents
 4. Temporary utilities for construction and to maintain existing service during construction
 5. Quality assurance testing
 6. Visits to the Project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required
 7. On-site and other facilities acceptable to Engineer for the storage of materials, supplies and equipment to be incorporated into the Work
 8. Facilities start-up and testing services required by the Contract Documents
 9. Construction administration and insurance

1.9 DESCRIPTION OF PAY ITEMS

- A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
- B. Each lump sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

(1) Western Ave Pump Station 2 Generator Replacement

- A. Method of Measurement: Payment of the lump sum amount shall be full compensation for furnishing all labor, materials, tools and equipment required for placing into service the generator at the Western Ave Pump Station 2, complete as specified and all its' appurtenances in its entirety, except that work included for payment under other items.
- A. Basis of Payment: Payment for this item shall constitute full compensation for all materials, equipment, services, and construction inherent to the Work, including but not limited to, startup and testing, and all appurtenant work needed for complete and operational systems, as specified.

END OF SECTION

SECTION 01200PROJECT MEETINGSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Owner will conduct project meetings throughout the construction period.
- B. Related work described elsewhere: The Contractor's relations with his subcontractors and materials suppliers and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings content.

1.2 QUALITY ASSURANCE

- A. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.3 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Owner at least 24 hours in advance of project meetings regarding all items to be added to the agenda.
- B. Minutes: The Owner will compile minutes of each project meeting and will furnish a copy to the Contractor. The Contractor may make and distribute such other copies as he wishes.

PART 2 - PRODUCTS

(No products are required in this Section.)

PART 3 - EXECUTION3.1 MEETING SCHEDULE

- A. The following meetings shall be held for the project:
 - 1. Preconstruction Meeting
 - 2. Pre-delivery Meeting – To be held prior to delivery of generator
 - 3. Pre-Startup and Testing – To be held after installation of generator and ATS, prior to manufacturer's representative arriving on site for start-up and testing
- B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

- A. Meetings will be held virtually. Owner will host the meetings via Microsoft Teams. All required meeting attendees are responsible for providing hardware necessary to view, share, be heard and hear content of the meeting.

3.3 PRECONSTRUCTION MEETING

- A. Preconstruction meeting will be scheduled within twenty days after the Effective Date of the Agreement, but before the Contractor starts work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Owner will advise other interested parties and request their attendance.
- B. Minimum agenda: Distribute data on, and discuss:
 - 1. Identification of key project personnel for Owner, Engineer, Contractor.
 - 2. Responsibilities of Owner, Engineer, Contractor.
 - 3. Channels and procedures for communications.
 - 4. Construction schedule, including sequence of critical work.
 - 5. Contract Documents, including distribution of required copies of original documents and revisions.
 - 6. Processing of Shop Drawings and other data submitted to the Engineer for review.
 - 7. Processing of field decisions and Change Orders.
 - 8. Rules and regulations governing performance of the Work.
 - 9. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

END OF SECTION

SECTION 01340SUBMITTALSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included:
 - 1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.
- B. Related Work Specified Elsewhere:
 - 1. Project Record Documents: Section 01720
- C. Submittals: This project shall utilize:
 - 1. Submittals – Electronic via Email/FTP with Hard Copy for Record
 - a. The Contractor shall submit to the Engineer an electronic submittal of shop drawings and O&M Manuals in portable document format (PDF) transmitted via email or file transfer protocol (FTP). The Engineer shall return an electronic PDF of the submittal review comments to the Contractor for distribution to subcontractors, suppliers and manufacturers. The electronic submittals shall serve as the electronic record of the project.
 - b. In addition, completed shop drawings and completed operations and maintenance (O&M) manuals shall be provided in hard copy (paper) format, for the record, in accordance with the following requirements.
 - i. Shop drawings and O&M manuals shall be considered “completed” once an action code of “0” or “1” has been attained, as specified below, unless otherwise directed by the Engineer.
 - ii. Once completed, the Contractor shall provide two hard copy sets (for Owner).
 - iii. Hard copy submittals shall be updated on a monthly basis, for those submittals completed during the preceding month.

1.2 SHOP DRAWINGS

- A. Shop Drawings are required for each and every element of the work.
- B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.
- C. The Contractor shall provide a completed Contractor Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.
 - 1. Each shop drawing submittal shall include a complete copy of the relevant specification section markup up to reflect “compliance” or “deviation” on an item-by-item basis.

- D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal. An exception to this requirement are shop drawings for reinforcing steel, miscellaneous metals and structural steel, which shall be submitted separately for each structure unless otherwise permitted by the Engineer.
- E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.
- F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.
- G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.
- H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.
- I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.
- J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.
- K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.
- L. A maximum of two submissions of each Shop Drawing will be reviewed, checked,

and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two submission limit.

- M. Shop Drawings that include drawings or other material that is illegible or too small may be returned without review.

1.3 OPERATION AND MAINTENANCE MANUALS

- A. Operation and Maintenance (O&M) Manuals are required for certain elements of the project, as specified herein.
- B. The Contractor shall provide a completed Operation and Maintenance Manual Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every Manual and signed by the Contractor and Manufacturer.
- C. Each hard copy of an O&M Manual shall be provided in a stand-alone binder or shall be suitable for insertion into a 3-ring binder. Include the General Contractor's and Manufacturer's representative's contact information on the front cover. O&M manuals must be appropriate for the project and customized for the project. If a Manufacturer's standard O&M manual is included in the submittal, all non-applicable content must be removed or crossed out.
- D. O&M Manuals shall contain the following operational information:
 - 1. Safety Precautions: List personnel hazards, equipment or product safety precautions for all operating conditions.
 - 2. Operator Prestart: Include all procedures required to set up and prepare each system, equipment or component for use.
 - 3. Startup Procedures: Provide a narrative description for all startup operating procedures, include all control sequences.
 - 4. Shutdown Procedures: Provide a narrative description for all shutdown operating procedures, include all control sequences.
 - 5. Post-Shutdown Procedures: Provide a narrative description for all post-shutdown operating procedures, include all control sequences.
 - 6. Normal Operating Procedures: Provide a narrative description of normal operating procedures. Include control diagrams with data to explain operation and control of systems and specific equipment.
 - 7. Emergency Operations: Include emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency shutdown instructions for fire, explosion, spills, or other foreseeable

- contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.
8. Operator Service Requirements: Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, alignment, spare parts installation and gage reading or recording.
 9. Environmental Conditions: Include a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which the equipment should not be allowed to run.
- E. O&M Manuals shall contain the following maintenance information:
1. Lubrication Data: Include a table showing recommended lubricants for specific temperature ranges and applications. Also, include charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, capacities and a lubrication schedule showing service interval frequency
 2. Preventative Maintenance Plan: Include the manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation as well as to ensure minimization of corrective maintenance and repair. Provide the manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide the manufacturer's specified frequency and procedures for each separate operation.
 3. Troubleshooting Guides: Include recommendations on procedures and instructions for correcting problems and making repairs. Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.
 4. Wiring and Control Diagrams: Provide Wiring diagrams and control diagrams. All diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to the actual installation numbering.
 5. Maintenance and Repair Procedures: Include instructions and list the tools required to restore products and/or equipment to proper conditions or operating standards.
 6. Removal and Replacement Instructions: Include step-by-step procedures, list required tools/supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.
 7. Spare Parts and Supply Lists: Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration shall be required for facilities at

- remote locations. List spare parts and supplies that have a long lead times to obtain.
8. Corrective Maintenance Work Hours: Include the manufacturer's projection of corrective maintenance work-hours including craft requirements by type of craft. Corrective maintenance that requires participation of the equipment manufacturer shall be identified and tabulated separately.
- F. O&M Manuals shall contain the following additional information:
1. Parts Identification: Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirements to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items.
 - a. When illustrations omit a part number and description, both the illustration and a separate listing shall show the index, reference, or key number which shall cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice.
 2. Warranty Information: List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force. Include warranty information for all primary components included in product systems.
 3. Personnel Training Requirements: Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.
 4. Testing and Special Tools: Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.
 5. Contractor Information: Provide a list that includes the name, address, and telephone number of the General Contractor and each subcontractor installing the respective product or equipment. Include local representatives and service organizations most convenient to the project site. Provide the name, address, and telephone number of the product or equipment manufacturers.
 6. Written confirmation from the manufacturer that the Contractor has coordinated the equipment One Year Service Call in accordance with specification Sections 15120 and 15124.

1.4 MANUFACTURER'S CERTIFICATES

- A. Prior to accepting the installation, the Contractor shall submit manufacturer's certificates for each item specified.
- B. Such manufacturer's certificates shall state that the equipment has been installed under either the continuous or periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the

manufacturer's authorized representative, and that it is operating in accordance with the specified requirements, to the manufacturer's satisfaction. All costs for meeting this requirement shall be included in the Contractor's bid price.

1.5 SUBMISSION REQUIREMENTS

- A. Accompany submittals with a transmittal cover sheet, containing:
1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
 - a. Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).
 - b. Under limited situations when additional different pieces of equipment are submitted under the same specification section, those submittals shall be numbered sequentially (e.g. 05500-01, 05500-02, 05500-03, etc.).
 - c. Resubmittals shall include an alphabetic suffix after the corresponding sequential number (e.g., 16000-01A).
 - d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters "OM", another dash, and then a sequential number beginning with 01 (e.g. 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g. 16000-OM-01A).
 5. Notification of deviations from Contract Documents.
 6. Other pertinent data.
- B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
1. Project name
 2. Specification Section and sequential number with alphabet suffix for resubmittal
 3. Description
 4. Identification of deviations from Contract Documents.
 5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.
 6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
 7. Where specified, manufacturer's guarantee.
- C. Additional Requirements for Electronic Submittals:
1. Each individual shop drawing or O&M submittal shall be contained in one PDF.
 2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
 3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
 4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
 5. The electronic PDF shall be configured such that is fully searchable.

6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

1.6 RESUBMISSION REQUIREMENTS

- A. Revise initial submittals as required and resubmit as specified for initial submittal.
- B. Indicate on submittals any changes which have been made other than those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer. If relabeling of individual pieces or assemblies has taken place, the labels from the previous submittal shall be indicated to assist in comparing the original and resubmitted shop drawing.
- C. All resubmittals shall include a summary of the previous submittal review comments with the vendors' written response as to how the previous comments were addressed.

1.7 ENGINEER'S REVIEW

- A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
- B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
 1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.
 2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the Contractor, unless otherwise notified in writing prior to execution of the relevant work.
 3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of review comments. Remarks will explicitly list what information needs to be resubmitted. Resubmittal from the Contractor should include a cover letter or summary which indicates how each review comment has been addressed. **This action code will not be used, or will be sparingly used, for electronic submittals.**
 4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted, but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter

which indicates how each review comment has been addressed and where to find the information in the resubmittal.

5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
6. In Review (Status 5 on shop drawing log). The shop drawing is currently under review.
7. For Information Only (Status 6 on shop drawing log). The shop drawing review was for information only.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

SHOP DRAWING NUMBER:	SPECIFICATION SECTION OR DRAWING NO:	SEQUENTIAL NUMBER (& ALPHA SUFFIX FOR RESUBMITTAL)
----------------------------	---	--

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

- NO DEVIATIONS
- or
- A COMPLETE LIST OF DEVIATIONS AS FOLLOWS^a:

By: _____ By: _____

Contractor^b

Manufacturer^c

Date: _____ Date: _____

a Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.

b Required on all submittals

c When required by specifications Page ___ of ___

General Contractor's Stamp

OPERATIONS AND MAINTENANCE MANUAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

	- OM -	
O&M NUMBER:	SPECIFICATION SECTION OR DRAWING NO:	SEQUENTIAL NUMBER (& ALPHA SUFFIX FOR RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced operations and maintenance manual has been reviewed by the undersigned and I/we certify that the manual is customized as needed for this project, is suitable for mounting in a 3-ring binder, and contains the following items:

- | | |
|--|--|
| <input type="checkbox"/> Table of Contents | <input type="checkbox"/> Project-Related Design Data |
| <input type="checkbox"/> Contractor and Manufacturer Contact Information | <input type="checkbox"/> Serial Numbers |
| <input type="checkbox"/> Preventative Maintenance Schedule and Summary | <input type="checkbox"/> Maintenance and Repair Procedures |
| <input type="checkbox"/> Removal and Replacement Instructions | <input type="checkbox"/> Wiring and Control Diagrams |
| <input type="checkbox"/> Lubrication Schedule | <input type="checkbox"/> Equipment Drawings & Schematics |
| <input type="checkbox"/> Troubleshooting Information | <input type="checkbox"/> Equipment Performance Curves |
| <input type="checkbox"/> Warranty Information | <input type="checkbox"/> Parts and Service Contact Information |
| <input type="checkbox"/> Rebuild Information for All Components | <input type="checkbox"/> Manufacturer's Contact Information |
| <input type="checkbox"/> Startup, Operation and Shutdown Procedures | <input type="checkbox"/> Emergency Operations Plan |
| <input type="checkbox"/> Normal and Emergency Operations | <input type="checkbox"/> List of All Component Part Numbers |
| <input type="checkbox"/> Safety Procedures and Precautions | <input type="checkbox"/> List of Spare Parts Supplied |
| <input type="checkbox"/> Shop Drawings corrected to As-Built Conditions | <input type="checkbox"/> Testing Equipment & Special Tools |
| <input type="checkbox"/> Personnel Training Requirements | <input type="checkbox"/> Other System Specific Information |

By: _____ By: _____
Contractor^a Manufacturer^b

Date: _____ Date: _____

^a Contact information shall include name, address and telephone number.

^b Required on all Operation and Maintenance Manuals.

^c When required by Specifications. Page ___ of ___

General Contractor's Stamp

SECTION 01370SCHEDULE OF VALUESPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Provide a detailed breakdown of the Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

B. Related Work Specified Elsewhere:

1. Section 00810 – Special Provisions
2. Section 00620 – Contractor’s Application for Payment
3. Section 01340 – Submittals

1.2 QUALITY ASSURANCE

A. Use required means to assure arithmetical accuracy of the sums described.

- B. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer substantiating the sums described.

1.3 SUBMITTALS

A. The proposed schedule of values (hereinafter referred to as “SOV”), meeting the requirements outlined below, shall be submitted to the Engineer for review. The SOV shall be used as the basis for reviewing and approving payment requisitions along with determining percentages of work completed. No payment requisitions will be processed until the Engineer has taken no exceptions to the schedule of values.

- B. The SOV shall consist of a detailed breakdown of all the work within the Contract Documents, as specified herein, and shall include a sufficient number of work items to serve as an accurate basis the General Contractor’s Application for Payment. Each work item shall include its prorated share of overhead and profit and subcontractor markup. The breakdown shall provide the level of detail outlined below.

1. General Conditions:

- a. Includes all work indicated in all specifications within Division 0 and 1.

2. Electrical:

- a. Includes all work indicated in specification 16620N.

- b. Breakdown by overall utility service, power distribution, building and structures, startup and commissioning.

3. Line items shall be broken down into work performed by the General Contractor or a Subcontractor.

4. Provide an aggregate percentage completed calculation for each major subcontractor (e.g., site, electrician, etc.).

5. If a work item, or series of work items, are separated into construction phases which will require phased payments, the SOV shall have separate line-item values for each phase.

END OF SECTION

SECTION 16620NSTANDBY POWER SYSTEM - NATURAL GASPART 1 - GENERAL1.1 DESCRIPTION

A. Provide a complete standby power system which shall be located at the existing Western Avenue No. 2 Pump Station. The system shall be a factory built, prototype tested, production tested, field tested, complete and operable emergency/standby electric generating system, including all devices and equipment specified herein, and/or as required for the service. Materials and equipment shall be new and current, delivered to the site completely wired, tested, and ready for installation. This system shall include the following:

1. An outdoor natural gas engine driven electric plant to provide standby electric power.
2. Engine-generator control console resiliently mounted on the generator set shall include complete engine start-stop control and monitoring system.
3. Starting batteries with battery charger for each engine-generator set.
4. Automatic load transfer controls to provide automatic starting and stopping of the electric plant and switching of the load shall be furnished by the generator supplier. Refer to specific requirements and specifications noted within this section. Mounted and loose accessories, control devices, and other equipment as specified.
5. Such other components, accessories, parts, tests, documents, and services, as needed to meet the performance requirements of this specification.
6. Start-up services for the entire standby power system as specified herein including the testing, operation, and settings for a new automatic transfer switch as specified. The owner presently has an existing Generac Model 97A00843-W, 300A, automatic transfer switch. The existing wall space for the installation of the new transfer switch is limited. Therefore, the width of the new automatic transfer switch cannot exceed 30 inches wide.
7. Both the generator load bank testing and the final building load testing shall be provided as specified herein.
8. The owner shall be responsible to take delivery of the entire standby system. The system supplier shall be responsible for delivery to the site. The owner shall be responsible for off-loading and setting the unit in place with direction and advice from the system supplier. The system supplier is responsible to coordinate all work and scheduling with the owner.
9. The system supplier is responsible to coordinate the required natural gas pressure requirements and volume with the owner prior to final approval of the entire standby system. The system supplier is responsible to provide the following equipment and devices for this entire standby system:
 - a. Fuel Solenoid Valve
 - b. Fuel gas regulator required for proper standby system fuel delivery, pressure requirements and operation.

- c. The existing gas piping to the new generator is 1.25" diameter pipe.
 - d. The existing pressure delivery is 2 psig.
- 10. All necessary interconnecting wiring and connections to provide proper system operation. Owner to coordinate branch circuits requirements with the type of service provided by the generator set manufacturer.
- 11. The new outdoor weather-protected standby generator and enclosure will be installed outdoors adjacent to the existing pump station. The generator supplier shall coordinate existing conditions regarding fuel supply, conduit and wiring, exhaust discharge, offset distances from existing building to meet code requirements, and concrete pad sizing with the owner for final installation and layout.
- B. This equipment, including engine-generator sets, shall be manufactured by Cummins, Caterpillar, or Kohler.
 - 1. The electric generating system described herein, including these components, shall be factory built, factory tested, and shipped by this single manufacturer, so there is one source of supply and responsibility for warranty, parts, and service. This manufacturer shall have a representative based within 150 miles of the installation site who can provide factory trained servicemen on a 24-hour per day basis, the required stock of replacement parts, and any technical assistance required.
 - 2. Separate manufacturers for the engine-generator set and the automatic load transfer controls will be acceptable providing that the equipment is fully tested together before shipment and the engine-generator set manufacturer is the source of supply and responsibility for warranty, parts and service.
 - 3. The responsibility for performance to this specification in its entirety cannot be split up among individual suppliers of components comprising the system but must be assumed solely by the supplier of the system. The manufacturer shall furnish schematic and wiring diagrams for the engine-generator set(s).
 - 4. All controls shall be the standard of the manufacturer who is engaged in the manufacture of generators and has them available for sale on the open market. Control parts shall be identified by part numbers of this manufacturer and shall have second source listing where applicable. Control systems that are supplied by a sub-vendor or subcontractor of the vendor and not incorporated within the documentation drawings of the generator manufacturer are not acceptable.
 - 5. Complete load bank testing, building load testing, sound level testing and system equipment check-out will be required to be performed as part of the overall acceptance of this equipment.
- C. The automatic load transfer controls and equipment is to be provided as new equipment as specified. The system supplier is responsible to set, operate and adjust all system parameters for testing the controls with the new standby power system. Automatic load transfer control shall be installed in a separate enclosure located within the pump station, as specified within this Section.

1.2 QUALITY ASSURANCE

- A. The electric generating system must meet all requirements of NFPA 110 (Level 2) including design specifications, prototype tests, one-step full-load pickup, and installation acceptance.

- B. The performance of the electric plant shall be certified by the manufacturer verifying the electric plant's full power rating, stability, and voltage and frequency regulation.
- C. The complete standby power system configuration, start-up and operating instructions shall be performed under the supervision of a factory-trained engineer/representative of the system manufacturer.
- D. Acceptable Manufacturers:
 - 1. Electric Plant:
 - a. Cummins Power Generation
 - b. Caterpillar
 - c. Kohler
 - 2. Automatic Load Transfer Controls:
 - a. Cummins Power Generation
 - b. Caterpillar
 - c. Kohler
 - 3. The design is based on a Cummins Generator. Acceptable manufactures shall be as listed above. The equipment spacing, mounts, electrical wiring, ventilation equipment, fuel and exhaust components have all been sized and designed around the manufacturer listed.
- E. Service: Replacement parts and factory authorized service shall be available within 24 hours.

1.3 SUBMITTALS TO THE ENGINEER

- A. Provide complete shop drawings for each system and piece of equipment specified, including all auxiliary devices. Shop drawing submittals shall consist of a digital PDF and single hard cover binder with individual index tabs, table of contents and shall include:
 - 1. Complete typewritten description of system operation(s), and ratings, including a listing of all auxiliary devices.
 - 2. Manufacturer's data sheets and detailed dimensioned drawings for all pieces of equipment and auxiliary devices.
 - 3. Complete interconnecting wiring diagrams, cross referenced with project specific equipment designations as indicated in the Contract Documents, indicating all required wiring between the electric plant control panel, the automatic load transfer controls and all auxiliary devices.
 - 4. Independent testing laboratory reports indicating the performance test results of the electric plants including power rating, stability and voltage and frequency regulation.
 - 5. Unless specified otherwise herein, all performance data and other information shall be as on the manufacturer's printed literature. Performance data shall be the result of test procedures in accordance with nationally recognized standards, plus such other procedures that are judged necessary by the manufacturer to ensure maximum service reliability for the emergency system and shall be available for inspection by the Engineer upon request.
 - 6. Equipment supplier shall submit complete detailed step load program and calculations as part of the shop drawing submittal to demonstrate compliance with the motor starting and performance criteria as specified elsewhere in this Section.

7. All testing data sheets for load bank testing results, building load testing and sound level testing shall be submitted for final acceptance.

1.4 TESTING

- A. The intent of this specification is to provide equipment of proven reliability, compatibility and facilitate standardization. Three separate series of tests shall be performed:
 - Factory Prototype Model Tests,
 - Factory Production Model Tests, and
 - Field Tests.
1. Factory Prototype Model Tests: The electric generating system consisting of prime mover, generator, governor, coupling and all controls must have been tested as complete unit on representative engineering prototype model as required by NFPA 110. The tests, being potentially damaging to the equipment tested, must not be performed on equipment to be sold, but on separate prototype models as specified by NFPA 110, and their accomplishment certified by means of documentation of the tests accompanying submittal data. These tests shall have included:
 - a. Maximum power level (maximum kW).
 - b. Maximum motor starting capacity (maximum KVA) and voltage dip recovery within seven (7) cycles of applied load.
 - c. Structural soundness (Short-Circuit and Endurance Tests).
 - d. Torsiograph Analysis: The manufacturer of the engine-generator set shall verify that the engine-generator combination, as configured, is free from harmful torsional stresses. The analysis shall include correlation of empirical data from tests on a representative prototype unit. The empirical data must include spectrum analysis of the torsional transducer output within the critical speed range of the engine-generator set. Results of this analysis shall be made available to the specifier on request. Calculations based on engine and generator separately are not acceptable.
 - i. Engine-generator cooling and combustion air requirements.
 - ii. Transient response and steady-state speed control and voltage regulation.
 - iii. Generator temperature rise per NEMA MG1.
 - iv. Harmonic analysis and voltage waveform deviation per MIL-STD-705B.
 - v. Three-phase short-circuit test for mechanical and electrical strength. With system operating at rated Volts, Amperes, power factor, and speed, the generator terminals must be short-circuited ten times on all three phases for a duration of thirty seconds. Engine-generator set must build up and perform normally without manual interventions of any kind such as resetting of circuit breakers or other tripping devices when the short circuit is removed. Circuit breaker minimum AIC Rating: 42,000.
 - e. Failure mode test for voltage regulator: With engine-generator set operating at no load, rated speed and voltage, the AC sensing circuit to the

- regulator must be disconnected for a period of at least one hour. The engine-generator set must be fully operational after the test, and without evidence of damage.
- f. Endurance testing is required to detect and correct potential electrical and mechanical problems associated with typical operation.
2. Factory Production Model Tests: Before shipment of the equipment, the engine-generator set and automatic load transfer controls shall be tested under rated load and power factor for performance and proper functioning of control and interfacing circuits. Automatic load transfer controls shall also be tested alone under rated load if rated load is larger than that of the engine-generator set(s). Testing at unity power factor only (resistance banks only) is not acceptable, since kW output is affected by the higher generator efficiency at unity power factor, and the KVAR for motor starting and regulation loads varies with power factor. Tests shall include:
 - a. Single step load pickup per NFPA 110.
 - b. Transient and voltage dip responses and steady state voltage and speed (frequency) checks. A summary of these test results shall be submitted a minimum of one month before the date of substantial completion.
 3. Field Tests after Installation: After installation the engine generator set and automatic load transfer controls shall be fully tested as specified herein in the presence of the Owner and Engineer. Submit test data and tables for the following:
 - a. Load bank testing.
 - b. Building load testing.
 - c. Sound level testing.
 - d. Owner is responsible to coordinate fuel connection to generator for natural gas feed to unit during testing and for final installation for this project.

1.5 WARRANTY

- A. The complete standby electric power system, including 1800 r/min engine-generator set and transfer switch equipped with set exerciser, and running time meter, shall be warranted for a period of five (5) years or fifteen hundred (1,500) operating hours, whichever occurs first, from the date of Project Substantial Completion. Multiple warranties for individual components (engine, generator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. This warranty shall be detailed in available written documents and shall include all labor, parts and travel to and from fixed installations. In the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.
- B. Service Calls: Equipment supplier shall provide a 6-month Level I and one year Level II service calls on the generator and automatic transfer switch. The Level II Service call shall include a full maintenance check and a change of all fluids and filters.

PART 2 - PRODUCTS

2.1 STANDBY GENERATOR

A. General:

1. This system shall include an engine-generator set meeting or exceeding the minimum ratings as tabulated below, on a continuous standby basis. This equipment shall be furnished and installed as listed below.

Maximum Allowable Starting Voltage Dip	Maximum Allowable Peak Voltage Dip	Maximum Allowable Freq. Dip	Maximum Surge kW Capability	Maximum Surge kVA Capability
20%	20%	10%	Per Manufacturer	Per Manufacturer

KW	KVA	Power Factor	Hz	Volts	Phase/Wire
80	100	0.8	60	480V	3 Phase, 4 Wire

2. The engine generator set shall be capable of reliably starting the connected loads in the order listed in the table below. This shall be accomplished without exceeding the voltage and frequency dip specifications, and without causing unacceptable operation of electrical equipment.

Load Name:	Load Rating (HP / kVA)	Starting Method
<i>Step 1:</i>		
Base Load 1 HVAC	6.25 KVA	FVNR
Base Load 2 Lighting	2.50 KV	N/A
Sewage Pump	35 HP	VFD 6-Pulse

3. The Standby Power System supplier shall have a complete understanding of the loads to be started and operated on emergency power, and the generator shall be properly sized and configured to perform the intended function.
4. 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, whether mounted internally or externally to the set.
5. Gear reduction or gear reduced type generators are not acceptable.
6. The step load program results (both) shall provide a generator sizing which shall not exceed 80 percent loading for the system. Generators submitted which exceed this value will be rejected.

B. Engine:

1. The engine shall be certified to US EPA SI Stationary Emissions Regulations under the provisions of 40CFR Part 16, for Emergency Standby applications only, in effect as of January 2012.
2. Engine shall be Natural Gas fueled.
3. Engine shall be certified by the engine manufacturer as capable of driving a generator yielding a kW rating as specified herein. Engine shall be capable of driving the generator at this rating on a continuous standby basis for the duration

- of normal utility source interruptions per SAE J1349 conditions. De-rating of the generator will not be acceptable.
4. Fuel injection and valves shall not require adjustment while in service.
 5. Maximum ambient air temperature: 122°F.
 6. Engine equipment shall include the following:
 - a. An electric starter(s) as required by the manufacturer.
 - b. Positive displacement, mechanical full pressure lubrication oil pump, full flow lubrication oil filters with replaceable elements and dipstick oil level indicator.
 - c. Replaceable dry element air cleaner.
 - d. Engine speed isochronous electronic governing system to control generator frequency within $\pm 0.25\%$ of rated frequency under steady state load conditions, and capable of parallel operation with load sharing controls.
 - e. Engine protection devices shall have sensing elements located on the engine to initiate the following preliminary alarms and engine shutdowns:
 - i. Low coolant temperature alarm
 - ii. Low lubrication oil pressure alarm
 - iii. High coolant temperature alarm
 - iv. Low lubrication oil pressure shutdown
 - v. High coolant temperature shutdown
 - vi. Overspeed shutdown
 - vii. Overcrank lockout
 - viii. Low coolant level shutdown
 - ix. Loss of fuel pressure to generator alarm
 - x. Selector switch not in auto position alarm contact
 - f. Engine starter battery charging alternator with solid-state voltage regulator.
 - g. Engine-mounted, thermostatically-controlled, water jacket heater(s) for ambient below 40 degrees F, to aid in quick starting for outdoor installation. Heater(s) shall be rated for the proper required outdoor installation.
 7. Cooling System:
 - a. 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 set manufacturer. Exhaust system shall be installed inside of the outdoor weather-protected enclosure. Any exhaust located on outside of the enclosure will be rejected.
 - b. Radiators shall be provided with a duct adapter flange permitting the attachment of air discharge duct directing the discharge of radiator air through the wall.
 8. Engine Exhaust System:
 - a. Exhaust muffler shall be provided for each engine of size as recommended by the set manufacturer. Muffler shall be of the critical type. Provide support for the muffler so its weight is not supported by the engine.

- b. Stainless steel flexible exhaust connection shall be provided as required for connection between engine exhaust manifold and exhaust line, in compliance with applicable codes and regulations.
 - c. All components shall be properly sized to assure proper operation without excessive back pressure, when installed as shown on drawings.
 - d. All parts of engine and generator shall be protected for hot areas being in contact with personnel anywhere on the unit. Provide guards or insulation as required by UL2200 at all "hot" locations of the generator including exhaust manifolds, flexible connections, etc., for a complete installation. Where not recommended or required for this application, the supplier is required to meet all safety and protective requirements of this section for alternative methods.
 - e. Exhaust silencer shall be located inside of the outdoor weather-protected generator enclosure.
9. Engine Fuel System
- a. Provide complete natural gas engine fuel system, including all pressure regulators, strainers, and fuel solenoid control valves. The fuel system shall be plumbed to the generator set skid for ease of site connections to the generator set. A solenoid valve shall be provided to control the flow of fuel. Provide loss of fuel protection and alarm.
 - b. Provide a primary regulator to be shipped loose with the generator and installed by the Owner. This shall be coordinated with the manufacturer and Owner and shall be included when required.
- C. Generator:
- 1. Generator shall be single-bearing, 2/3rd pitch, 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 PMG exciter system. No brushes will be allowed. Telephone influence factor less than 50 per NEMA MG1.
 - 2. Generator shall be directly connected to engine flywheel housing and driven through a flexible coupling to ensure permanent alignment; gear driven generators are not acceptable under this specification.
 - 3. Insulation shall meet NEMA standards for Class H.
 - 4. The maximum alternator temperature rise shall not exceed 105°C above ambient. Generator design shall prevent potentially damaging shaft currents.
 - 5. In order to limit generator voltage distortion caused by harmonic currents, the generator sub-transient reactance shall not exceed 0.12 per unit as calculated by the generator supplier using the generator set base rating.
 - 6. The three-phase, broad range, and reconnectable generator shall have 12 leads brought out to allow connection by user to obtain any of the available voltages for the unit. Refer to connected load tables for specific application.
 - 7. 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 $\pm 1\%$ during steady-state conditions.

- a. 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.
 - b. The voltage regulator shall be insensitive to severe load induced waveshape distortion from SCR or thyristor circuits, such as those used in battery charging (UPS) and motor speed control equipment.
 - c. A rheostat shall provide a minimum of $\pm 5\%$ voltage adjustment from rated value.
8. 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 fastest possible system recovery from transient speed dips. A system that routinely selects a linear-type (straight line) constant volts/hertz characteristic, without regard for the engine power and torque characteristics, will not meet this specification.
 9. PMG Exciter shall be three-phase, full-wave rectified, with heavy-duty silicon diodes mounted on the common rotor shaft and sized for maximum motor starting loads. Refer to connected load tables for specific application.
 10. 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.
- D. Engine-Generator Set Control:
1. 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.
 2. Control Switches
 - a. 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. Provide not in auto contact for remote alarm indication.
 - b. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" pushbutton. Depressing the emergency stop switch shall cause the generator set to immediately shut down and be locked out from automatic restarting.

- c. 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.
 - d. 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.
 3. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:
 - a. Analog voltmeter, ammeter, frequency meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Ammeter and KW meter scales shall be color coded in the following fashion: readings from 0-90% of generator set standby rating: green; readings from 90-100% of standby rating: amber; readings in excess of 100%: red.
 - b. 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-line or line-to-neutral) simultaneously.
 - c. Both analog and digital metering are required. The analog and digital metering equipment shall be driven by a single microprocessor, to provide consistent readings and performance.
 4. Generator Set Alarm and Status Display
 - a. The generator set shall be provided with alarm and status indicating lamps to indicate non-automatic generator status, and existing warning and shutdown conditions. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on an alphanumeric digital display panel:
 - i. low oil pressure (alarm)
 - ii. low oil pressure (shutdown)
 - iii. oil pressure sender failure (alarm)
 - iv. low coolant temperature (alarm)
 - v. high coolant temperature (alarm)
 - vi. high coolant temperature (shutdown)
 - vii. engine temperature sender failure (alarm)
 - viii. low coolant level (alarm or shutdown—selectable)
 - ix. fail to crank (shutdown)
 - x. fail to start/overcrank (shutdown)
 - xi. over speed (shutdown)
 - xii. low DC voltage (battery)(alarm)
 - xiii. high DC voltage (battery)(alarm)
 - xiv. weak battery (alarm)
 - xv. high AC voltage (shutdown)
 - xvi. low AC voltage (shutdown)
 - xvii. under frequency (shutdown)

- xviii. over current (warning)
 - xix. over current (shutdown)
 - xx. short circuit (shutdown)
 - xxi. ground fault (alarm) (optional—when required by code or specified)
 - xxii. overload (alarm)
 - xxiii. emergency stop (shutdown)
 - xxiv. selector switch not in "Auto" (audible alarm)
 - b. 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.
5. Engine Status Monitoring
- a. The following information shall be available from a digital status panel on the generator set control:
 - i. engine oil pressure (psi or kPA)
 - ii. engine coolant temperature (degrees F or C)
 - iii. engine oil temperature (degrees F or C)
 - iv. engine speed (rpm)
 - v. number of hours of operation (hours)
 - vi. number of start attempts
 - vii. battery voltage (DC volts)
 - b. 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.
 - c. Provide auxiliary dry contacts for remote indication for the following:
 - i. Generator Run Status
 - ii. Generator Failure Alarm
 - iii. Generator Warning Alarm
 - iv. Oil Pressure
 - v. Overcrank
 - vi. Sensor Loss
 - vii. Coolant High Temperature
 - viii. Overspeed
 - ix. Low Battery Alarm
6. Engine Control Functions
- a. 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 a 15-second rest period between cranking periods.
 - b. 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.

- c. 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. The governor control shall be suitable for use in paralleling applications without component changes.
 - d. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
 - e. 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 actual failure conditions.
7. Alternator Control Functions
- a. The generator set shall include an 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 malfunctions 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 a threshold of 58 HZ. 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.
 - b. 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 with the requirements of NFPA70.
 - c. 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 with the requirements of NFPA70.
 - d. Controls shall be provided to monitor the kW load on the generator set and initiate an alarm condition (overload) when total load on the generator set exceeds the generator set rating 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.

- e. 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.
 - f. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 12VDC or more than 16 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and if DC voltage drops to less than 8 volts for more than two seconds a “weak battery” alarm shall be initiated.
 - g. When required by National Electrical Code, the Control System shall include a ground fault monitoring relay. The relay shall be adjustable from 3.8-1200 amps and include adjustable time delay of 0-10.0 seconds. The relay shall be for indication only, and not trip or shut down the generator set. Note bonding and grounding requirements for the generator set and provide relay that will function correctly in system as installed.
 - h. Provide relay and auxiliary dry contract for remote generator failure alarm.
 - i. Provide relay and auxiliary dry contact for remote generator run status.
 - j. Provide relay and auxiliary dry contact normally closed when generator is running and normally open when generator shuts down for ventilation system of the weather-proof enclosure.
- E. Auxiliary Equipment:
- 1. Starting Battery: One (1) battery shall be supplied for each engine (12VDC control system) and shall be mounted in a battery rack within the engine-generator set skid base. Batteries shall be 12 Volt, heavy duty, lead-acid type. Batteries to be manufactured by Interstate Model 31-MHD threaded lug type with 950 CCA or District approved equal shall be supplied for each generator set with battery cables and connectors.
 - 2. Battery Charger(s): A voltage regulated battery charger shall be provided for each engine-generator set. Chargers shall be equipped with float, taper, and equalize charge settings. Battery charger shall be SENS model NRG 22-10-RC, 10 Ampere, 12 Volt or Owner-approved equal.
 - 3. Coolant Heater
 - a. A coolant heater, rated for 120 Volts, 1500 Watts shall be provided as recommended by the manufacturer. The Owner shall provide power requirements including circuit breaker, conduit, wiring, plug, etc. necessary to operate the heater.
 - 4. Emergency Stop remote push button control station: Shall be 40mm in size, red mushroom head, maintain type: push to open and pull to engage. Shall be installed in a pad-lockable NEMA 4X enclosure and to be located on the outside of the weather-protected enclosure and readily accessible.
- F. Outdoor Weather-Protective Enclosure
- 1. Generator set housing shall be provided factory-assembled to generator set base and radiator cowling. Housing shall provide ample airflow for generator set

operation at rated load in the ambient conditions previously specified. The housing shall have hinged side-access doors and rear control door. All doors shall be lockable. All sheet-metal shall be primed for corrosion protection and finish painted with the manufacturers standard color using a two-step electro-coating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating which meets the following requirements:

- i. Primer thickness, 0.5-2.0 mils. Top-coat thickness, 0.8-1.2 mils.
 - ii. Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.
 - iii. Crosshatch adhesion, per ASTM D3359-93, 4B-5B.
 - iv. Impact resistance, per ASTM D2794-93, 120-160 inch-pounds.
 - v. Salt Spray, per ASTM B117-90, 1000+hours
 - vi. Humidity, per ASTM D2247-92, 1000+ hours
 - vii. Water Soak, per ASTM D2247-92, 1000+ hours
- b. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant and designed to minimize marring of the painted surface when removed for normal installation or service work.
 - c. Sound-attenuation enclosure shall reduce sound levels as follows:

<u>Manufacturer</u>	Sound Level Requirements		
	Sound Pressure Levels dBA at Full Load		
	<u>1M</u>	<u>7M</u>	<u>15M</u>
Cummins	88	71	65

- d. Provide a complete and assembled Quiet Site II, Level 2, sound attenuated outdoor weather-protective engine generator unit for mounting on an existing concrete pad.
- e. All equipment located and supplied within the enclosure shall be pre-wired by the generator manufacturer except for the battery charger and block heater which shall be wired in the field by the owner.
- f. The enclosure shall have vibration isolation and shall be bolted to an outside concrete pad.
- g. Enclosures shall be provided with motorized dampers for the exhaust and intake louvers to prevent the infiltration of ambient air when not in operation.
- h. Exhaust piping outlet shall exit the enclosure either via the top of the unit or the side of the unit. Coordinate discharge location with Owner for final approval.
- i. Provide final field testing of sound levels as specified.

2.2 AUTOMATIC TRANSFER SWITCH

A. General:

- 1. The enclosure shall be a wall-mounted, NEMA 1 enclosure. There shall be no side clips around the front or sides of the entire enclosure.
- 2. ATS enclosure shall not exceed 30-inches in width.

3. Transfer switch shall be a minimum of 300 ampere, 3 pole, 480 volts, 3 phase, 60 HZ.
4. The transfer switch shall have a key lockable handle installed on the front door.
5. Transfer switch shall be rated to carry 100 percent of their rated current continuously when in an enclosure. Transfer switch which must be de-rated when installed in an enclosure (due to integral overcurrent devices or any other reasons) do not meet this specification. Transfer switch shall be rated for continuous operation in ambient temperatures of -40°C (-40°F) to 67°C (142°F).
6. All transfer switches shall be U.L. Listed per Standard 1008. All transfer switches shall be suitable for use on emergency and legally required standby systems in accordance with ANSI-C1 and NFPA-99, rated for total system load. These loads shall include motors, electric discharge lamps, resistive loads, and tungsten lamps as described in Section 1 of U.L. 1008 Standard.
7. Withstand and Closing Ratings
 - a. The automatic transfer switch shall be rated to close on and withstand the available RMS symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans.
 - b. The ATS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1½ and 3 cycle, long-time ratings. ATSs which are not tested and labeled with 1½ and 3 cycle (any breaker) ratings and have series, or specific breaker ratings only, are not acceptable.
 - c. Where the line side overcurrent protection is provided by circuit breakers at 480 volts AC or less, the short circuit WCR shall be as follows:

TRANSFER SWITCH CONTINUOUS CURRENT RATINGS	K & J/L* FUSES	WITHSTAND AND CLOSING RATINGS
40A, 70A, 100A	125A/200A*	14,000A RMS
150A, 260A	400A/600A*	30,000A RMS
400A, 600A	1200A/1200A*	65,000A RMS
800A, 1000A	2000A/2000A*	65,000A RMS

* Class J and L Fuses WCR = 200,000A RMS

8. Transfer switches with in-phase monitoring for switching between sources are not acceptable and do not meet this specification.
- B. Construction:**
1. Transfer switch shall be a programmed delayed transition switch with center "off" position operation, double-throw construction. Switch shall be positively electrically and mechanically interlocked by a mechanical beam to prevent simultaneous closing (for break before make operation), and mechanically held in both normal and emergency positions. The transfer switch shall move to a neutral position before transferring to the Normal or Emergency position.
 - a. Transfer switch shall be quick-break, quick-make operation so that the speed of opening and closing is not controlled by an operator during manual operation. Transfer switch shall provide a center "Programmed Transition Off" position for manual switching.

- b. Transfer switch shall be approved for manual operation under full load by integral mounted, permanently attached, high dielectric, manual operating handles. Manual operating handles, which are normally stored and must be installed for manual operation, do not meet this specification.
- c. The electrical operating means shall be a direct-acting, constant force in both directions, bi-directional linear induction motor to provide minimum friction, straight-line switch action. Motor shall be attached directly to the switching mechanism without the use of gears, cams, or other complex mechanical linkage methods.
- d. Transfer switch shall not contain any integral overcurrent devices in the main power circuit, including molded case circuit breakers or fuses.
- e. The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching.
- f. Manual operating handles and controls (other than key- operated switches) shall be accessible to authorized personnel only by opening the key locking cabinet door. Transfer switches located on the outside of the cabinet do not meet this specification.
- g. Maximum transfer time in either direction shall be six (6) cycles, except where the "Programmed Transition" feature is furnished.
- h. All transfer switches shall have transparent protective covers to protect operating personnel during manual operation, and to allow an operator to visually determine that the main contacts are "Open" or "Closed".
- i. The main switch contacts shall be of the no maintenance type and high-pressure silver cadmium oxide to resist burning and pitting for long life operation. All switches shall have arc chutes of heat absorbing material and metal leaves for positive extinguishing of arcs quickly and effectively; arc chutes shall have insulating covers to prevent interphase flashover.
- j. Transfer switch shall have one (1) S.P.D.T. (Single Pole Double Throw), 480 volts auxiliary switch on both the normal and emergency-sides, operated by the transfer switch. These auxiliary switches shall be factory wired to an easy access terminal block and may be used to monitor transfer switch position for controlling indicator lamps or other peripheral equipment.
- k. Complete AL-CU (Aluminum-Copper) lugs, U.L. listed and CSA certified, shall be provided for both normal and emergency load positions. For 150A and larger transfer switches, top or bottom feed for load connections shall be provided for slimmer design, requiring less wall space. Load connections shall be field changeable either from top-to-bottom or bottom-to-top. Wiring space at normal, emergency, and load lugs inside the transfer switch cabinet shall comply with 2011 NEC Table 312.6(b). Full rated neutral bar with lugs for normal, emergency, and load neutral conductors shall be provided inside the cabinet.
- l. Relay, with 2 N.O. and 2 N.C. contacts that is energized whenever the normal source is available regardless of switch position.

- m. Relay with 2 N.O. and 2 N.C. contacts that is energized whenever the emergency source is available regardless of switch position.
- C. Transfer Switch Control (Level II):
- 1. CONTROL PANEL
 - a. Each transfer switch shall be provided with an operator interface terminal control panel to allow the operator to view the status and control operation of the transfer switch. The operator panel shall be a sealed membrane panel that is permanently labeled for switch and control functions. The operator panel shall be provided with the following features and capabilities:
 - i. High intensity LED lamps to indicate the source that the load is connected to (Source 1 or Source 2); and which source(s) are available. Source available LED indicators shall operate from the control microprocessor to indicate the true condition of the sources as sensed by the control.
 - ii. High intensity LED lamps to indicate that the transfer switch is “not in auto” (due to control being disabled or due to bypass switch {when used} enabled or in operation) and “Test/Exercise Active” to indicate that the control system is testing or exercising the generator set.
 - iii. “OVERRIDE” pushbutton to cause the transfer switch to bypass any active time delays for start, transfer, and retransfer and immediately proceed with its next logical operation.
 - iv. “TEST” pushbutton to initiate a preprogrammed test sequence for the generator set and transfer switch. The transfer switch shall be programmable for test with load or test without load.
 - v. “RESET/LAMP TEST” pushbutton that will clear any faults present in the control, or simultaneously test all lamps on the panel by lighting them.
 - vi. The control system shall continuously log information on the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. This information shall be available via a PC-based service tool or an operator display panel.
 - vii. Security Key Switch to allow the user to inhibit adjustments, manual operation or testing of the transfer switch unless key is in place and operated.
 - viii. Vacuum fluorescent alphanumeric display panel with pushbutton navigation switches. The display shall be clearly visible in both bright (sunlight) and no light conditions. It shall be visible over an angle of at least 120 degrees. The alphanumeric display panel shall be capable of providing the following functions and capabilities.
 - 2. CONTROL PANEL DISPLAY REQUIREMENTS
 - a. Display source condition information, including AC voltage for each phase of normal and emergency source, and frequency of each source.

- Voltage for all three phases shall be displayed on a single screen for easy viewing of voltage balance.
- b. Display source status, to indicate source is connected or not connected.
 - c. Display load data, including 3-phase AC voltage, frequency, kW, kVA, and power factor. Voltage data for all phases shall be displayed on a single screen.
 - d. The display panel shall allow the operator to view and make the following adjustments in the control system, after entering an access code:
 - i. Set nominal voltage and frequency for the transfer switch.
 - ii. Adjust voltage and frequency sensor operation set points.
 - iii. Set up time clock functions.
 - iv. Set up load sequence functions.
 - v. Enable or disable control functions in the transfer switch, including program transition.
 - vi. Set up exercise and load test operation conditions, as well as normal system time delays for transfer time, time delay start, stop, transfer, and retransfer.
 - e. Display Real Time Clock data, including date, and time in hours, minutes, and seconds. The real time clock shall incorporate provisions for automatic daylight savings time and leap year adjustments. The control shall also log total operating hours for the control system.
 - f. Display service history for the transfer switch. Display source- connected hours, to indicate the total number of hours connected to each source. Display number of times transferred, and total number of times each source has failed.
 - g. Display information for other transfer switches in the system, including transfer switch name, real time load in kW on the transfer switch, current source condition, and current operating mode.
 - h. Display fault history on the transfer switch, including condition, and date and time of fault. Faults to include controller checksum error, low controller DC voltage, ATS fail to close on transfer, ATS fail to close on retransfer, battery charger malfunction, network battery voltage low, network communications error.
3. INTERNAL CONTROL REQUIREMENTS:
- a. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600VAC. Provide RMS voltage sensing and metering that is accurate to within plus or minus 1% of nominal voltage level. Frequency sensing shall be accurate to within + 0.2%. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.
 - b. Transfer switch voltage sensors shall be close differential type, providing source availability information to the control system based on the following functions:
 - i. Monitoring all phases of the normal service (Source 1) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of

- the normal voltage level and dropout in a range of 75 to 98% of normal voltage level.
- ii. Monitoring all phases of the emergency service (Source 2) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of pickup voltage level).
 - iii. Monitoring all phases of the normal service (Source 1) and emergency service (Source2) for voltage imbalance.
 - iv. Monitoring all phases of the normal service (Source 1) and emergency service (Source 2) for loss of a single phase.
 - v. Monitoring all phases of the normal service (Source 1) and emergency service (Source 2) for phase rotation.
 - vi. Monitoring all phases of the normal service (Source 1) and emergency service (Source 2) for over voltage conditions (adjustable for dropout over a range of 105 to 135% of normal voltage, and pickup at 95-99% of dropout voltage level).
 - vii. Monitoring all phases of the normal service (Source 1) and emergency service (Source 2) for over or under frequency conditions.
- c. All transfer switch sensing shall be configurable from a Windows PC-based service tool, to allow setting of levels, and enabling or disabling of features and functions. Selected functions including voltage sensing levels and time delays shall be configurable using the operator panel. Designs utilizing DIP switches or other electromechanical devices are not acceptable. The transfer control shall incorporate a series of diagnostic LED lamps.
 - d. The transfer switch shall be configurable to control the operation time from source to source (program transition operation). The control system shall be capable of enabling or disabling this feature, and adjusting the time period to a specific value. A phase band monitor or similar device is not an acceptable alternate for this feature.
 - e. Controls:
 - i. Controls shall signal the emergency power system to start upon signal from normal source voltage sensors. Solid-state adjustable time delay (0-90 sec) start shall avoid nuisance engine-generator set start-ups on momentary voltage dips or interruptions.
 - ii. The transfer switch shall transfer the load to the emergency power system after the engine-generator set reaches proper voltage and frequency and has stabilized.
 - iii. The transfer switch shall control the engine-generator set to allow the set to start and transfer the load within 10 seconds (adjustable from 2 to 120 sec) after a normal source power failure. It shall be the responsibility of the transfer switch supplier to meet this requirement.
 - iv. The transfer switch shall retransfer the load to the normal source after normal source power is restored, allowing normal source to

- stabilize before retransfer and shall allow staggered retransfer of loads in multiple transfer switch systems. Retransfer time delay shall be adjustable from 0-30 min.
- v. The controls shall signal the engine-generator set(s) to stop after load retransfer to the normal source, but shall maintain the availability of the emergency source in the event that the normal source fails shortly after retransfer. The controls shall allow the engine-generator set(s), to run unloaded for a cool down period prior to shut down (adjustable from 0 to 10 min).
 - vi. The controls shall provide an automatic retransfer of the load from the emergency source to the normal source if the emergency source fails when the normal source is available.
 - vii. The transfer switch operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred.
 - viii. Controls shall provide built-in "Control Mode Status" indicators, mounted on the interior of the enclosure, consisting of L.E.D.s (Light Emitting Diodes) to indicate a sequence of functions such as the following:
 - (1) Source 1 OK
 - (2) 2-Wire Run
 - (3) Source 2 Ok
 - (4) Timing for Transfer
 - (5) Transfer Command
 - (6) Timing for Retransfer
 - (7) Retransfer Command
 - (8) Timing for Stop
 - ix. The indicators shall allow the operator to determine that the controls are properly sequencing and shall assist in determining the sequence of any malfunctions that might occur.
 - x. The control system shall be designed, and prototype tested for operation in ambient temperatures from -40°C to $+70^{\circ}\text{C}$. It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.
 - xi. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.
4. CONTROL INTERFACE:
- a. The transfer switch will provide an isolated relay contact for starting a generator set. The relay shall be normally held open, and close to start the generator set. Output contacts shall be form C, for compatibility with any generator set.
 - b. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 Amps, 250 VAC.

PART 3 - EXECUTION

3.1 INSTALLATION – BY OWNER

- A. Installation shall be made in complete accordance with manufacturer's recommendations.
- B. Install unit on concrete base and bolt to the base with stainless steel hardware at all locations. Also allow base to provide for servicing access and oil pan removal.
- C. Flexible connections shall be used on all connections to unit.
- D. Fill the engine cooling system with a percentage of solution of ethylene glycol and water as required by the manufacturer.
- E. Support muffler so that its weight is not supported by the engine. Exhaust pipe sizing shall be as required to maintain exhaust backpressure within the limits established by the generator set manufacturer.
- F. Bond steel base, generator and engine frames and all equipment enclosures.
- G. Set all required parameters for the Automatic Transfer Switch (to be performed by system supplier). All parameters for the transfer switch are required to be set up for proper operation when interfacing with the utility company and emergency power. Refer to document below for set up requirements. Set-up and configuration shall be submitted to the engineer with test data for record purposes.

3.2 FIELD TESTS AFTER INSTALLATION – BY MANUFACTURER

- A. The complete installation shall be initially started and checked out for operational compliance by factory-trained representative(s) of the engine-generator set manufacturer. The engine lubrication oil as recommended by the manufacturer for operation under environmental conditions specified, shall be provided by the engine-generator set supplier.
- B. Upon completion of initial start-up and system checkout, the supplier of the system shall perform a field test in the presence of the Engineer and Owner's operating personnel to demonstrate load carrying capability and voltage and frequency stability.
- C. The Owner shall bear costs for fuel for the generator before startup and after successful testing and acceptance by the Engineer, water for pumps, and complete electrical system operating and functional in order to verify that generator will start the connected loads in the order specified.
- D. 100% Load shall consist of resistive load bank. Unity power factor is suitable for on-site testing, provided that rated load tests at power factor have been performed by the manufacturer prior to shipment.
 - 1. Records shall be maintained throughout the tests consisting of:
 - a. Time-of-day
 - b. Coolant temperature
 - c. Cranking time until prime mover starts and runs
 - d. Time required to come up to operating speed, voltage and frequency overshoot
 - e. Time required to achieve steady-state condition with all switches transferred to the emergency position
 - f. Voltage
 - g. Frequency
 - h. Current
 - i. Oil pressure
 - j. Ambient air temperature

- k. Kilowatts
 - l. Power factor
 - m. Battery charger rate at 5-minute intervals for the first 15 minutes
2. Data shall be recorded at 15-minute intervals throughout the test.
 3. Continue this load test for 2 hours minimum per NFPA 110, (up to a max of 3 hours, if requested by the Owner or Engineer) observing and recording load changes and the resultant effect on voltage and frequency.
 4. Return normal power, record the time delay on retransfer for each switch (set for 15 minutes minimum) and the time delay on prime mover cooldown period and shutdown.
 5. Perform a building load test with the actual conditions of the load. Coordinate with Owner and Engineer to set up time and conditions of testing.
 6. The manufacturer's representative shall test and verify all protective functions of the generator control by accessing the control system through the use of a laptop computer and simulating failure modes or fault conditions.
 7. During or after the tests, the Owner's operating personnel shall be fully instructed by the factory-trained representative in the operation and maintenance of this equipment.
 8. Perform and test sound level values based on conditions set forth in the specifications and as required by each local jurisdiction where applicable.
 9. Provide standby power system resistive load bank test results and building load test results for site. The forms provided at the end of this specification shall be completed for each site.
 10. Provide three eight-hour days of manufacturer's authorized representative on site to conduct load bank testing, building load testing, and operator training.

3.3 SERVICE MANUALS AND PARTS BOOKS

- A. The system manufacturer's authorized local dealer shall furnish 3 complete hard copies each of the manuals for the generator (one complete set) and books listed below to be kept inside the enclosure and two sets for the Owner's files. The manufacturer shall also provide one PDF each of the manuals, instructions, lists, procedures, charts, wire diagrams, and schematics on them.
 1. OPERATING INSTRUCTIONS - with description and illustration of all switchgear controls and indicators; and engine and generator controls and indicators.
 2. PARTS - Illustrates and list all assemblies, subassemblies and components, except standard fastening hardware (nuts, bolts, washers, etc.).
 3. PREVENTATIVE MAINTENANCE INSTRUCTIONS - on the complete system that cover daily, weekly, monthly, biannual, and annual maintenance requirements and include a complete lubrication chart.
 4. ROUTINE TEST PROCEDURES - for all electronic and electrical circuits and for the main AC generator.
 5. TROUBLESHOOTING CHART - covering the complete Genset showing description of trouble, probable cause, and suggested remedy.
 6. RECOMMENDED SPARE PARTS LIST - showing all consumables anticipated to be required during routine maintenance and test.

7. WIRING DIAGRAMS AND SCHEMATICS - showing function of all electrical components, corrected as required showing as-built conditions.

STANDBY POWER SYSTEM - RESISTIVE LOAD BANK TEST

Owner: _____ Date: _____

Project: _____

Equipment
Manufacturer: _____

Equipment: _____

This certifies that the entire equipment/system has met the RESISTIVE LOAD BANK TESTING requirements of Section 16620 and all other applicable requirements of the contract documents.

(Authorized Representative of the Manufacturer)

(Date)

(Owner)

(Date)

STANDBY POWER SYSTEM - BUILDING LOAD TESTS

Owner: _____ Date: _____

Project: _____

Equipment
Manufacturer: _____

Equipment: _____

TEST #1

TEST #2

TEST #3

This certifies that the entire equipment/system has met the BUILDING LOAD TESTING requirements of Section 16620 and all other applicable requirements of the contract documents.

(Authorized Representative of the Manufacturer)

(Date)

(Owner)

(Date)

STANDBY POWER SYSTEM
AUTOMATIC TRANSFER SWITCH SET-UP AND CONFIGURATION

Date: _____

Project: _____

Equipment Manufacturer: _____

Automatic Transfer Switch Model: _____

PARAMETERS

Parameter Description	Recommended Setting	Actual Setting
Time delay to override momentary normal source outages	* 5 Seconds	
Adjustable time delay on retransfer to normal from emergency	*5 Minutes	
Time delay to stop emergency power upon re-transfer to normal source (generator cool down)	5 Minutes	
Time delay on transfer to emergency	*5 Seconds	

* *Field coordinate time setting to obtain proper operation of equipment*

Remarks: _____

This certifies that the Automatic Transfer Switch has been set up and configured as required to operate according to Section 16620.

(Authorized Representative of the Manufacturer)

(Date)

(Owner)

(Date)

END OF SECTION

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